**Supplementary 2.** Key cellular events that can induce or repress transcription factors, enzymes, kinases, permeases, transporters, and pumps in *C. neoformans*. Some of these genes encode putative homologues/orthologues transcription factors of mammalian cells and fungi, such as the species of *Saccharomyces, Magnaporthe, Aspergillus, Neurospora*, and *Candida*.

| **Cellular events** | ***Transcription factors* and protein kinases** | | **Among the activated signalling pathways/metabolisms** |
| --- | --- | --- | --- |
| **Induced** | **Repressed** |
| Growth at 39oC | *Ada2, Apn2, Aro80, Atf1, Cdc24, Cdc42, Cdc43, Ert1, Fzc31, Gat6, Grx4, Hap1, Mbs2, Miz1, Sp1, Rac1, Ras1, Sre1, Usv101,* Bck1, Kcs1, Kic1, Pos5, Swe102, Vrk1 | *Aox1, Fzc46,* *Gat1, Mcm1, Mln1* | ***Mpk signalling pathway:***  Ipc1/Pdk1🡪Pck1🡪Bck1(MAPKKK)🡪Mkk2(MAPKK)🡪 Mpk1(MAPK)  ***Hog-independent activation of response kinase:***  Tco1/Tco2🡪↓Ypd1🡪↓Ssk1🡪Skn7  ***Cdc24-dependent Ras signalling pathway:*** Ras1🡪Cdc24🡪Cdc42🡪Ste20 |
| Growth at 37oC | *Acc1, Acs1, Afr1, Arf2, Arg3, Arg8, Bna5, Bna6, Ccr4, Cdc3, Cdc10, Cdc11, Cdc12, Cdc24, Cdc42, Cdc43, Cdc420, Chl1, Clc1, Cpa1, Drp1, Dur3, Fas1, Glt1, Grx4, Hsp78, Hsp104, Hxl1, Icl1, Kar2, Kre5, Kre6, Kre61, Leu1, Lys2, Mga1, Mga2, Nmt1, Ole1, Plr1, Pma1, Pgi1, Pps1, Pro2, Rac1, Ras1, Rds1, Rim15, Rpl1, Rpl30, Rpl36a, Rpl37b, Rpl41, Rps12, Skn1, Slg1, Smg1, Sod2, Sit1, Ssn801, Tao3, Tef1, Thr4, Tps1, Tps2, Tsa1, Tsa3,* Cbk1, Cdk8, Ire1, Kcs1, Snf1 | *Aox1, Gat1, Fhb1, Ilv2, Ilv5, Liv3, Lys2, Mdr1, Ndh1, Opt1, Pan6, Pak1, Pka2, Pkr1, Qsp1, Rpl22, Spe3-Lys9, Ura2* | ***Cdc24-dependent Ras signalling pathway:*** Ras1🡪Cdc24🡪Cdc42🡪Ste20  ***Cdc24-independent Ras signalling pathway:***  Ras1🡪Rac1-GTP🡪Ste20  ***Mpk signalling pathway:***  Ipc1/Pdk1🡪Pck1🡪Bck1🡪Mkk2🡪Mpk1 |
| Growth between 25 – 39oC | *Ags1, Bzp2, Can2, Cas35, Cbp1, Cch1, Ccn1, Ccr4, Cdc24, Cdc7,* *Chs3, Cir1, Cna1, Cnb1, Cpa1, Cps1, Csr2, Cts1, Cuf1, Eca1, Fzc6, Gat5, Gcs1, Ilv2, Liv4, Lrg1, Met6, Mga2, Mpf3, Nrg1, Pmt4, Ppg1, Puf4, Ras1, Rom2, Sav1, Tps1, Tps2, Trx2, Tsa1, Tup1, Ugd1, Uge1, Ugt1, Ura5, Vph1, Vps34, Vps41,* Bud32, Bck1, Cbk1, Hog1, Ipk1, Kic1,Mec1, Mkk2, Mob2, Mpk1, Pbs2, Ste20, Yck2, Ypk1 | *Gat1, Pbp1, Rho11* | ***Cdc24-dependent*** ***Ras signalling pathway:*** Ras1🡪Cdc24🡪Cdc42🡪Ste20  ***Cdc24-independent Ras signalling pathway:***  Ras1🡪Rac1-GTP🡪Ste20  ***Mpk signalling pathway:***  Ipc1/Pdk1🡪Pck1🡪Bck1🡪Mkk2🡪Mpk1 |
| Growth between 25 – 30oC | *Aox1, Fhb1, Hlh3, Hob1, Ilv2, Ilv5, Kre5, Kre6, Kre61, Liv3, Fbp26, Ino1/Myo1, Ras1, Rpl18, Rps26, Skn1, Spe3-Lys9,* Pck1, Pos5 | *Rho11* | ***Mpk signalling pathway:***  Ipc1/Pdk1🡪Pck1🡪Bck1🡪Mkk2🡪Mpk1 |
| Growth between 20 – 24oC | *Gpp2, Tps1* | *Ras1, Rho11* | ***Glycerol and trehalose biosynthesis via Sln1- or Cdc24-dependent Hog1 activation:***  (Sln1🡪Ypd1🡪Ssk1🡪Ssk2/Ssk22) or (Cdc42/Sho1🡪Ste20🡪Ste50🡪 Ste11)🡪Pbs2🡪Hog1🡪Hot1🡪Gpd1 (glycerol) or Msn2/4🡪Tps1 (trehalose) |
| CSF survival at 37oC | *Ckb1, Cps1, Csn1201, Ena1, Hrd1, Nsr1, Pgi1, Pik1, Pxa2, Rub1, Sre1, Swe1, Vam6, Vps25* | *Sit1* | ***Recruiting ubiquitin E2 to SCF E3 ligase for effective proteasomal targeting of proteins:***  ***►***Neddylation pathway  ►Phosphatidylinositol signalling pathway  ►PI3K signalling  ►Autophagy vesicles in response to starvation  ►Tsc1/Tsc2 Tor-like signalling pathway |
| Heat-stress (heat-stress proteins, Hsp) | *Cdc24, Cdc42, Erg, Gre2, Hsp10, Hsp12, Hsp60, Hsp70, Hsp90, Hsp122, Lhp1, Puf4, Ras1, Sks2* | Pka1, Pkr1 | ***Cna1/Cnb1 signalling pathway:***  [Ca2+]↑🡪Cam1🡪Cna1-Cnb1🡪Rcn2, Crz1🡪Rcn2, Yap1, Slm1, Slm2, Hph1  ***Cdc24-dependent Ras signalling pathway:*** Ras1🡪Cdc24🡪Cdc42🡪Ste20 |
| Colony morphology | *Afr1, Cap60, Cps1, Gcs1, Ndh1, Pcl12, Pgi1, Sog2, Smt1, Tao3,* Cbk1, Kcs1 |  | ***Ram signalling pathway:***  Hym1-Sog2-Kic1-Tao3­🡪Cbk1-Mob2🡪Ace2 |
| Capsule formation | *Aca1, Ada2, Ags1, Alg3/Cmt1, Arf1, Bzp4, Cac1, Cap10, Cap59, Cap60, Cap64, Cas1, Cas34, Cas35, Cir1, Clc-A, Clr2, Clr4, Clr5, Cpl1, Cpr****a****, Cps1, Cxt1, Drp1, Ecm2201, Fap1, Fhl1, Fzc16, Fzc33, Fzc34, Fzc45, Fzc47m, Gat1, Gat201, Gat204, Gcn5, Gmt1, Gpa1, Gpr4, Grasp, Grx4, Hap3, Hap5, Hob3, Hob4, Hob5, Hos2, Hsf2, Ilv2, Kre61, Liv1, Liv3, Lrg1, Man1, May1, Mbs1, Mcm1, Met6, Nrg1, Pgi1, Pbx1, Pbx2, Ppg1, Ptp2, Rds2, Rim101, Set302, Swi6, Ugd1, Uxs1, Vph1, Yap1, Zap104, Zfc4,* Kic1, Pka1, Pkc1, Gsk3, DSte12, Ste20 | *Atf1, Bzp3, Cep3, Chs3, Clr1, Clr3, Clr6, Crg1, Csr2, Cuf1, Ena1, Fbp1, Fkh101, Fkh2, Fzc1, Fzc14, Fzc17, Fzc18, Fzc24, Fzc29, Fzc3, Fzc30, Fzc36, Fzc46, Fzc49, Fzc51, Hap1, Hcm1, Hlh3, Hlh4, Hob7, Hog1, Hxt1, Jjj1, Liv3, Mgt2, Mln1, Ndh1, Nha1, Opt1, Ova1, Ova2, Pde1, Pde2, Pdr802, Plr1, Pph3, Puf4, Qsp1, Rom2, Rom20, Rom21, Rub1, Set3, Sre1, Ssa1, Ssd1, Ssn8, Tao3, Tup1, Uge1, Ugt1, Usv101, Zfc3,* Bck1, Cbk1, Hog1, Ipk1, Irk5, Kcs1, Mkk2, Pbs2, Pik1, Pka2, Pkr1, Sch9, Skn7, Ssk2, Ste12 | ***cAMP/Pka signalling pathway:***  Gpa1🡪Cac1:Aca1🡪cAMP🡪Pkr1🡪Pka🡪Nrg1 |
| Melanin formation | *Aca1, Ada2, Atx1, Bab4, Bik1, Bzp4, Cac1, Ccc2, Cdc2801, Cho2, Chs3, Cir1, Clc1/Clc-A, Csn1, Csn4, Csn7, Csn1201, Csr2, Cuf1, Doa4, Drp1, Ert1, Ess1, Fhl1, Fzc6, Fzc8, Fzc25, Gpa1, Gpp2, Grx4, Hap5, Hob1, Hos2, Hse102, Lac1, Lac2, Mbf1, Mbp102, Mbs1, Mbs2, Met3, Mgt2, Mln1, Mln2, Mln3, Mln4, Mlr1, Nhp6b01, Nhp6b02, Nup75, Opt1, Pan1, Pgi1, Ppg1, Prb1, Ptp1, Ptp2, Qsp1, Rim20, Rim101, Rps3102, Rtf1, Rub1, Scp1, Set101, Set202, Set302, Sod1, Snf5, Sre1, Ssa1, Ssn801, Stp1, Tao3, Tup1, Ubp14, Usv101, Vad1, Vam6, Vph1, Vps25, Vps34, Yck2, Zap104,* Bck1, Bud32, Cbk1, Cka1, Gsk3, Ipk1, Irk5, Kcs1, Kic1, Mkk2, Pka1, Pka2, Pkc1, Snf102, DSte12 | *Atf1, Bck1, Bzp3, Crg1, Cxd1, Cxd2, Cxd3, Ena1, Fbp1, Fkh2, Fcz1, Fzc31, Gat1, Gat201, Grasp, Hlh1, Hlh2, Hog1, Liv3, Lrg1, May1, Mpr1, Ndh1, Nha1, Nrg1, Ova1, Ova2, Pep4, Pph3, Prc1, Puf4, Rco1, Rds2, Rom2, Rom20, Rom21, Scx1, Sip4, Sip401, Sit1, Ssd1, Ssn8, Sxi1, Yap1, Zfc4,* Tco1, Hog1, Pbs2, Pik1, Pkr1, Skn7, Ssk2, Ste12 | ***cAMP/Pka signalling pathway:***  Gpa1🡪Cac1:Aca1🡪cAMP🡪Pkr1🡪Pka🡪Nrg1  ***Inositol-phosphorylceramide synthase/Pkc cascade:***  Ipc1🡪Pkc1🡪Lac1 |
| General virulence and infection | *Aca1, Acs1, ‡Ada2, Afr1, Ags1, Aox1, Aph1, App1, Aro80, Atf1, Atg8, Bwc1, Bwc2, Cac1, Cap10, Cap59, Cap60, Cap64, Cas1, Cas35, Cbp1, Ccr4, Cch1, Cdc24, Cep3, Cft1, Cir1, Clc-A, Clr1, Cna1, Cnb1, Cpa1, Cpa2, Cpr****a****, Cps1, Crz1, Cts1, Cul3, Cuf1, Cxt1, Ddt1, Eca1, Ena1, Ena2, Ess1, Fbp1, Fhb1, Fkbp12, Fyv10, Fzc1, Fzc2, Fzc5, Fzc9, Fzc11, Fzc22, Fzc26, Fzc30, Fzc31, Fzc37, Fzc39, Fzc42, Fzc43, Fzc47, Fzc50, Gat5, Gat201, Gat204, Gcs1, Glr1, Gpa1, Grasp, Grx4, Hcm1, Hira, Hos4, Hob1, Hob5, ‡Hlh1, Hrd1, Hsf3, Hsp12, Hsp90, Hst3, Hst302, Hsv2, Hxl1, Ilv2, Isc1, Jjj1, Lac1, Lac2, Liv1 - 15, Man1, Mal13, Met3, Met6, Met32, Mbs2, Mgt2, Mln1, Mpf3, Nrg1, Pan1, Pbp1, Pbx1, Pbx2, Pdr802, Plb1, Pmt4, Ptp1, Ptp2, Puf4, Ras1, Rmd5, Rom2, Rpd304, Rph1, Rub1, Sas3, Scp1, Sks2, Snt1, Sod1, Sod2, Spe3/Lys9, Spp101, Sre1, Ssa1, Ssn8, Stp1, Tco1, Top1, Tps1, Trx1, Tsa1, Vad1, Vph1, Vps34, Vps41, Uba4, Ubc8, Ugd1, Uge1, Ugt1, Ure1, Ure2, Uxs1, ‡Yap1, Yku80, Zap104, Zfc2,* Cdk8, Hog1, Hrk1, Ire1, Kcs1, Kin1, Mpk1, Pak1, Pbs2, Pck1, Pik1,Pka1, Sch9, Skn7, DSte12, Ste20 | *Bni4, Bzp2, Crg1, Ert1, Fkh2, Fzc6, Fzc17, Fzc18, Fzc19, Fzc24, Fzc38, Fzc40, Gat1, Gat6, Gat203, Grf1, Hcm101, Hel2, Hob3, Hva1, Liv16, Lsb1, Mat2, Nrg1, Pip201, Pkr1, Rgd1, Rho104, ‡Rum1, Sit1, ‡Sre1, Ste50, ‡Usv101, Yap4, Yox101, Zap103, Zfc1, Zfc4, Zfc7, Znf2,* Ksp1,Rck2, Ste12 | ***Virulence expression pathways:***  ►Capsule formation  ►Melanin formation  ►Hydrolytic and proteases  ►Ureases  ►Phospholipases  ►Metabolic enzymes |
| Metabolic regulatory genes involved in infections | *Acd1, Acd2, Acd3, Aco1, Acs1, Ade4, Adh1, ▲Agx1, Aldh, Ard1, Arg3, Arh1, ▲Aro4, ▲Aro40, Atg26, Ayr10, Ayr13, Bat1, 10, Bdh1, Bdh10, Bud23, ▲Car2, Car20, Ccc2, Cgl1, Cnh1, ▲Cyb20, Cyb21, Cyb50, Cys4, Cwc24, Dcr1, Dog1, Dug3, ▲Dus3, Ech1, Eci1, Ena5, Ena50, Ena52, Eor2, Erg13, Faa1, Faa2, Faa20, ▲Fcy1, Fmp52, Fox2, For1, ▲Fur10, Gal1, Gat1, Gcn5, Gdf1, Gdf3, Gfa1, Glh3, Glh5, Gln1, ▲Glt1, Gpd1, Grx4, Had1, Had2, Hem14, His4, His5, His7, Hnt1, Hxk2, Icl1, Idh1, ▲Ilv3, Imd2, Kgd1, 2, Kpr1, ▲Lcb21, Leu2, Leu9, Lpe1, Lys2, ▲Lys4, Lys21, ▲Lys40, ▲Lys41, ▲Lys42, Mae1, Mae10, Mae11, Med12, Med13, ▲Met5, Met10, Mls1, Mtd1, ▲Nat6, Nat63, Nat64, Nep1, 4, Nfs1, Nmr1, 3, Nor5, Nor6, Nor7, Nor9, Nth1, Ogg1, Osh1/Swh1, Oye2, Pbr, Pdc1, Pfk, Pho13, Plb1, ▲Pnc1, Pot1, Pox1, ▲Sca1, Scd1, Scd2, Scd4, Scd7, Scd10, Sdh1, Sdh2, Ser3, Sdh3, Sir2, Smm1, Sor1, Spo14, Srebp, Ssn8, Ssn801, ▲Tad2, Tmt1, Tmt2, ▲Trp1, Trp2, ▲Ubq1, Uga1, Uga2, Ugp1, ▲Ura2, Ura20, Ura24, Xfp1, ▲Zta10, Zta11,* Kcs1, Cdk8, Hom3*,* Pck1, Pfk1, Yef1, 10 | *Acs1, Ade5.7, Adh5, Adh21, ▼Adh50, Ams1, ▼Amt1, Aos1, Ard1, Aro7, Bio2, Bna5, Cbd1, ▼Cbd2, Cha1, Cha10, ▼Cps1, Cps10, Css1, Cys40, Dho1, Drs2/20, Dug2, Dur1, Dur10, Dur11, Dus1, Ehd3, Ehd31, Ena51, Eor1, Erg1, Erg6, Erg26, Erg130, Gal10, ▼Gdf2, ▼Gdh2, Gdh3, Glh63, Glh71, Glh710, Gna1, Gnd2, Gpd1, Gpt2, Hat1, ▼Hcd1, Hnt2, Hor2, Fas1, Fas2, Fba10, Fbp26, Fol2, For2, For3, Fot1, Fur1, Ima2, Ifa38, Ilv1, Ima1, Ino1, Irc24, Kgd20, Kpr2, ▼Lad1, Lcb2, Lcb20, Lip5, Lsc1, Lsc2, ▼Lys10, Mdh3, Met1, Mns1, Mns10, Nat60, Nat61, Nat62, Nep2, Nep3, Nor1, Nor2, Nor3, Nor4, Nor8, Nmr2, Oye20, 21, Pcs60, Pda1, Pdb1, Pdx1, Pgi1, Pgs1, Pro2, 3, Ptc5, 6, Qri1, Ram1, 10, Rnr1, Scd3, Scd5, Scd6, Scd8, Scd9, Scd11, Scd12, Scd13, Scd14, Sec53, See1, Ser1, Sir30, Sir31, Sir33, Spf1, Suc2, Thi6, Tkl1, Tkl2, Tyr1, Uga10, Uga20, Uge4, Ugd1, Ugp1, Ula1, Ura3, Xfp2, ▼Zta1, Ztd1,* Snf4,Yfh7 | ***General metabolic systems:***  ►Pyruvate, ethanol, and acetate metabolism  ►Glycolysis pathway  ►TCA cycle  ►Glyoxylate cycle  ►Pentose phosphate pathway  ►Lipid metabolism  Signalling pathways involved include:  ***cAMP/Pka signalling pathway:***  Gpa1🡪Cac1:Aca1🡪cAMP🡪Pkr1🡪Pka🡪Nrg1  ***Phosphate assimilation:***  Pho81IP7🡪Pcl6//Pho85active🡪glycogen metabolism |
| Homeostasis transmembrane transporters/permeases involved in infections | *Agt1, Amt1, Amt2, Aap1, Aap2, Aap3, Aap4, Aap5, Aap6, Aap7, Aap8, Ato2, Ady2, Cft1, Ctr4, Ena1, Gdh1, Hxt1, \*Hxt3, Jen1, Mgt2, Mph/Mal, Mrs4, Mup1, Mup3, Nha1, Pho84, Sfc1/Acr1, Spe2, Uga4* | *Fbp1* | ***Osmo-regulation pathways:***  ***Hog1 activation via Cdc24 or histidine protein kinase Sln1:***  (Sln1🡪Ypd1🡪Ssk1🡪Ssk2/Ssk22) or (Cdc42/Sho1🡪Ste20🡪Ste50🡪 Ste11)🡪Pbs2🡪Hog1🡪Gpd1, Gpp2, Pfk26, Stl1, Fps1, Tps1 |
| Mating (bisexual and unisexual/haploid/monokaryotic fruiting), filamentation/hyphae, and basidiospore formation | *Aca1, Ada2, Aox1, Atf1, Bni4, Bre1, Bzp2, Bzp3, Bzp5, Cac1, Cbd4, Cda, Cdc4, Cdc10, Cdc11, Cdc12, Cdc24, Cdc42, Cdc43, Clr4, Cna1, Cpa1, Cpa2, Cpr2, Cqs2, Cuf1, Dfr1, Dip5, Drp1, Ebg1, Ece1, Erg25, Fbp1, Fzc1, Fzc6, Fzc9, Fzc21, Fzc31, Fzc26, Fzc36, Gat5, Gpa1, Gpa2, Gpa3, Gpb1, Gpg1, Gpg2, Gpr1, Gpr4, Hem1, Hfm1, Hlh2, Hob1, Hob7, Kre6, Liv3, Liv4, Mat2, Mfα1, Mfs, Mbf1, Mcm1, Myo2α, Myo13, Ndh1, Opt1, Ovd1, Pan1, Pas3, Pbp1, Pdc1, PepP, Pex19, Pft1, Pgi1, Phd, Pnb1, Prm1, Pry2, Pth11, Ptp2, Puf4, Pum1, Qsp1, Rac1, Ras1, Rax1, Rhg4, Rpl22α, Rpo41α, Rum1α, Ryl2, Rze1, Scd1, Scd2, Sec61, Sir2, Sis, Snf5, Sp96, Spo14α, Ste3α, Ste6, Ste14, Ste50, Ssn80H99, Sur2, Sxi1α, Sxi2, Tao3, Tea1, Tif3, TtdT, Uap1, Ubp14, Usv101, Zap104, Znf1α, Znf2, Znf3,* Bck1, Bud32, Cdk8, Cka1, Cpk1, Ipk1, Kcs1, Kic1, Kin2*,* Kin4, Pak1, Pka1, Pka2, Pkc, Ste7, Ste11, Ste12,Ste20, Urk1 | *Bwc1, Bwc2, Cat1, Cat3, Ccd4, Crg1, Crk1, Cwc1, Cwc2, #Fbp1, Fnx1, Fzc37, Fzc34, Gat1, Gat8, Gat201, Gst1, Hap2, Hcm1, Hlh1, Hmp1, Hog1, Hsf2, Hsp12, Liz1, Mfs, Miz1, Pbr, Spo12, Sre1, Ssn8/Srb11, Ssn80KN99,* Hog1, Pbs2, Pkr1, Skn7, Ssk2 | ***Mitogen activation pathways:***  Gpa2🡪Gpb1-Gpg1,2🡪Ste50-(Ste20*α/a*(MAPKKK)*-*Ste11*α/a*)-Ste5-(Ste7(MAPKK)-Cpk1(MAPK))🡪Mat2🡪Sxi1*α, Sxi2a, Ste3α, Ste12, Mfα, Znf2, Cfl1, Pum1*  ***α–a mating:***  MAT*α\_Sxi1* + MAT**a**\_Sxi2**a**🡪bisexual cell fusion (by cooperation/induction/modification)🡪haploid filamentation🡪basidia formation🡪 Cell identity and sexual development.  ►*Mat2* is repressed for unisexual but induced for bisexual reproduction. Neither Sxi1*α* nor Sxi2***a*** is essential for the unisexual mating hyphal formation.  ►Regulation of Cpk1 MAPK is centrally controlled by Ste7, Ssn8, and Mat2 but not Znf2 and Sxi1*α/Sxi2****a***.  ►Mat2 and Ste7 are necessary for pheromone sensing to initiate hyphal growth but not hyphal morphogenesis.  ►Ste12 is not important for mating in either serotype A or D but highly important for haploid fruiting in the two serotypes. Again, it is not important for hyphae formation in serotype D but overexpression induced filamentation in serotype A .  ►Mf*α* induced for bisexual but repressed for unisexual reproduction.  ►Znf2 may influence pheromone sensing but is highly needed for hyphal growth and morphogenesis.  ***GTPase-activating PAK kinase:***  *Cdc42-Ste20α/Pak1-Ste11α-Cpk1* |
| Cell polarity, karyokinesis, septin formation, cytokinesis, and actin organisation (cell division/budding) | *Arp2, 3, Cap1, Cap2, Cdc3, Cdc10, Cdc11, Cdc12, Cdc24, Cdc42, Cdc43, Cdc420, Cin1, Cna1, Cps1, Las17/Bee1, Mob2, Rac1, Rac2, Ras1, Rho1, Rho10, Rho11, Sir2, Sog2, Tao3, Tea1, Wsp1,* Cbk1, Gcn2, Kic1, Ste20 | *Hog1* | ***Vacuolar membrane localisation and actin organisation:***  ►Cin1-Cdc42-Wsp1-Rac1 effector signalling pathway  ►ROS-activated regulation of polarised growth, differentiation, and morphogenesis    ►***Rac-induced Nox activation:***  Rac1/2-Cdc42/420-Nox-NoxR |
| Pheromone expression/response | *Anb2, Cqs2, Cin1, Cna1, Crg1, Gpa2, Gpa3, Gpb1,* *Gpg1, Gpg2, Mat2, Mfα1, Pbp1, Puf4, Qsp1, Ste5, Ste6*, *Ste50, Ste3* *Cpr1*/2, *Ste7, Tif3, Znf2, Znf3, Wsp1,* Cpk1, Ste11, Ste20 | *Aap1, Aap3, Bwc1, Bwc2, Can1, Can2, Crk1, Crz1, Gat1, Hap2, Hlh1, Hog1, Mgt2* | ***Pheromone signalling pathway:***  Ste3*α/Cpr1,2*🡪Gpa2🡪Gpb1-Gpg1,2🡪Ste50-(Ste20*α/****a****-*Ste11*α/****a***)-Ste5-(Ste7-Cpk1)🡪Mat2-P🡪PREs (Sxi1*α, Sxi2****a****, Ste3α, Mfα, Znf2, Znf3*) |
| Nitrogen assimilation and alternative nitrogen sources | *Aap1, Aap2, Aap3, Aap4, Aap5, Aap6, Aap7, Aap8, Amt1/Mep, Amt2, Dal1, Gdh1, Gdh2, Gln1, Glt1, Mup1, Mup3, Put1, Put2/Put5, Trp2-4, Uga4, Ure1, Uro1* |  | ►Activation of nitrogen catabolite repression  ►Activation of Gat1-independent metabolisms |
| Urease activity | *Cam1, Cna1, Cuf1, Crz1, Fzc46, Gpp2, Hlh1, Nic1, Pmc1, Ptp1, Ptp2, Sod1, Sre1, Ure1, Ure4, Ure6, Ure7, Zap104,* Ssk2, Bud32, Cka1, Ipk1 | *Atf1, Fkh2, Fzc1, Fzc14, Fzc26, Gat1, Grasp, Hob4, Hob7, Hog1, Mln1, Rim101, Sxi1α, Usv101, Yap1, Zfc7,* Pka1, Irk5, Gsk3, Skn7 | GTP-activated Ni2+-sequestration for the maturation of urease apoprotein |
| Antifungal activity (5-FC) | *Apn2, Bzp2, Bzp3, Bzp5, Fzc6, Fzc19, Fzc44, Fzc46, Fzc51, Hap2, Hcm1, Hlh1, Jjj1, kcs1, Mbs1, Nrg1, Pip2, Ptp2, Yap1, Yap2, Zfc2* | Arg5.6*, Cki1,* *Fab1, Fzc31, Fzc50, Gat204, Hlh3, Hob3,* *Hog1,* Igi1, *Rds2, Rim101, Znf2,* Irk5, Urk1, Vrk1, Sat4, Ste7 | ***Tor-like activation:***  Tor1-Sin1🡪Ypk1  ***Mpk signalling pathway:***  Pdk1/Tor1🡪Pkc1🡪Bck1🡪Mkk2🡪Mpk1 |
| Antifungal activity (AmpB) | *Asg1, Bwc2, Bzp2, Bzp3, Bzp5, Cac1, Cuf1, Ecm22, Ert1, Fap1, Fzc1, Fzc6, Fzc8, Fzc10, Fzc22, Fzc23, Fzc31, Fzc44, Fzc45, Fzc49, Fzc51, Gat201, Gat204, Grf1, Grx4, Hcm1, Hel2, Hlh1, Hlh2, Hlh3, Hob1, Hob4, Hob5, Hob6, Hog1, Hsp12, Hsp122, Jjj1, kcs1, Liv1, Mbs1, Met22, Mln1, Nrg1, Pan1, Pdr802, Pip2, Pip201, Ras1, Rim101, Rum1, Sp1/Crz1, Usv101, Zfc2, Zap104,* Arg1, Kcs1, Ssk1, Ste12 | *Atf1, Clr1, Bzp4, Fzc4, Fzc51, Ico4, Sps1, Sre1, Yap1,* Sch9, Skn7, Snf102, Swe102 | ***Hog1 signalling pathway:***  Tco1/Tco2🡪Ypd1🡪Ssk1🡪Ssk2-Pbs2-Hog1 |
| Antifungal activity (FCZ) | *Afr1, Asg1, Bzp1/Hxl1, Bzp2, Bzp3, Bzp5, Fzc2, Fzc14, Fzc17, Fzc22, Fzc30, Fzc31, Fzc34, Fzc45, Fzc46, Grx4, Hlh1, Hlh2, Hlh3, Hlx1, Hob1, Hob4, Hob6, Hsf2, Liv1, Mbf1, Mbs1, Met32, Miz1, Mln1, Pan1, Pip2, Rim101, Sp1/Crz1, Sre1, Sxi1α, Yap1, Yap2, Yap4, Zfc6,* Arg1, kcs1, Ste12 | *Ada2, Cuf1, Ddt1, Ecm22, Ert1, Fkh2, Fzc9, Fzc51, Gat5, Gat7, Hap2, Hcm1, Hob1, Hog1, Jjj1, Liv4, Mbs1, Nrg1, Ppr1, Yrm103,* Sch9, Ssk1, Skn7 | ***Membrane stability and integrity:***  ***Hog1 signalling pathway:***  Tco1/Tco2🡪Ypd1🡪Ssk1🡪Ssk2-Pbs2-Hog1🡪sterol biosynthesis🡪membrane stability |
| Antifungal activity (FDX) | *Aca1, Ada2, Aim2, Aqy1, Asg1, Bgl2, Bzp1/Hxl1, Bzp2, Bzp5, Cna1, Cys2, Ddt1, Ena1, Fkh2, Fzc6, Fzc21, Fzc22, Fzc32, Fzc35, Fzc41, Fzc43, Fzc46, Fzc51, Gln3, Glo2, Gst3, Hob6, Hap1, Hap2, Hlh1, Hlh3, kcs1, Liv1, Met32, Mln1, Pan1, Pas1, Pdr5, Pdr5-2, Pdr5-3, Pip2, Plb1, Rlm1, Snq1, Ssl1, Usv101, Yap1, Yap2, Yor1, Yrm101, Yrm103, Zfc3, Zfc8,* Arg1, Kcs1, Mpk1, Sch9 | *Agc1, Apn1, Ala1, Cac1, Ccp1, Cdc31, Cft18, Cox17, Erg6, Erg13, Fen2, Fap1, Fre7, Fum1, Fzc50, Gat7, Gat204, Gpa1, Hel2, Hog1, Ism1, Jjj1, Klp3, Kre33, Mcm5, Mug72, Nrg1, Pri1, Psa1, Sp1/Crz1, Sre1, Tub2, Zfc2, Znf2, Zrt1,* Guk1, Pbs2, Skn7, Ssk1 | ►Activation of ATP-binding cassette (ABC-type) multidrug transporters  ►deactivation of Pbs2-dependent phosphorylation  ►Catalytic deactivation of Hog1 MAPK |
| Phosphate-sensing and acquisition | **[Pi]low:** *Aph1, Aph3, Aph4, Bta1, Gde2, Epp1, Mip2, Pcl6, Pcl7, Pho4, Pho81high, Pho84high, Pho89high, Pho840high, Pho91, Xpp1, Vtc4high,* Pho85low | **[Pi]high:** *Pho81low, Pho84low, Pho89low, Pho840low, Vtc4low,* Pho85high | ►**[Pi]high:** [Pho81-Cdk*i*]-IP7*-*(Cdk:Pho80-cyclin//Pho85 kinase)-phosphorylates-[Pho4]-**P** to prevent PHO gene expression  ►**[Pi]low:** [Pho81-Cdk*i*]-IP7*-*(Cdk:Pho80-cyclin//Pho85 kinase)-no phosphorylation of-[Pho4]; PHO gene expression including *Pcl6*, *Pcl7* for phosphate acquisition/assimilation |
| Phagocytosed cryptococcal cells | *Agt1, Alg3, Amt1, Amt2, Ant1, Apc10, Apc2, Atg3, Atg8, Atg9, Cap10, Cas1, Cas2, Cas31, Cas32, Cat2, Cdc25, Cdc420, Cgl1, Chl1, Cna1, Cpp2(Fcy2/Fcy21), Czc1, Dip5, DnaJ, Fet3, Fhb1, Ftr1, Gpa1, Gth1, Gth1, hAldr, Hsp40, Icl1, Iki3, Ipc1, Itr1, Lac1, Lac2, LepA, Matα*, *Mph2, Pet8, Pex5, Pex7, Pho84, Pka1, Pxa1, Pxa2, Rgt2, Sac1, Sec6, Sec8, Smg1, Thr4, Tna1, Tra1, Trp1, Trp3, Uga4, Vps34, Wsc2, Yvh1,* Cdk8 | *Dbp10, Dhp1, Eef1α, Eif2a, Eif3α, Eif3\_2, Eif3\_3γ, Eif6, Etrf1, Gsp1, Lia1, Map1, Mdn1, Mgt2, MipD, Mis3, Nmd3, Nob1, Nob1, Pinx1, Pmt2/Spb1, Pno1, Rbg1, Rnp24, Rpa135, Rpc2, Rpl1, Rps8, Spb4, Zpr1* | ***cAMP/Pka signalling pathway:***  Gpa1🡪Cac1:Aca1🡪cAMP🡪Pkr1🡪Pka🡪Nrg1  ►amino acid metabolisms and their transporters  ►anti-oxidative reactions  ►autophagy  ►cell division  ►cell wall formation  ►glycolysis and sugar transporters  ►iron acquisition via high-affinity iron permeases and transporters  ►lipid metabolisms  ►mating  ►nitrogen acquisition via ammonium permeases  ►peroxisomal reactions and fatty acid transporters  ►phosphate acquisition via inorganic phosphate permeases  ►virulence factors – melanin and capsule  ►titanisation/cell enlargement |
| Iron uptake, homeostasis, and heme biosynthesis | *Ccc1, Cfo1, Cig1, Cir1, Coq11, Dre2, Fre3, Fre6, Fre8, Fre201, Grx4, Grx6, Hap3, Hap5, HapX, Hem14, Isa2, Jac1, Lac1, Leu1, Lys4, Mmt2, Mrs3, Mrs4, Nrg1, Rim101, Sat4, Sit1/Arn1, Sit3, Sit4, Sit5, Sit6, Sre1, Tah18, Tup1, Yah1* | *Aco1, Aco2, Bio2, Cir2, Elp3, Glt1, Grx5, Fre7, Hem1, Hem3, Hem4, Hem13, Iba57, Isa1, Leu1, Lip5, Lys4, Met5, Nar1, Nfu1, Ntg2, Rip1, Shh3, Ssq1* |  |
| Fe-S containing proteins | *Coq11, Dre2, Grx6, Isa2, Jac1, Mrs3/Mrs4, Sat4, Tah18, Yah1,* | *Aco1, Aco2, Bio2, Cir2, Elp3, Glt1, Grx5, Iba57, Isa1, Leu1, Lip5, Lys4, Met5, Nar1, Nfu1, Ntg2, Rip1, Shh3, Ssq1* |  |
| Electron transport and mitochondrial functions | *Ald5, Mcr1, Mir1* | *Cyb2, Cyc7, Cyt1, Qcr2, Qcr7, Sdh1, Sdh2, Yhb1* |  |
| Ca2+ homeostasis, cell budding, cell division, virulence, and dissemination | *Afr1, Atf1, Cam1, Cch1, Cna1, Crz1, Eca1, Mid1, Ncs1, Nic1, Plb1, Pmc1, Ure1, Vcx1* |  | Cam1p-Cna1p🡪Crz1p🡪Pmc1p, Cch1p, Mid1p, Eca1p, Vcx1p = urease activity, stress response, cell wall integrity, thermotolerance, reproduction, and virulence via Ca2+ mobilisation  ►Cam1p-Cna1-Cnb1 complex becomes active only when the intracellular Ca2+ level is between 1 – 10 μM  ►Cch1p – a voltage-gated Ca2+ permeable channel induced by low cellular Ca2+  ►Mid1p – a stretch-activated Ca2+-channel  ►Eca1p and Pmc1p – are Ca2+ ATPase  ►Vcx1p – a H+/Ca2+ antiporter, and Pmc1p are vacuolar membrane proteins for Ca2+ storage |
| Hypoxia | *Adh302, Aox1, Arv1, Atp9, Bst1, Lys10, Cob1, Cox1, Csh1, Ctr3, Cpr101, Dak202-A, Dal502, Erg1, Erg2, Erg4, Erg5, Erg6, Erg7, Erg10, Erg11, Erg13, Erg25, Erg3-B, Fen2, Fet3, 5, Fmp52, Fre7, Ftr1/Fth1, Gal2-A, Gal2-B, Gat1, Gdh3, Gph1, Hem13, Hem3, Hsp104, Hsp78, Hxt2-A, Hxt503-A, Kip1, Lys1202, Mal1106, Mep2, Met101, Met102, Mnd1, Mss51, Nad1, Nad5, Ncp1, Ole1, Oye2, Pdc1, Pot1, Ptr2, Scp1, Scs7, Sis102, Sit1, Sps1901, Sre1, Ssa4, Stp1, Suc2, Sur2, Tpo2, Ybl095w, Yhb1, Yir007w, Yjl203cp, Ymr099c, Ypc1,* Tco1 | *Apm101, Arf202, Asc1, Bni4, Cbf5, Chs7, Cnb1, Cta101, Cta102, Efb1, Emg1, Erg6, Erp2, Gfa1-B, Got1, Kre601, Nog1, Osh6, Pep7, Rki1, Rpl14b, Rpl18a-A, Rpl23b, Rpl2b, Rpl5, Rpl6b, Rps4a, Rps5, Sec4, Sup45, Tuf1* | ***Membrane stability and integrity:***  ***Hog1 signalling pathway:***  Tco1/Tco2🡪Ypd1🡪Ssk1🡪Ssk2-Pbs2-Hog1🡪sterol biosynthesis🡪membrane stability  ►iron homeostasis  ►copper homeostasis |
| CO2 sensing | *Aim38, Atf1, Cac1, Can2, Cas3, Cfo1, Cfo2, Fas1, Fur1, Gpb1, Meu1, Nap1, Nop58, Oct1, Prx1, Tps1, Tps2, Trx1, Uri1* |  | ***Activation of carbonic anhydrase:***  CO2(g) + H2O(l) ↔ HCO3‾(aq)+ 2H+(aq)  ***Activation of Rim101 signalling event via Rim21 membrane protein:***  Rim9🡪Rim21-Rim8🡪Rim20-Rim13 + PKa1 🡪Rim101-P  ***Cam1-Cna1/Cnb1/Cbp1 signalling cascade:***  [Ca2+]↑🡪Cam1🡪Cna1-**Cnb1**-Cbp1🡪Crz1/Sp1 (to induce *HTG, HMR, PHH, ESR, CWI*-associated genes for mating, growth, resistance, filamentation, and biofilm) or Znf2 (to induce *Znf2, Cfl1, Pum1*–related genes for adhesion, matrix signal, and *m*RNA stability) |
| Oxidative and nitrosative stress | *Acd1, Acd3, Ada2, ▲Adi1, Aif10, Aif11, Aif12, ▲Aif13, Ald52, Aox1, Ara1, Adh3, Asg1, Atf1, Atg1, Ayr10, Ayr13, Bdh1, Blg2, Bna2, ‡Bwc2, Bzp2, Bzp3, Bzp5, Cat1, ◊Cat2, Cat3, ▲Ccp1, Cda1, Cdc24, Cdr11, Cfo1, Chs5, Chs6, ▲Cir2, Clr1, Cta11,* *Cta12, ‡Cuf1, Cyb20, ▲Cyb21, Cyb25, ▲Dox3, ▲Dus3, Duf1264, Ecm22, Eor2, Erg3, Erg5, Erg25, Erg50, Erg110, Ero1, ‡Fap1, Fds1, ▲Feo2, Fet5, Fhb1, Fkh2, Flr1, For1, For4, Fox22, ▲Frd1, Fre2, Fsb1, ▲Fsb2, Fzc1, Fzc3, Fzc4, Fzc6, Fzc8, ‡Fzc9, Fzc13, Fzc15, Fzc19, Fzc21, Fzc22, Fzc26, Fzc27, Fzc30, Fzc31, Fzc34, ‡Fzc35, Fzc37, Fzc38, Fzc44, Fzc46, Fzc49, ‡Fzc50, Fzc51, ‡Gat1, Gat5, Gat6, Gat8, Gat201, Gat204, Gln3, ▲Glt1, Gpx1, Gpx2, Grf1, Grx4, Gsc2, Gut2, Gut20, ‡Hap2, Hcm1, Hem14, Hel2, His4, Hlh1, Hlh2, Hlh3, Hob1, Hob2, Hob4, Hob5, Hob6, Hog1, Hox1, Hsf2, Idh1, Idp1, Ilv5, Imd2, Iox1, Isu1, ‡Jjj1, Kgd1, Kgd2, Kpr1, Leu2, Lia1, Liv1, Lys1, Lys2, Mae1, Mae10, Mae11, ▲Mbo1, Mbs1, Mcm1, Mdr1, Mep3, ▲Met5, Met10, Met32, Mfe2, Mio1, Miz1, Mln1, Mtd1, Mxr1, Mxr2, Nat64, Nde2, Nha1, Nor5, Nor6, Nor7, Nor9, ▲Nor11, Nth1, ‡Nrg1, ▲Nuo2, ▲Nuo51, Ole1, Oye2, Pan1, Pas1, Pdr51, Pip2, Ppr1, Rad16, Ras1, Rim101, Rlm1, Rnr2, Rnr20, Rum1, Scd2, Scd4, Scd7, Scd10, Scs7, Sdh1, ▲Sdh2, Ser3, Sip402, Sks1, Snc2, Smm1, Sod1, Sod2, Sor1, Sp1/Crz1, Sre1, Srx1, Ssn80, Ste12, Sur2, Tah18, Tfd2, Tfd5, Tps1, Tps2, Trr1, Trx1, Trx2, Tsa1, Tsa4, ▲Txl1, Ubc4, Ubc6-2, Ubc7, Ubc8, Ubi4, Uox1, Usv101, Xyl2, Yah1, Yap1, Yap2, Ycf1, Yhb1, Yor1, Yox101, Ypr10, Ypr11, Ypr12, Ypr14, Yrm103, Zap103, Zfc4, Zfc8, ‡Znf2, Zta1, ▲Zta10, Zta11, ▲Zta13,* Cdk8, Pkc1, Ssk1, ‡Skn7, Sch9 | *Adh3, Adh21, ▼Adh50, Ara2, Bem3, Cat2, Cat4, Cat5, Cbr1, Ccp1, Cdr1, Cfo2, Chs2, Clr3, Cox5a, Ddt1, Dfr1, Dho1, Dld2, Dot5, Dox2, Dus1, Ena1, Eor1, Erg1, Erg2, Erg4, Erg6, Erg8, Erg20, Erg24, Erg26, Erg28, Erg130, Fas1, Fas2, Fen1, Feo1, For2, For3, For5, Fox21, Fre7, Fre20, Frl1, Fzc7, Fzc20, Fzc33, Fzc45, Gal1, Gcy12, ▼Gdh2, Gdh3, Gnd2, Gpb1, Gpd1, Grx5, ▼Had2, ▼Hem13, Hyr1, Ifa38, Ino1, Irc24, Jlp1, Kpr2, Lac1, ▼Lad1, Lat1, Lot6, Mbs2, Mdh1, Mdh3, Met1, Met13, Mug72, Nep2, Nor2, Nor4, Nor10, Nuo3, ▼Ofd1, Oye3, Oye20, Pda1, Pdb1, Pdx3, Pro2, Pro3, Prx1, Pst2, Pyx3, Rli1, Rnr1, Rpc40, Rps7b, Scd5, Scd9, Scd11, Scd12, Scd13, Scd14, Ser30, Ser31, Sip4, Sps19, Sqr1, Tfd3, Tfd4, Tsa3, Tsc10, ▼Tsc13, Tyr1, Uga20, Ugd1, Utp18, Utp22, Uxs1, Ylr290, Ypr1, Ypr13, Ypr15, Ypr16, Ypr 17, Zfc2* | ►***Ubiquitin-proteasome system function induced by Mpk:***  Ipc1/Pdk1🡪Pck1🡪Bck1🡪Mkk2🡪Mpk1  ►Thioredoxin system (*thioredoxin, thioredoxin reductase, and NADPH)*  ►Glutathione peroxidase function  ►Superoxide dismutase function  ►Sulphiredoxin/peroxiredoxin function  ►Downregulation of ribosomal biosynthesis |
| Osmotic stress | *Ada2, Ald5, Aqy1, Arb1, Aro8001, Axl2, Bzp2, Bzp4, Cdc24, Cfo1, Chs2, Cys2, Dur3, \*Ena1, Exg1, Fre2, Fzc6, Fzc13, Fzc19, Fzc31, Fzc32, Fzc34, Fzc35, Fzc42, Fzc43, Fzc44, Fzc46, Fzc51, Gat5, Gat7, Gat8, Gcn4, Gpd1, Gpp1, Gpp2, Grx4, Gsc2, Hal1, Hap2, Hcm1, Hnm1, Hob1, Hob6, \*Hog1, Mbs1, Mep2/Amt2, Mep3, Met32, Nha1, Nrg1, Pan1, Pdr5, Pip2, Pho84, Prm10, Prx1, Ptr2, Qdr1, Ras1, Rim101, Rnr3, Rsn1, Stl1, Sul1, Tok1, Tps1, Tps2, Uga3, Xut1, Yap2, Zfc6, \**Pbs2, Skn7,\*Ssk1, Ssk2 | *Atf1, Bna1, Cfo2, Cuf1, Ena1, Erg5, Fmp52, Fre7, Fzc36, Gal2, Gdb1, Hel2, Hem1, Hlh3, Hog1, Hsp78, Hxt13, Hxt17, Hxt5, Msh6, Pex7, Rnr2, Sur2, Tif5, Trm44,* Pbs2, Rck2, \*Skn7, Ssk1 | ***Cdc24-dependent Ras signalling pathway:***  Ras1🡪Cdc24🡪Cdc42-GTP🡪Ste20  ***Hog1 signalling pathway:***  Tco1/Tco2🡪Ypd1🡪Ssk1🡪Ssk2(MAPKKK)-Pbs2(MAPKK)-Hog1(MAPK) |
| Cell wall and membrane stress by dyes and detergent | *Asg1, Asg101, Bdl2, Bzp1/Hxl1, Bzp2, Bzp3, Bzp5, Cda1, Cdc24, Chs2, Chs5, Chs6, Chs7, Chs8, Clr1, Clr4, Crl6, Cuf1, Ecm22, Ert1, Fap1, Fks1, Fzc15, Fzc21, Fzc23, Fzc26, Fzc30, Fzc31, Fzc7, Gat1, Gat201, Gat5, Gat6, Gat7, Gcn5, Grx4, Gsc2, Hap2, Hlh3, Hob1, Hob3, Hob5, Hxl1, Jjj1, Kre61, Mp88, Nrg1, Ova1, Pan1, Pip2, Ras1, Rds2, Rho1, Rho10, Rho11, Rim101, Rlm1, Rum1, Sip4, Sp1/Crz1, Sre1, Sre1, Ssn8, Ssn80, Sxi1α, Usv101, Yap1, Yap2, Zfc4, Zfc6,* Cdk8, Ire1, Kcs1, Mpk1 | *Bwc2, Fzc1, Fzc6, Fzc8, Fzc9, Fzc22, Fzc50, Fzc51, Grf1, Hsf3, Zfc1,* Skn7 | ***Mpk signalling pathway:***  Pdk1/Tor1🡪Pkc1🡪Bck1🡪Mkk2🡪Mpk1  ***Cdc24-dependent Ras signalling pathway:***  Ras1🡪Cdc24🡪Cdc42-GTP🡪Ste20 |
| Genotoxic stress | *Ada2, Apn2, Bzp1/Hxl1, Bzp2, Cdc24, Fzc1, Fzc4, Fzc6, Gat5, Gat6, Grx4, Hcm1, Hcm101, Hlh2, Hob1, Jjj1, Mbs1, Miz1, Nrg1, Pip2, Ras1, Sre1,* Skn7 | *Fzc20, Yox101* | ***Cdc24-dependent Ras signalling pathway:***  Ras1🡪Cdc24🡪Cdc42-GTP🡪Ste20 |
| ER stress | *Ada2, Apn2, Bzp1/Hxl1, ‡Bzp2, ‡Bzp3, Ccr4, ‡Clr1, Cna1, CopI/Sec28, CopII/Sec13, ‡Cuf1, Dap2, Ddt1, Fpr3, Fzc2, Fzc21, Fzc25, Fzc31, Fzc36, Fzc44, Gat201, ‡Gat5, Gat7, ‡Hap2, ‡Hlh1, Hlh2, ‡Hob1, Hob7, Liv4, Mbs1, ‡Met32, Mln1, ‡Nrg1, Ost2, ‡Pan1, Per1, ‡Pip2, Png1, Rim101, Rlm1, Rpn5, Rpn14, Crz1/Sp1, Sre1, Sss1, Ste12, Uba2, Usv101, Yap2, Zfc8,* Ire1 | *Bwc2, Clr4, Fkh2, Fzc6, Fzc11, Fzc20, Gat6, Gat1, Gat203, Hcm1, Hel2, Hob3, Jjj1, Ppr1, Sip401, Rds2, Stb4, Yap1, Yap4, Zfc3, Zfc2, Zfc4,* Skn7 | ► ***ER stress and UPR pathways:***  Folded\_KAR2↔Misfolded/Unfolded🡪ER Stress🡪*IRE* polymerisation🡪(Unspliced *Hxl1* *m*RNA🡪Spliced *Hxl1* *m*RNA)🡪nuclear translocation🡪*Kar2/BiP* expression  ► *m*RNA decay process |
| UPR signalling pathway and ubiquitin-dependent stress-induced protein catabolic process | *Alg7, Ccr4, Chs2, Cna1, Cpr3, Ddi1, Der1, Erv29, Hxl1, Ino1, Itr1, Kar2/BiP, Met30, Mpe1, Nam7, Ost1, Otu2, Pmt1, Pmt2, Pmt4, Puf4, Qri8, Rad16, Rad23, Rad4, Rad7, Ris1, Rpa32, Rpb4, Rpn14, Rsp5, Sec61, Ubc4, Ubc6, Ubc60, Ubc8, Ubi4, Ubp13, Ubp16, Wbp1,* Ire1 | *Aos1, Apc1, Apc11, Arc40, Blm10, Cdc16, Cdc23, Cdc31, Cdc36, Cop1, Dnc1, Egd2, Gcn1, Gga2, Hrd1, Hrt1, Ibr1, Kog1, Mlo2, Nas5, ▼Pan2, Pps1, Pre1, Pre2, Pre3, Pre4, Pre5, Pre6, Pre7, Pre8, Pre9, Pre10, Pup1, Pup3, Rad5, Rad6/Ubc2, Rpn1, Rpn2, Rpn3, Rpn5, Rpn6, Rpn7, Rpn8/Rpn12, Rpn8/Rpn80, Rpn9, Rpn10, Rpn11, Rps31/Ubi3, Rpt1, Rpt2, Rpt3, Rpt4, Rpt5, Rpt6, Scl1, Sec27, Sgt1, Skp1, Sod2, Tul1, Ubc1, Ubc12, Ubc13, Ubc5, Ubp14, Ubp6, Vps21, Vps36, Yrb1, Yuh1,* Cks1 | ►***ER- and cell wall-stress response:***  Pdk1/Tor1🡪Pkc1🡪Bck1🡪Mkk2🡪Mpk1  ►***ER stress and UPR pathways:***  Folded\_KAR2↔Misfolded/Unfolded🡪ER Stress🡪*IRE* polymerisation🡪(Unspliced *Hxl1* *m*RNA🡪Spliced *Hxl1* *m*RNA)🡪nuclear translocation🡪*Kar2, Ost1, Pmt1, Pmt2, Pmt4, Wbp1* expression for virulence, thermotolerance, antifungal drug and diamide resistance, membrane and cell wall stability |
| Processing bodies (P-bodies) and stress granules – PΒs/SGs | *Anb1, Car2, Cdc3, Cna1, Crz1, Ede1, Hsp12, Gcd2, Gwo1, Lhp1, Lsp1, Pab1, Pbp1, Pdc1, Puf4, Sec16, Sla1, Snf7, Smy2, Spc34, Tif3, Vts1, Yhb1, Ypi1* |  | ***Cna1/Cnb1 signalling pathway:***  ►[Ca2+]↑Cam1🡪**Cna1**/Cnb1🡪Crz1 activation by dephosphorylation  ►[Ca2+]↑Cam1🡪**Cna1**/Cnb1🡪Lhp-P  ►[Ca2+]↑Cam1🡪Cna1/Cnb1🡪Puf4-P, Pbp1-Pn (hyper-phosphorylation; n represents multiple phosphorylation) |
| Heavy metal stress response | *Ade12,**Ada2, Alo1, Alp5, Arf2, Arr3, Aro80, Aro8001, Asr2, Atm1, Atp1, Bdf1, Bre2, Bzp2, Bzp4, Ccd4, Cdc24, Cdc34, Coq2, Coq10, Ctf4, Cuf1, Elp3, Erg6, Fap1, Fzc10, Fzc19, Fzc35, Fzc37, Fzc46, Fzc47, Fzc51, Fzc6, Fzc8, Gat5, Gcn3, Gcn5, Gln3, Gsh1, Hap2, Hcm1, Hmt2, Hob5, Hob6, Hob7, Isa1, Kip1, Lys2, Met3, Met7, Map1, Mbs2, Mln1, Mtd1, Myo2, Nab2, Nha1, Pip2, Pip201, Pub1, Ras1, Rsc8, Rib4, Rum1, Sah1, Sfa1, Snf2, Tma29, Tom1, Top1, Trr1, Tsr2, Tub2, Tub4, Tup1, Ubc4, Ubp14, Vps1, Vps17, Yap1, Yox101, Zfc8,* Skn7 | *Alr2, Asg101, Atf1, Bzp1/Hxl1, Clr1, Doa4, Fzc20, Fzc39, Fzc50, Fzc7, Gat201, Gat204, Gat7, Gst3, Hlh2, Hog1, Hsf3, Mde5, Nrg1, Pma1, Rds2, Rlm1, Sip4, Sod2, Sol3, Sre1, Vps4, Zfc3, Znf2,* Pbs2, Ssk1, Ssk2 | ► Histone acetylation  ► Deactivation of Hog1 MAPK |
| Environmental and common stress | *Bgl2, Bsc6, Ccn1, Cdc14, Chs7, Chs8, Dcs1, Dna2, Ena2, Gal2, Gsc2, Fmp10, Fre7, Fur4, Fzd6, Jlp1, Kre5, Kre6, Mei2, Mnd1, Mug58, Ole1, Ova1, Ova2, Pkp1, Pnc1, Pma1, Ptp1, Ptp2, Rad14, Rad3, Rdi1, Rsb1, Set1, Skn1, Sly41, Snf3, Spt3, Tpo2, Tps1, Tps2, Yrm1, Ysa1* |  |  |
| Light and UV-light | *Bwc1, Bwc2, Cwc1, Cwc2, Rad17/Mec3/Ddc1, Rad24, Ssn8, Uve1,* Crk1 | *Cwc1Light, Cwc2Light, Mat2, Sxi1α, Znf2* | ***Chromophore-light-activated protein:***  Chromophore-binding protein🡪Bwc1🡪Bwc1-Bwc2🡪Crk1  *Δcwc1/Δcwc2* mutants are active mating phenotypes in the presence of light but are sensitive to UV |
| Quorum-sensing | *Cfl1, Cqs1(Qsp1), Cqs2(Qsp2), Gat201, Gat204, Liv3, May1, Opt1, Pres, Pum1, Tup1,*  *Znf2* | Crk1 |  |
| DNA repair (repairsome) | *Dna2, Dmc1, Gcn5, Grx4, Mnd1, Msh6, Rad3, Rad5, Rad7, Rad8, Rad14, Rad16, Rad17, Rad21, Rad23, Rad24, Rad51, Rad54, Rad54b, Rad502, Rec8, Rev1, Rint1, Rnr2, Rnr3, Swi5, Uve1, Yku80* |  | ***Cdc24-dependent Ras signalling pathway:***  Ras1🡪Cdc24🡪Cdc42-GTP🡪Ste20 |
| Spliceosome | *Cdc16, Cdc23, Cdc28, Mod2, Nuc2, Prp1/Zer1, Prp4, Prp6, Prp9, Prp11, Prp13, Prp40, Syf1, Syf2, Syf3/Cnn1* | Pkr | ►Production of tetratricopeptide-repeat (TPR)  ►Inhibition of Pkr  ►Spliceosome assembly bound to pre-*m*RNA  **i. Complex initiation:**  ExonI◄{Mud2-BBP-U1\_Prp40-Syf1-Syf2}►ExonII  **ii. Pre-spliceosome:** (BBP displaced for U2-snRNP Cnn1)  ExonI◄{Mud2-U2\_Cnn1-U1\_Prp40-Syf1-Syf2}►ExonII  **iii. Active spliceosome:** (U1\_Prp40 is displaced for U4/U6.5 tri-snRNP)  ExonI║[Mud2-U2\_Cnn1-U4-U6-U5-Syf1-Syf2]║ExonII  **iv. Dissolution of spliceosome, and the formation of mature *m*RNA**  ~ExonI~ExonII~ExonIII~ |
| pH-sensing and signalling | *Cna1, Rim8, Rim13, Rim20, Rim21, Rim101,* Pka1 |  | ***Rim101 activation pathway:***  Gpr5+Rim9-Pka1🡪Rim101-P🡪 proteolytically activated by (Rim21-Rim8-Rim20-Rim13) complex |
| Cell wall, membrane integrity, and ergosterol metabolism | *Bgl2, Cda1, Cda2, Cda3, Cdc24, Cdc42, Cdc420, Chs2, Chs5, Chs6, Chs7, Chs8, Erg2, Erg3, Erg4, Erg7, Erg25, Gsc2, Had1, Hoc1, Hxl1, Grx4, Kre5, Kre6, Ktr3, Mnn2, Och1, Rho1, Skn1, Ssn80,* Cdk8, Ire1, Kcs1, Mpk1, Pkc1 | *Ccd43, Rho10, Rho11* | ***Cdc24-dependent Ras signalling pathway:***  Ras1🡪Cdc24🡪Cdc42-GTP🡪Ste20 |
| Membrane stability, integrity, and potential | *Ccc1, Cft1, Cps1, Ctr1, Ena1, Gcs1, Kre5, Kre6, Nha1, Pho84, Pho85, Skn1, Smt1, Vph1* |  | ►**Ena1**-induced Rim101-Nrg1-dependent in NaCl/alkaline pH  ►**Ena1**-induced Hog1-Atf1 partly dependent in NaCl/alkaline pH  ►**Ena1**-induced-Cna1-independent in NaCl solution  ►**Ena1**-induced-Cna1-dependent in alkaline pH  ►**Nha1**-induced Rim101-Nrg1-dependent in KCl/acidic pH  ►**Nha1**-induced-Hog1-Atf1-independent in KCl solution  ►**Nha1**-induced-Cna1-independent in KCl solution |
| Vesicular trafficking | *Arf, Arl3, Atg8, Bet1, Cpy, Drs2, Dnf1, Dnf2, Gcs1, Gea1, Gea2, Ipc, Mss4, Ova1, Pmm1, Rac1, Rac2, \*Sac1, Sec2, Sec4, Sec7/Syt1, Sec15, Sec61, Sjl1/Inp51, Sjl2/Inp52, Sjl3/Inp53, Snc1, Snc2, Vph1, Vps14, Vps15, Vps30/Atg6, Vps34, Vps38, Vpsa, Ypt3,* Pik1, Pkc | *Sac1* | Activation of small GTPase by Rab and Arf protein families to convert cytGDPinactive ↔ membGTPactive  ***Carboxypeptidase Y (CPY) pathway involves:***  ►Type I kinase subcomplex (Atg6, Atg14, Vps15, Vps34)  ►PI3K complex II (Vps15, Vps30, Vps34, Vps38)  ►Atg8initiates lipid binding for vesicular transport |
| Cellular and vacuolar membrane localization of proteins | *Cdc43, Cdc42, Cin1, Csr1, Csr2, Csr3, Rac1, Rac2, Ras1, Rho1, Rho10, Rho11, Wsp1* |  | ***CaaX prenyltransferase activities on Rho-family proteins, chitin regulatory proteins and others***  ► farnesyltransferase (Ftase)  ► geranylgeranyltransferase-I (Ggtase-1)  ***Vacuolar membrane localisation and actin organisation***  ►Cin1-Cdc42-Wsp1-Rac1 effector signalling pathway |
| Agar adherence and invasion | *Amt1, Amt2, Ptp1, Ptp2* | *Hog1, Sit1, DSsn8,* Cbk1 | ►Inactivation of nitrogen catabolite repression  ►Inactivation of Hog1 signalling pathway |

↓ **=** decreases/reduce/repress; **5-FC =** 5-flucytosine; **AmpB =** Amphotericin B; **FDX =** fludioxonil; **FCZ =** Fluconazole; **CFW =** Calcofluor-white; **CSF =** cerebrospinal fluid; **PREs =** pheromone releasing elements; **snRNP = s**mall **n**uclear **r**ibo**n**ucleo**p**roteins (components of the spliceosome, e.g., Mud2, Prp40, Clf1)

**\*** under glucose starvation

*◊*carnitine acetyltransferase 2

▼initially induced but later repressed

▲initially repressed but later induced

**‡**could be induced/repressed depending on the source of the stress or type of virulence expression

#mitotic unisexual cell division

Demphasis on serotype D. Repressing *Sit1* gene enhances *Lac* expression (melanin production) and agar invasion, but this can be overruled by 1.0% glucose [150,180,181].

**Table 3.** Phenotypic responses of different mutants of *Cryptococcus* against various quantitative external factors: oxidants, nitrosants, denaturants, peroxides, metals, salts, chelators, inhibitors, dyes, genotoxicants, cyanides, UV, amides, urea, amino acids, caffeine, pH, temperature, sorbitol, glycerol, ethanol, vitamins, synthetic media, and antifungal agents. All phenotypic descriptions were assessed in the YPD at 30oC unless otherwise stated.

| **External factors** | **Hypersensitive mutants** | **Slightly-to-moderately sensitive mutants** | **Hyper-resistant mutants** | **Slightly-to-moderately resistant mutants** | **Wild type normal growth/resistance/sensitivity** |
| --- | --- | --- | --- | --- | --- |
| 0.5 mM H2O2 | *Δtsa1, Δtsa1Δtsa3, Δtsa1Δtsa3 Δtsa4,* *Δtsa1 Δtsa4, Δtrx1, Δtrx1Δtrx2, Δpep4* | *Δtrx2, Δprb1, Δpkc1S* |  |  | *Δtsa3, Δtsa4, Δtsa3Δtsa4, Δtsa3, Δtrx2,* *Δgpx1, Δgpx2, Δgpx1Δgpx2* |
| 1 – 2 mM H2O2 | *Δpbs2, Δpgi1, Δpkc1S, Δssk1* | *Δcac1, Δskn7* |  |  | *Δbck1, Δgpp2, Δhog1, Δmkk2, Δmpk1, Δqsp1,* *Δopt1, Δqsp1,* *Δras1, Δvps34* |
| 2.5 mM H2O2 | *Δbzp2, Δhog1, Δpbs2, Δssk1, Δtco2* | *Δgat5, Δsch9, Δskn7, Δtco1Δtco2* |  |  | *Δfbp1,* *Δtco1, Δtco(3-5), Δtco7* |
| 3.0 mM H2O2 | *Δhog1, Δssk1, Δtco2, Δtco1Δtco2* | *Δatf1, Δcac1, Δhog1Δypd1, Δptp2, Δsch9* |  | *Δena1, Δskn7,* | *Δaca1, Δgpa1, Δgpp2, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δhxl1, Δire1, Δpdr5, Δpdr5-2, Δpdr5-3, Δpka1, Δpka2, Δpka1Δpka2, Δptp1, Ptp1ovex, Ptp1ovexΔptp2, Δras1, Δrho10, Δrho11, Δrho10Δrho11, Δssn8, Δste11, Δste50, Δtco1, Δtco(3-5), Δtco7, Δubc6-2, Δubc8, Δyor1* |
| 3.5 mM H2O2 | *Δatf1, Δfzc31, Δhob1, Δhog1, Ptp2ovex, Ptp2ovexΔhog1, Δyap1, Δsre1* | *Δcac1, Δgrx4, Δhob1, Δhog1Δptp2, Δpan1, Δpka1, Δptp1Δptp2, Δptp2, Δubc8, Δusv101* |  | *Δubc6-2* | *Δaca1, Δgpa1, Δpdr5, Δpdr5-2, Δpdr5-3, Δpka2, Δpka1Δpka2, Δptp1, Δras1, Δyor1* |
| 5.0 mM H2O2 | *Δaap2, Δaap4, Δaap5, Δaap4Δaap5, Δleu1±2mm Leu* | *Δlys4* |  |  | *Δgcs1* |
| 0.05 mM *t*-BOOH | *Δras1* | *Δcdc24* |  |  | *Δaca1, Δcac1, Δgpa1, Δpka1, Δpka2, Δpka1Δpka2, Δras2* |
| 0.1 mM *t*-BOOH |  | *Δtsa1, Δtsa1Δtsa3, Δtsa1 Δtsa4, Δtsa1Δtsa3Δtsa4* |  |  | *Δtsa3, Δtsa4, Δtsa3Δtsa4* |
| 0.2 mM *t*-BOOH | *Δgpx1, Δgpx1Δgpx2* | *Δatf1* |  |  | *Δgpx2* |
| 0.5 mM *t*-BOOH | *Δtps1* | *Δnht1, Δtps2* |  |  |  |
| 0.6 mM *t*-BOOH | *Δras1* | *Δatf1, Δhog1, Δhog1Δptp2, Δptp1Δptp2, Δptp2* |  |  | *Δhog1, Δcac1, Δptp1* |
| 0.7 mM *t*-BOOH | *Δskn7* | *Δfzc31, Δgat5* |  |  |  |
| 0.8 mM *t*-BOOH | *Δpan1, Δsre1, Δhob1, Δfzc34* | *Δyap1, Δusv101* |  |  |  |
| 1 – 2 mM *t*-BOOH | *Δnht1, Δtps1, Δtps2* |  |  |  | *Δgrx4* |
| 0.02 mM COOH | *Δgpx1Δgpx2* | *Δgpx1, Δgpx2* |  |  |  |
| 0.05 mM COOH | *Δgpx2, Δgpx1Δgpx2* |  |  |  | *Δgpx1* |
| 1.0 mM Diamide | *Δpkc1S* |  |  |  | *Δbck1, Δmkk2, Δmpk1* |
| 2.0 mM Diamide | *Δire1, Δptp1Δptp2, Δptp2, Δras1* | *Δbzp2, Δgat5* | *Δhog1, Δhog1Δptp2* | *Δaca1, Δcac1, Δgpa1, Δpka1, Δpka1Δpka2* | *Δhxl1, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δpka2, Δptp1* |
| 2.5 mM Diamide | *Δhob1, Δire1, Δsre1, Δyap1* | *Δpan1, Δfzc34* |  |  | *Δhxl1* |
| 3.0 mM Diamide | *Δcdc24, Δhob1, Δire1, Δptp2, Δras1* | *Δsre1, Δfzc31* | *Δaca1, Δcac1, Δatf1, Δgpa1, Δhog1, Δpka1, Δpka1Δpka2, Ptp2ovex, Ptp2ovexΔhog1, Δhog1Δypd1* | *ΔAtf1, ΔSsk1, ΔSkn7* | *ΔGre2, ΔHxl1, ΔPka2, ΔPkp1, ΔRas2, ΔRho10, ΔRho11, ΔRho10ΔRho11, ΔSte11, ΔSte50, ΔTsa3, ΔTsa4, ΔTsa3ΔTsa4* |
| 4.0 mM Diamide | *Δpka2, Δras1* |  | *Δpka1Δpka2* | *Δaca1, Δcac1, Δgpa1, Δpka1* |  |
| 2 – 3 μg/mL MND | *Δsod1, Δsod2, Δsod1Δsod2* | *Δyap1, Δpan1* |  |  | *Δusv101, Δvps34* |
| 4.0 μg/mL MND |  |  |  |  | *Δaca1, Δcac1, Δgpa1, Δgre2, Δhog1, Δpka1, Δpka2, Δpka1Δpka2, Δpkp1, Δras1* |
| 5.0 μg/mL MND |  | *Δfzc34, Δgrx4* |  | *Δras1* | *Δbzp2, Δcac1****,*** *Δgre2, Δhog1,**Δhsp12, Δhsp122, Δhsp12Δhsp122, Δpkp1* |
| 6.0 μg/mL MND |  |  |  | *Δras1* | *Δaca1, Δcac1, Δgpa1, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δpka1, Δpka2, Δpka1Δpka2* |
| 1.0 mM NaNO2 | *Δpkc1S, Δtrx1, Δtrx1Δtrx2* | *Δtsa1, Δtrx2, Δyap4* |  |  | *Δbck1, Δgcs1, Δgpx1, Δgpx2, Δgpx1Δgpx2, Δmkk2, Δmpk1, Δpgi1* |
| 2.0 mM NaNO2 | *Δhira, Δhrd1, Δliv8, Δrad54, Δsre1* | *Δcap10, Δcul3, Δena2, Δfhb1, Δfyv10, Δgat201, Δhcm1, Δhos4, Δhrk1, Δhst302, Δhsv2, Δjjj1, Δkin1, Δliv1, Δliv10, Δliv11, Δliv12, Δliv13, Δliv14, Δliv15, Δliv2, Δliv3, Δliv4, Δliv5, Δliv6, Δliv7, Δliv9, Δpdr802, Δrad23, Δrad502, Δrint1, Δrmd5, Δrpd304, Δrph1, Δsas3, Δsnf1*37°C*, Δsnt1, Δssp101, Δsxi1, Δtco1, Δuba4, Δubc8, Δure1, Δyku80* |  |  | *Δqsp1, Δopt1, Δssn8* |
| 5.0 μM CdSO4 |  | *Δcac1,* |  |  | *Δhog1, Δras1* |
| 15 - 20 μM CdSO4 |  | *Δubc6-2* | *Δhog1, Δpbs2, Δssk1, Δssk2,* | *Δskn7, Δtco2, Δtco1Δtco2,* | *Δena1, Δpdr5, Δpdr5-2, Δpdr5-3, Δsch9, Δtco1, Δtco3, Δtco4, Δtco5, Δtco7, Δubc8, Δyor1* |
| 15 – 25 μM CdSO4 | *Δaca1Δras1, Δfzc6,* *Δras1* | *Δaca1, Δcac1, Δfzc37, Δgpa1, Δhap2, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δpka1, Δpka1Δpka2, Δste11, Δste50,* | *Δbzp1/Δhxl1* | *Δsip4, Δznf2, Δrds2* | *Δcac1Δras1, Δena1, Δgre2, Δpka2, Δpkp1,* |
| 25 μM CdSO4 |  | *Δptp2* | *Δhog1, Δpbs2, Δssk1, Δssk2* | *Δtco2, Δtco1Δtco2,* | *Δptp1, Ptp1ovex, Ptp1ovexΔptp2, Δskn7, Δtco1, Δtco3, Δtco4, Δtco5, Δtco7* |
| 27.5 μM CdSO4 |  | *Δptp2* | *Ptp2ovex, Ptp2ovexΔhog1* | *Δhog1* |  |
| 30 μM CdSO4 | *Δaca1Δras1, Δcdc24, Δgat5, Δras1* | *Δaca1, Δcac1, Δcuf1, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δpka1, Δgpa1, Δpka1Δpka2, Δras2* |  | *Δssk1, Δssk2, Δpbs2, Δhog1****,*** *Δgat201, Δfzc30* | *Δpka2, Δskn7, Δtco1, Δtco2, Δtco3, Δtco4, Δtco5, Δtco7, Δtco1Δtco2,* |
| 35 μM CdSO4 | *Δras1* | *Δaac1, ΔCac1, Δgpa1, Δgre2, Δpka1, Δpka1Δpka2, Δpkp1* | *Δhog1* |  | *Δpka2* |
| 15 mM Vanadate | *Δalg3, Δalg3Δcap59* | *Δalg9Δcap59, Δalg12Δcap59, Δcap59, Δoch1Δcap59* |  |  | *Δalg9, Δalg12, Δhoc1, Δhoc2, Δhxl1, Δktr3, Δmnn2, Δoch1, Δuxs1* |
| 1 – 5 mM KCN | *Δliv8, Δlys4, Δrint1, Δsre1* | *Δaox1,* |  |  | *Δsxi1* |
| 0.020 – 0.025% MMS | *Δire1, Δras1* | *Δhxl1* |  |  | *Δcac1, Δhog1, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δssk1, Δskn7, Δatf1* |
| 0.03% MMS | *Δgrx4, Δhob1, Δire1* | *Δcdc24, Δgat5, Δhxl1, Δsre1, Δras1* |  |  | *Δaca1, Δatf1, Δcac1, Δgpa1, Δhog1, Δpka1, Δpka2, Δpka1Δpka2, Δras2, Δssk1, Δskn7* |
| 0.04 – 0.06% MMS | *Δaca1Δras1, Δcac1Δras1, Δhog1, Δhog1Δptp2, Δgat6, Δptp1Δptp2, Δptp2, Δras1* | *Δhxl1, Δhob1, Δfzc6, Δbzp2* |  |  | *Δaca1, Δcac1, Δptp1, Δsre1* |
| 10 mM HU |  | *Δras1, Δhog1* |  |  | *Δcac1* |
| 25 – 30 mM HU | *Δaca1Δras1, Δgrx4, Δhog1* | *Δras1, Δssk1* |  |  | *Δaca1, Δatf1, Δcac1, Δgpa1, Δpka1, Δpka2, Δpka1Δpka2, Δskn7* |
| 50 mM HU | *Δbzp2, Δhog1, Δgat6, Δras1, Δssk1* | *Δcdc24* |  |  | *Δatf1, Δcac1, Δgre2, Δhxl1, Δpkp1, Δras2, Δste11, Δste50, Δskn7* |
| 100 mM HU | *Δgat5, Δhob1, Δsre1* | *Δfzc6* |  |  |  |
| 110 mM HU | *Δhog1, Δhog1Δptp2, Δptp2, Ptp2ovexΔhog1* | *Δptp1Δptp2, Ptp2ovex,* |  |  | *Δptp1* |
| 130 – 150 mM HU | *Δire1* | *Δhxl1, Δire1* |  |  |  |
| 0.5 – 1.0 mg/mL CFW | *Δgrx4Δcna1, Δkre5, Δkre6Δskn1, Δhxl1, Δire1, ΔRho1G15V, ΔRho1Q64L,* | *Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δcdc42Δcdc420, Δcdk8, Δoch1Δcap59, Δssn801* |  |  | *Δalg3, Δalg9, Δalg12, Δcap59, Δcdc42, Δcdc42Δcdc420, Δcdc420, Δcdc43, Δcna1, Δcrz1, Δcys3, Δgrx4, Δfbp1, Δkre6, Δkre6Δkre61, Δkre61, Δkre62, Δkre63, Δkre64, Δoch1, Δskn1* |
| 1.5 mg/mL CFW | *Δcna1, Δgrx4Δcna1, Δhxl1,* *Δire1* | *Δccr4, Δgrx4Δcna1, Δpkc1S, Δppg1, Δrho10, Δrho10Δrho11* |  |  | *Δcap60, Δcrz1, Δbck1, Δena1, Δena1Δnha1, Δgrx4, Δhoc1/Δhoc2, Δhog1, Δhxl1S, Δire1S, Δktr3, Δlrg1, Δmkk2, Δmnn2, Δnha1, Δoch1, Δopt1, Δpph3, Δpuf4, Δqsp1, Δrho11, Δrom2, Δssd1, Δssn8, Δuxs1* |
| 3 – 4 mg/mL CFW | *Δcna1, Δhad1Δcrz1, Δhxl1, ΔIre1, Δsp1/Δcrz1* | *Δhob1, Δhlh3* |  |  | *Δhad1, Δcys3* |
| 4.5 – 7.0 mg/mL CFW | *Δbzp2, Δcna1, Δhob1, Δsre1* | *Δgrx4, Δhad1, Δhap2, Δnrg1* |  |  | *Δcys3* |
| 0.01 – 0.05% Congo red | *Δgrx4, Δgrx4Δcrz1* | *Δcdk8, Δcrz1, Δssn801* |  |  |  |
| 0.5% Congo red | *Δaca1Δras1, Δbck1, Δcdc42Δcdc420, Δchs3, Δcna1, Δcsr2, Δgrx4Δcna1, Δhxl1, Δire1, Δkre5, Δkre6Δskn1, Δlrg1, Δlys4, Δmkk2, Δpkc1S,Δppg1, Δrho1G15V, Δrho1Q64L* | *Δccr4, Δcac1Δras1, Δcys3, Δgpp2, Δgrx4, Δipk1, Δipk1Δkcs1, Δkcs1, Δplc1, Δpuf4, Δrom2, Δssn8* |  |  | *Δcap60, Δaca1, Δcac1, Δcdc42, Δcdc42Δcdc420, Δcdc420, Δcdc43, Δchs1, Δchs2, Δchs4, Δchs5, Δchs6, Δchs7, Δchs8, Δcsr1, Δcsr3, Δfbp1, Δgrx4, Δhoc1, Δhoc2, Δhog1, Δhxl1S, Δire1S,Δkre6, Δkre6Δkre61, Δkre61, Δkre62, Δkre63, Δkre64, Δktr3, Δmnn2, Δoch1, Δplc2, Δras1, Δskn1, Δste11, Δste50, Δssd1, Δuxs1* |
| 0.7% Congo red | *Δras1* | *Δcdc24* |  |  | *Δras2* |
| 0.8% Congo red | *Δcna1, Δhad1Δcrz1, Δhob1* | *Δcrz1, Δhad1, Δhlh3, Δnrg1, Δbzp2* |  |  | *Δanb1, Δgcd2, Δgwo1, Δlhp1, Δpbp1, Δpuf4, Δtif3, Δvts1* |
| 0.9% Congo red | *Δras1* |  |  |  | *Δcac1, Δgre2, Δhog1, Δpkp1* |
| 1.0% Congo red | *Δcna1, Δhxl1, Δire1, Δmpk1, Δpgi1* | *Δhad1, Δhap2* |  |  | *Δalg3, Δalg9, Δalg12, Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δaca1, Δcac1,* *Δcap59, Δcar2, Δdyn2, Δena1, Δena1Δnha1, Δgpp2, Δhog1, Δhsp12, Δlsp1, Δnha1, Δoch1, Δoch1Δcap59, Δpdc1, Δpka1, Δpka2, Δpka1Δpka2, Δras1, Δsym2* |
| 0.01 μg/mL TCM |  | *Δire1* |  |  | *Δhxl1* |
| 0.020 – 0.125 μg/mL TCM | *Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δcap59, Δcna1, Δhxl1, Δire1, Δoch1Δcap59* | *Δcac1, Δcpk1, Δhog1, Δmpk1* |  |  | *Δalg3, Δalg9, Δalg12, Δhxl1S, Δire1S, Δoch1* |
| 0.20 μg/mL TCM | *Δbzp1/Δhxl1* |  |  |  |  |
| 0.25 μg/mL TCM | *Δcna1, Δgrx4Δcna1, Δgrx4Δcrz1, Δhxl1, Δire1, Δmpk1* | *Δcac1, Δcpk1, Δgrx4, Δhog1* | *Δpuf4* | *Δccr4* | *Δcrz1* |
| 0.30 μg/mL TCM | *Δptp2* | *Δhog1, Ptp2ovex, Ptp2ovexΔhog1, Δsre1* | *Δbzp2, Δnrg1, Δmbs1* | *Δhob1, Δhap2, Δclr1* |  |
| 0.40 μg/mL TCM | *Δcna1* | *Δcrz1* | *Δpuf4* | *Δlhp1* | *Δanb1, Δgcd2, Δgwo1, Δpbp1, Δtif3, Δvts1* |
| 5 – 10 mM DDT | *Δhxl1, Δire1* |  |  |  |  |
| 15 mM DTT | *Δbzp1/Δhxl1, Δbzp2, Δcna1, Δgrx4, Δgrx4Δcna1, Δgrx4Δcrz1, Δhob1, Δsre1* | *Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δcap59, Δclr1, Δgrx4, Δhad1, Δhad1Δcrz1, Δnrg1, Δhap2, Δoch1Δcap59, Δpuf4* |  | *Δmbs1* | *Δalg3, Δalg9, Δalg12, Δcrz1, Δoch1* |
| 20 mM DTT | *Δhxl1, Δire1* | *Δcna1, Δhad1* |  | *Δcrz1, Δpbp1, Δvts1* | *Δanb1, Δgcd2, Δgwo1, Δlhp1, Δpuf4, Δtif3* |
| 0.005% SDS | *Δleu1±2mM Leu, Δlys4* | *Δras1, Δcac1* |  |  | *ΔHog1* |
| 0.010% SDS | *Δbck1, Δcna1, Δgrx4, Δgrx4Δcna1, Δkcs1, Δmkk2, Δpkc1S, ΔRho1Q64L, Δugd1,* | *Δpgi1, Δppg1, ΔRho1G15V, Δrho10, Δrho10Δrho11* |  |  | *Δcap10, Δcap59, Δcap60, Δcap64, Δcdk8, Δlrg1, Δopt1, Δpuf4, Δqsp1, Δrho11, Δrom2, Δssd1, Δssn801, Δuxs1* |
| 0.015% SDS | *Δcna1, Δhad1Δcrz1* | *Δhad1* |  |  | *Δcrz1* |
| 0.020% SDS | *Δcdc42Δcdc420, Δcna1, Δcrz1, Δhad1* | *Δgpp2, Δpep4* |  |  | *Δcar2, Δcdc42, Δcdc42Δcdc420, Δcdc420, Δcdc43, Δcxd1, Δcxd2, Δcxd3, Δdyn2, Δhsp12, Δlsp1, Δmay1, Δmpr1, Δpdc1, Δprc1, Δprb1, Δscx1, Δsym2* |
| 0.025% SDS | *Δpmt4* | *Δssk1, Δhog1, Δhog1Δypd1* |  |  | *Δskn7* |
| 0.03% SDS | *Δcap10, Δchs3, Δcna1, Δcrz1/sp1, Δcsr1, Δcsr3, Δcsr2, Δhad1, Δhob1, Δhog1, Δire1, Δkre5, Δkre6Δskn1, Δliv8, Δras1, ΔRho1G15V, ΔRho1Q64L, Δrho10, Δrho10Δrho11, Δsre1* | *Δcap60, Δccr4, Δbzp2, Δgpp2, Δhap2, Δhrk1, Δkre6, Δkre6Δkre61, Δnrg1, Δpuf4* |  |  | *Δanb1, Δatf1, Δcac1, Δchs1, Δchs2, Δchs4, Δchs5, Δchs6, Δchs7, Δchs8, Δcsr1, Δcsr3, Δgcd2, Δgwo1, Δhlh3, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δhxl1, Δkre61, Δkre62, Δkre63, Δkre64, Δlhp1, Δpbp1, Δrho11, Δskn1, Δtif3, Δvts1* |
| 0.04% SDS | *Δhog1, Δire1, Ptp2ovex, Ptp2ovexΔhog1* | *Δptp2* |  |  | *Δhxl1* |
| 0.05 – 0.06% SDS | *Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δaca1, Δaca1Δras1, Δcac1Δras1, Δcap59, Δcdc3, Δcna1, Δfbp1, Δhog1, Δmpk1, Δoch1Δcap59, Δplc1, Δras1, Δuxs1* | *Δalg9, Δcdc24, Δktr3* |  |  | *Δalg3, Δalg12, Δcac1, Δgcs1, Δgre2, Δhoc1, Δhoc2, Δhxl1, Δmnn2, Δoch1, Δpka1, Δpka2, Δpka1Δpka2, Δpkp1, Δplc2, Δras2,* *Δste11, Δste50* |
| 0.10% SDS | *Δugd1, Δuxs1, Δcap10, Δcap59, Δcap60, Δcap64* |  |  |  | *Δssn8* |
| 0.30% SDS | *Δena1, Δena1Δnha1, Δhog1* |  |  |  | *Δnha1* |
| 0.50% SDS | *Δena1, Δena1Δnha1, Δhog1, Δsmt1* | *Δgcs1* |  | *Δnha1* |  |
| >1.9% SDS |  | *Δqsp1* |  |  |  |
| 0.025% Triton X-100 or X-114 | *Δsmt1* | *Δgcs1* |  |  |  |
| 0.05 mg/mL Caffeine | *Δplc1* |  |  |  | *Δplc2* |
| 0.2 mg/mL Caffeine | *Δrho10, Δrho10Δrho11* | *Δppg1* |  |  | *Δbck1, Δlrg1, Δmkk2, Δpuf4, Δrom2, Δssd1* |
| 0.5 – 0.7 mg/mL Caffeine | *Δcna1, Δcsr2, Δgrx4, Δgrx4Δcna1, Δipk1, Δipk1Δkcs1, Δkcs1, Δkre6, Δskn1, Δpkc1S, Δrho10* | *Δccr4, Δcdc3*24°C*, Δcdc12*24°C*, Δchs3, Δgrx4, Δkre5, Δpka1, Δrho10Δrho11* |  |  | *Δcap60, Δchs1, Δchs2, Δchs4 Δchs5, Δchs6, Δchs7, Δchs8, Δcsr1, Δcsr3, Δdnj130/37/39°C, Δkre6, Δkre6Δkre61, Δkre61, Δkre62, Δkre63, Δkre64, Δqsp1, Δopt1, Δpkr1, Δskn1, Δssn8* |
| 1.0 mg/mL Caffeine | *Δcdc42Δcdc420, ΔRho1G15V, ΔRho1Q64L, Δrho10, Δrho10Δrho11* |  |  |  | *Δalg3, Δalg9, Δalg12, Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δcap59, Δcdc42, Δcdc42Δcdc420, Δcdc420, Δcdc43, Δoch1, Δoch1Δcap59* |
| 5.0 mg/mL Caffeine |  |  |  |  | *Δmay1, Δmpr1, Δscx1, Δprc1, Δprb1, Δcxd1, Δcxd2, Δcxd3, Δpep4* |
| >37.5 mg/mL Caffeine |  | *Δqsp1* |  |  |  |
| 0.05 μg/mL AmpB |  |  |  |  | *Δhog1, Δpbs2, Δssk2* |
| 0.06 – 0.08 μg/mL AmpB |  | *Δhog1* |  |  | *Δcac1, Δras1,* |
| 0.09 – 0.1 μg/mL AmpB | *Δplc1* | *Δhog1, Δpbs2, Δssk2* |  |  |  |
| 0.3 μg/mL AmpB | *Δhog1, Δhog1Δcac1, Δhog1Δpka1, Δpbs2, Δssk2* | *Δcac1, Δpka1, Δhog1* |  |  |  |
| 0.4 μg/mL AmpB |  | *Δhog1, Δpbs2, Δssk1, Δssk2* |  |  | *Δskn7, Δtco1, Δtco2,* *Δtco3, Δtco4, Δtco5, Δtco7* |
| 0.5 μg/mL AmpB | *Δhog1, Δpbs2, Δssk1, Δssk2* | *Δgrx4, Δtco2* |  |  | *Δskn7, Δtco1, Δtco3, Δtco4, Δtco5, Δtco7* |
| 0.4 – 0.8 μg/mL AmpB | *Δaca1Δras1, Δcac1, Δcac1Δras1, Δgpa1, Δhog1, Δhog1Δypd1, Δpbs2, Δpka1, Δpka1Δpka2, Δssk1, Δssk2, Δtco2* | *Δaca1, Δcdc24, Δena1,* *Δena1Δnha1, Δhxl1, Δire1, Δpka2, Δras1, Δras2, Δubc6-2* |  | *Δyor1* | *Δgre2, Δnha1, Δtco1, Δtco3, Δtco4, Δtco5, Δtco7, Δpdr5, Δpdr5-2, Δpdr5-3, Δpkp1, Δsch9, Δskn7, Δsnf1, Δste11, Δste50, Δubc8* |
| 1.0 μg/mL AmpB | *Δena1Δnha1, Δgpa1, Δhog1, Δpka1, Δpka1Δpka2, Δssk1, Δcac1* | *Δaca1, Δena1, Δpka2, Δras1* |  | *Δatf1* | *Δnha1, Δskn7* |
| 1.2 μg/mL AmpB | *Δcac1, Δhog1Δras1* | *Δhsp12, Δhsp122, Δhsp12Δhsp122* |  |  |  |
| 1.5 μg/mL AmpB | *Δhob1, Δjjj1, Δmbs1, Δert1, Δhcm1, Δecm22* |  | *Δsre1, Δyap1* |  |  |
| 0.05 μg/mL MCZ | *Δdnj130/37°C, Δleu1±2mM Leu, Δlys4* |  |  |  |  |
| 5 – 6 μg/mL FCZ | *Δhxl1, Δire1* |  |  |  |  |
| 10 μg/mL FCZ | *Δdnj1, Δart1, Δcfo1, Δcft1, Δmga2* | *Δarf1, Δgrx4* |  |  | *Δdnj137*°C*, Δcap60, Δcbk1, Δcfo1, Δkic1, Δndh1* |
| 12 μg/mL FCZ |  | *Δras1* | *Δhog1* |  | *Δcac1* |
| 14 μg/mL FCZ | *Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δcap59, Δoch1Δcap59,* | *Δalg12, Δalg3Δcap59* | *Δhog1, Δpbs2, Δssk1, Δssk2, Δskn7* | *Δtco1Δtco2* | *Δalg3, Δalg9, Δoch1, Δtco1, Δtco2, Δtco3, Δtco4, Δtco5, Δtco7* |
| 16 μg/mL FCZ | *Δena1* |  | *Δhog1, Δpbs2, Δssk1, Δssk2, Δskn7* | *ΔTco1ΔTco2, ΔTco7* | *Δtco1, Δtco2, Δtco3, Δtco4, Δtco5* |
| 18 μg/mL FCZ |  | *Δcac1, Δras1* | *Δhog1, Δpbs2, Δssk1, Δssk2* | *Δsch9, Δskn7, Δubc6-2, Δubc8* | *Δpdr5, Δpdr5-2, Δpdr5-3, Δtco1Δtco2,* *Δtco1, Δtco2, Δtco3, Δtco4, Δtco5, Δtco7, Δyor1* |
| 12 – 18 μg/mL FCZ | *Δcac1Δhog1, Δhxl1, Δire1, Δlys4, Δptp2, Δsre1, Δyap1* | *Δena1Δnha1,* | *Δert1, Δhcm1, Δhob1, Δhog1Δypd1, Δjjj1, Δmsb1, Δpbs2, Ptp2ovex, Ptp2ovexΔhog1, Δssk2* | *Δatf1, Δecm22* | *Δena1, Δgre2, Δhog1Δpka1, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δkre5, Δkre6Δskn1, Δnha1, Δpka1, Δpkp1, Δras1, Δste11, Δste50* |
| 0.05 μg/mL KCZ | *Δhxl1* | *Δire1* |  |  |  |
| 0.075 – 0.100 μg/mL KCZ | *Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δcap59, Δhxl1, Δire1, Δoch1Δcap59* |  |  |  | *Δalg3, Δalg9, Δalg12, Δoch1* |
| 0.2 μg/mL KCZ |  | *Δtco1* | *Δssk1, Δssk2, Δpbs2, Δhog1Δypd1* | *Δhog1, Δskn7, Δtco2, Δtco1Δtco2* | *Δste11, Δste50, Δtco1, Δtco3, Δtco4, Δtco5, Δtco7* |
| 0.3 μg/mL KCZ |  | *Δena1, Δena1Δnha1, Δhog1Δpka1, Δhog1Δcac1* |  | *Δcac1, Δhog1, Δpbs2, Δpka1, Δssk1, Δssk2* | *ΔNha1, Δtco1, Δtco2, Δtco3, Δtco4, Δtco5, ΔTco7, ΔTco1ΔTco2, ΔSkn7* |
| 0.7 μg/mL KCZ |  |  |  |  | *Δhog1, Δras1, Δcac1* |
| 0.02 – <0.03 μg/mL ICZ | *Δhxl1, Δire1, Δplc1* |  |  |  |  |
| 0.04 – 0.05 μg/mL ICZ | *Δcac1, Δhxl1, Δire1, Δras1* | *Δaca1, Δcdc24, Δgpa1, Δpka1Δpka2, Δpka1, Δpka2, Δras2* |  |  | *Δgre2, Δhog1, Δpbs2, Δpkp1, Δssk2, Δssk1, Δskn7, Δtco1, Δtco2, Δtco3, Δtco4, Δtco5, Δtco7, Δtco1Δtco2* |
| 0.5 – 0.6 μg/mL ICZ | *Δhog1Δpka1, Δhog1Δcac1, Δhxl1, Δire1* | *Δcac1, Δhog1, Δpka1* |  |  |  |
| 0.7 μg/mL ICZ | *Δcac1, Δras1* |  |  | *Δhog1* |  |
| 0.03 μg/mL VCZ | *Δplc1* |  |  |  |  |
| 1.0 μg/mL 5-FC | *Δplc1* |  |  |  |  |
| 500 μg/mL 5-FC | *Δras1, Δatf1* | *Δhog1* |  | *Δcac1* |  |
| 600 μg/mL 5-FC | *ΔPtp2* | *Δhog1, Ptp1ovexΔptp2, Ptp2ovexΔhog1* | *PTP2ovex* |  | *ΔPtp1, PTP1ovex* |
| 0.1 μg/mL FDX |  | *Δaca1Δras1* |  |  | *Δaca1, Δcac1, Δcac1Δras1, Δhog1, Δras1* |
| 0.5 μg/mL FDX | *Δaca1Δras1, Δhxl1, Δire1, Δras1* | *Δcac1Δras1* |  |  | *Δaca1, Δcac1, Δhog1* |
| 1.0 μg/mL FDX | *Δaca1Δras1, Δbck1, Δcac1Δras1, Δcna1, Δcnb1, Δhxl1, ΔIre1, Δmkk1, Δmpk1, Δras1, Δsch9* | *Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δcac1, Δcdc24, Δoch1Δcap59, Δras2* | *Δhog1, Δpbs2* | *Δssk1, Δubc8* | *Δalg3, Δalg9, Δalg12, Δaca1, Δcac1, Δcac1Δhog1, Δcap59, Δgpa1, Δgpa1Δhog1, Δgre2, Δhog1, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δoch1, Δpdr5, Δpdr5-2, Δpdr5-3, Δpka1, Δpka1Δhog1, Δpka1Δpka2, Δpka2, Δpkp1, Ubc6-2, Δyor1* |
| 1.5 μg/mL FDX | *Δptp2* |  | *Δhog1, Ptp2ovex, Ptp2ovexΔhog1* |  |  |
| 2.5 μg/mL FDX |  | *Δaca1* | *Δhog1, Δpka1Δhog1, Δgpa1Δhog1, Δcac1Δhog1* |  | *Δcac1, Δgpa1, Δpka1, Δpka2, Δpka1Δpka2* |
| 5.0 μg/mL FDX | *Δaca1, Δatf1, Δgre2, Δpkp1, Δras1* | *Δpdr5, Δyor1* | *Δcac1Δhog1, Δgpa1Δhog1, Δhog1, Δssk1, Δpbs2, Δpka1Δhog1* | *Δena1, Δskn7, Δubc8* | *Δcac1, Δgpa1, Δpdr5-2, Δpdr5-3, Δpka1, Δpka2, Δpka1Δpka2, Δste11, Δste50, Δubc6-2* |
| 10 μg/mL FDX | *Δaca1, Δcna1, Δcnb1, Δmpk1, Δskn7, Δsch9* |  | *Δcac1Δhog1, Δgpa1Δhog1,* *Δhog1Δcna1, Δhog1Δypd1, Δssk1, Δhog1, Δpbs2, Δpka1Δhog1* |  | *Δcac1, Δgpa1, Δpka1, Δpka2, Δpka1Δpka2* |
| 100 μg/mL FDX |  |  | *Δhog1±Glc, \*Δpbs2, Δssk1±Glc, Δtco1,* *Δtco1Δtco2* | *\*Δskn7, Δtco2* | *Δtco3, Δtco4, Δtco5, Δtco7* |
| 15 mM MG |  | *Δhog1±Glc, Δssk1±Glc, Δtco2, Δtco1Δtco2, \*Δpbs2* |  |  | *\*Δskn7, Δtco1, Δtco3, Δtco4, Δtco5, Δtco7* |
| 20 mM MG | *Δhog1±Glc, Δssk1±Glc, \*Δpbs2, Δtco1Δtco2, Δtco2* | *Δaca1,* *Δaca1Δras1, Δcac1* |  | *Δtco1, Δtco4, Δtco5* | *Δcac1Δras1, Δgre2, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δpkp1, Δras1, \*Δskn7, Δste11, Δste50, Δtco3, Δtco7* |
| 25 mM MG | *Δaca1Δras1, Δatf1, Δhog1* | *Δaca1, Δcac1, Δcac1Δras1, Δgpa1, Δpka1, Δpka1Δpka2* | *Δras1* |  | *Δhsp12, Δhsp122, Δhsp12Δhsp122, Δpka2* |
| 1 – 5 μg/mL Antimycin A | *Δsod2, Δsod1Δsod2* | *Δgrx4* |  |  | *Δsod1* |
| 1.0 mM ParaquatTM | *Δsod2, Δsod1Δsod2* | *Δsod1* |  |  |  |
| 1.0 mg/mL Oxytetracycline | *Δsod1, Δsod2, Δsod1Δsod2* |  |  |  |  |
| 20 μg/mL Hygromycin B |  |  |  | *Δhoc1* | *Δoch1, Δhoc2, Δhxl1, Δktr3, Δmnn2, Δuxs1* |
| 25 – 100 μg/mL Hygromycin B | *Δhog1, Δsnf1, Δvph1* |  | *Δena1Δnha1* | *Δnha1* | *Δena1* |
| 100 – 250 μg/mL CsA | *Δcbk1, Δcpa1, Δcpa2, Δgrx437🡪30°C, Δmob2, Δras1, Δsog2* | *Δess1, Δgrx430🡪30°C, Δkic1, Δtao3* | *Δcpa1Δcpa2* |  | *Δarf1, Δcap60, Δhym1, Δndh1* |
| 10 μg/mL CpF or 100 ng/mL RPM | *Δcna1, Δgrx4Δcna1* |  |  |  | *Δarf1, Δcap60, Δcbk1, Δcdc3, Δcdc12, Δgrx4, Δkic1, Δkre5, Δkre6Δskn1, Δndh1* |
| ≥32 μg/mL CpF | *Δccr4* |  |  |  | *Δplc1* |
| 0.005 μg/mL FK-506 | *Δcna1* | *Δcrz1, Δlhp1, Δpuf4* | *Δpbp1* | *Δgwo1, Δtif3* | *Δanb1, Δgcd2, Δvts1* |
| 1.0 μg/mL FK-506 at 30oC | *Δgrx437🡪30°C* | *Δgrx430🡪30°C* |  |  | *Δcna1, Δcnb1, Δhog1, Δpbs2* |
| 1.0 μg/mL FK-506 + 1.0 μg/mL FDX at 30oC | *Δcna1, Δcnb1* |  | *Δhog1, Δpbs2* |  |  |
| 1.0 – 2.5 μg/mL FK-520 at 25oC |  |  |  |  | *Δess1, Δcna1* |
| 1.0 – 2.5 μg/mL FK-520/FK-506 at ≥30oC | *Δcbk1, Δcna1, Δess1, Δras1, Δsog2* | *Δkic1, Δmob2, Δtao3* |  |  | *Δarf1, Δhym1, Δndh1* |
| 0.5 μM LatA | *(Δcap1, Δcap2, Δcap1Δcap2)37°C,* *Δsac628°C/37°C/1%O2,5%CO2,28°C**, (Δbni1, Δtpm1, Δsac6Δcap1, Δsac6Δcap2)28°C/37°C/5%CO2,28°C/1%O2,5%CO2,28°C* |  |  |  | *(Δcap1, Δcap2, Δcap1Δcap2)28°C, (Δcap1, Δcap2, Δcap1Δcap2, Δsac6)5%CO2**,28°C, (Δcap1, Δcap2, Δcap1Δcap2)1%O2,5%CO2,28°C* |
| 3 – 6 mM CQ |  | *Δgrx4, Δvps45* |  |  |  |
| 22oC | *Δgpp2* |  |  |  | *Δmat2, Δznf2* |
| 24 – 25oC | *Δbzp2, Δcku80Δpkc1, Δpkc1* | *Δcin1, Δcpa1Δcpa2, Δcuf1, Δfzc6, Δgat5, Δgrx4, Δhlh3, Δhob1, Δliv4,* *Δmga2, Δnrg1, Δplc1, Δras1Δras2,* *Δtsa1, Δtsa1Δtsa3* |  | *Δrho11* | *Δada2, Δapn2, Δaro80, Δatf1, Δbzp1/Δhxl1, Δcch1, Δcdc3, Δcdc10, Δcdc11, Δcdc12, Δcku80, Δclc1, Δcna1,* *Δcns5, Δcrz1/Δsp1, Δena1Δnha1, Δert1, Δess1, Δfzc1, Δfzc30, Δfzc31, Δfzc46, Δgat6, Δhap1, Δmbs2, Δmcm1, Δmiz1, Δmln1, Δnha1, Δpkc1, Δplc2, Δras1, Δras2, Δrho10, Δrho10Δrho11, Δrho-GEF, Δrom2±2μM NCZ, Δsh3-rho-GEF, Δsod2, Δsre1, Δtsa3, Δura5, Δusv101, Δwsp1* |
| 28oC | *(Δbni1, Δtpm1)5%CO2±1%O2, (Δbni1, Δsac6, Δtmp1)1%O2+5%CO2, Δcdc24Δptp3* | *(Δsac6, Δtmp1)±5%CO2, (Δsac6Δcap1, Δsac6Δcap2)1%O2+5%CO2* |  |  | *(Δcap1, Δcap2, Δcap1Δcap2, Δsac6, Δsac6Δcap1, Δsac6Δcap2)±5%CO2, (Δcap1, Δcap2, Δcap1Δcap2, Δsac6)1%O2+5%CO2, Δcdc24, Δptp3, Δras1, Δras1Δcdc24* |
| 30oC | *Δbni1, Δbzp2, Δcdc3, Δcdc11, Δcdc12,* *Δcdc42Δcdc420Δrac2, Δcku80Δpkc1, Δcys3, Δcys320mM Met, Δmgt2↓Pgal7, Δpkc1, Δuge1, Δugt1, Δvph1pH3.5* | *Δaca1Δras1, Δbzp2, Δcam1, Δcap10, Δcbk1, Δcdc42Δcdc420, Δcin1, Δcpa1Δcpa2, Δcrz1Δlhp1, Δcuf1, Δfzc6, Δgat5, Δgat6, Δhad1, Δhxk2, Δcrz1Δhad1, Δkcs1, Δkre5, Δkre6Δskn1, Δleu1±2mM Leu, Δliv8, Δmga2, Δmgt2Pgal7 (50 mmol/L Mg), Δmob2, Δnrg1, Δpgi1, Δppg1, Δptp2, Δpuf4, Δpuf4Δcrz1, Δras1, Δrho10, Δrho10Δrho11, Δsod2, Δspe3-lys9; Δspe3-Lys9, Δtao3, Δtmp1, Δtrx1, Δtrx1Δtrx2, Δvph1* |  | *Δrho11* | *Δabp1, Δaap2, Δaap4, Δaap5, Δaap4Δaap5, Δaca1, Δada2, Δalg3, Δalg9, Δalg12, Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δanb1, Δaph1, Δapn2, Δarf1, Δarg3, Δaro80, Δatf1, Δbck1, Δbzp1/Δhxl1, Δbwc2, Δcac1, Δcap59, Δcap60, Δcar2, Δchs1, Δchs2, Δchs3, Δchs4, Δchs5, Δchs6, Δchs7, Δchs8, Δccr4, Δcdc3, Δcdc10, Δcdc11, Δcdc12, Δcdc24, Δcdc42, Δcdc42Δcdc420, Δcdc43, Δcdc420, Δcdk8, Δcir1, Δcku80, Δclc1, Δcna1, Δcnb1, Δcns5, Δcpa1, Δcpa2, Δcrn1, Δcsr1, Δcsr2, Δcsr3, Δcrz1/Δsp1, Δcrz1Δpbp1, Δcrz1Δpuf4, Δcys320mM Cys, Δdyn2, Δena1, Δena1Δnha1, Δert1, Δess1, Δfbp1, Δfzc1, Δfzc30, Δfzc31, Δfzc46, Δgat1, Δgat201, Δgat204, Δgcd2, Δgcn5, Δgpa1, Δgpp2, Δgrx4, Δgwo1, Δhap1, Δhlh3, Δhxl1, Δhob1, Δhoc1, Δhoc2, Δhog1, Δhog1Δcac1, Δhog1Δgpa1, Δhog1Δpka1, Δhog1Δptp2, Δhsp12, Δhym1, Δire1, Δipk1, Δipk1Δkcs1, Δkic1, Δkre6, Δkre6Δkre61, Δkre61, Δkre62, Δkre63, Δkre64, Δktr3, Δlac1, Δleu120mM Asc, Δlhp1, Δliv4, Δlrg1, Δlsp1, Δlys4, Δmbs2, Δmcm1, Δmgt1, Δmgt3, Δmgt1Δmgt3, Δmiz1, Δmkk1, Δmkk2, Δmln1, Δmnn2, Δmpk1, Δncs1, Δndh1, Δnha1, Δoch1, Δoch1Δcap59, Δpbp1, Δpbs2, Δpdc1, Δpdr5, Δpdr5-2, Δpdr5-3, Δpka1, Δpka2, Δpka1Δpka2, Δpkc1, Δplc1, Δplc2, Δpmt4, Δptp1, Ptp1ovex, PtpovexΔptp2, Ptpovex, Ptp2ovexΔhog1, Δpbs2, Δptp1Δptp2, Δrac1, Δrac2, Δrad17, Δras1, Δras1Δcdc24, ΔRho1G15V, ΔRho1Q64L, Δrho11, Δrho-GEF, Δrom2±2μM NCZ, Δsac6, Δsch9, Δsh3-rho-GEF, Δsit1, Δskn1, Δskn7, Δsla2, Δsnf1, Δsnf7, Δsod1, Δsod1Δsod2, Δsog2, ΔSpe3-lys9, Δsre1, Δssd1, Δssk1, Δssk2, Δssn8, Δssn801, Δste11, Δste50, Δsym2, Δtao3, Δtco1, Δtco2, Δtco3, Δtco4, Δtco5, Δtco1Δtco2, Δtco7, Δtif3, Δtrx2, Δtsa1, Δtsa1Δtsa3, Δtsa3, Δubc6-2, Δubc8, Δura5, Δusv101, Δuxs1, Δvad1, Δvps34, Δvts1, Δwsp1, Δyor1, Δyor1Δabp1,* |
| 33 – 35oC | *Δcna1, Δhxl1* | *Δgcn5, Δire1, Δras1* |  | *Δhog1, Δmpk1* |  |
| 37oC | *Δaap4Δaap5, Δbni1, (Δbni1, Δsac6, Δtpm1)1%O2+5%CO2, Δbzp1/Δhxl1, Δbzp2, Δcam1, Δcbk1, Δcdc3, Δcdc11, Δcdc12, Δcdc42, Δcdc42Δcdc420, Δcdc42Δcdc420Δrac2, Δcdc43, Δcin1, Δcku80Δpkc1, Δcna1****,*** *Δcsr2, Δire1, Δkic1, Δkre5, Δkre6Δskn1, Δleu1, Δlys4, Δmga2, Δmob2, Δnmt1, Δpkc1, Δplc1, Δras1, Δras1Δcdc24, Δras1Δras2,* *Δrho10, Δrho10Δrho11, Δrom22μM NCZ, (Δsac6Δcap1, Δsac6Δcap2)±5%CO2, (Δsac6Δcap1, Δsac6Δcap2)±1%O2+5%CO2, Δsit1, Δsod1Δsod2, Δsod2, Δsog2, Δspe3-Lys9, ΔSpe3-lys9, Δtao3, Δtpm1, Δtps1, Δtps2, Δtrx1Δtrx2, Δura5, Δvph1* | *(Δcap1, Δcap2, Δcap1Δcap2)1%O2+5%CO2, Δccr4, Δcdc10, Δcdc24, Δcdc42,**Δckb1, Δcpa1Δcpa2, Δcuf1, Δcrz1Δhad1, Δcrz1Δlhp1, Δcrz1Δpuf4, Δfzc6, Δgat5, Δgat6, Δgrx4, Δhad1, Δipk1Δkcs1, Δkcs1, Δleu120mM Asc,Δlrg1, Δmpk1, Δnrg1, Δpgi1, Δppg1, Δptp1Δptp2, Δptp2, Δpuf4, Δpuf4Δcr1, Δrub1, Δspe3-Lys9, Δtrx1, Δwsp1* |  |  | *(Δabp1, Δcrn1, sla2)1%O2,5%CO2, Δaap4, Δaap5, Δada2, Δalg3, Δalg9, Δalg12, Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δanb1, Δaph1, Δapn2, Δarf1, Δaro80, Δatf1, Δbck1, Δcap1, Δcap2, (Δcap1Δcap2, Δsac6)±5%CO2,* *(Δcap1Δcap2, Δsac6)1%O2,5%CO2, Δcap59, Δcap60, Δcar2, Δcch1, Δcdc420, Δcdk8, Δchs1, Δchs2, Δchs4, Δchs5, Δchs6, Δchs7, Δchs8, Δcku80, Δclc1, Δcpa1, Δcpa2,* *Δcps1, Δcns5, Δcrz1/Δsp1, Δcsn1201, Δcsr1, Δcsr3, Δcrz1Δpbp1, Δcxd1, Δcxd2, Δcxd3, Δdyn2, Δena1, Δena1Δnha1, Δert1, Δess1, Δfbp1, Δfzc1, Δfzc30, Δfzc31, Δfzc46, Δgat1, Δgcd2, Δgcs1, Δgpp2, Δgwo1, Δhap1, Δhlh3, Δhob1, Δhoc1, Δhoc2, Δhog1, Δhog1Δptp2, Δhrd1, Δhsp12, Δipk1, Δkre6, Δkre6Δkre61, Δkre61, Δkre62, Δkre63, Δkre64, Δktr3, Δlhp1, Δliv4, Δlsp1, Δmat2, Δmay1, Δmbs2, Δmcm1, Δmiz1, Δmkk2, Δmln1, Δmnn2, Δmpr1, Δncs1, Δnha1, Δndh1, Δnsr1, Δnth1, Δoch1, Δoch1Δcap59, Δpak1, Δpbp1, Δpdc1, Δpep4, Δpik1, Δplc2, Δpmt4, Δptp1, Ptp1ovex, Ptp1ovexΔptp2, Δprb1, Δprc1, Δpxa2, Δrac1, Δrac2, Δras2, Δrho11, Δrho-GEF,* *Δrom2, Δscx1, Δsh3-rho-GEF, Δskn1, Δsnf7, Δsod1, Δsre1, Δssd1, Δssn8, Δssn801, Δste11, Δste20α, Δste50, Δswe1, Δsym2, Δtif3, Δtrx2, Δtsa1, Δtsa1Δtsa3, Δtsa3, Δusv101, Δuxs1, Δvad1, Δvam6, Δvps25, Δvps34, Δvts1, Δznf2* |
| 38oC | *Δbzp1/Δhxl1, Δbzp2, Δcna1, Δcpa1, Δcpa1Δcpa2, Δcrz1Δlhp1, Δcrz1Δpuf4, Δfzc1, Δfzc30, Δhob1, Δgcn5, Δire1, Δmga2, Δpkc1, Δpuf4, Δras1, Δsnf1, Δsre1, Δura5* | *Δada2, Δapn2, Δaro80, Δatf1, Δcrz1/Δsp1, Δcrz1Δhad1, Δcuf1, Δert1, Δfzc31, Δfzc6, Δgat5, Δgat6, Δhad1, Δhap1, Δhlh3, Δlhp1, Δmbs2, Δmiz1, Δnrg1, Δtsa1,* *Δtsa1Δtsa3, Δtsa1Δtsa3Δtsa4, Δtsa1Δtsa4, Δusv101* |  | *Δfzc46, Δmln1, Δmcm1* | *Δanb1, Δclc1, Δcpa2, Δena1Δnha1, Δgat1, Δgcd2, Δgwo1, Δliv4, Δnha1, Δpbp1, Δras2, Δtif3, Δtsa3, Δtsa3Δtsa4, Δtsa4, Δvts1* |
| 39oC | *Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δbck1, Δcam1, Δcap59, Δcdc24, Δcdc42, Δcdc43, Δcdc42Δcdc420, Δcna1, Δcrz1, Δcrz1Δhad1, Δhad1, Δhxl1, Δlhp1, Δmga2, Δmkk2, Δncs1, Δoch1Δcap59, Δppg1, Δpuf4, Δrho10, Δrho10Δrho11, Δste20α, Δura5* | *Δanb1, Δgcd2, Δgrx4, Δgwo1, Δhoc1, Δhog1, Δkcs1, Δktr3, Δlrg1, Δuxs1, Δvts1* |  | *Δgat1, Δpbp1* | *Δalg3, Δalg9, Δalg12, Δcdc420, Δclc1, Δcrz1Δpbp1, Δfbp1, Δhoc2, Δmnn2, Δoch1, Δpak1, Δpmt4, Δrho11, Δrom2, Δssd1, Δssn8, Δtif3* |
| 40oC | *Δatf1, Δchs3, Chs6, Δcsr2, Δptp1Δptp2, Δras1* | *Δcac1, Δchs5, Δchs7, Δchs8, Δhog1, Δhog1Δptp2, Δpbs2, Δptp2, Ptp1ovexΔptp2* | *Δgat1* |  | *Δchs1, Δchs2, Δchs4, Δcsr1, Δcsr3, Δptp1, Ptp1ovex, Δskn7, Δssk1, Δste11, Δste50, Δtco1, Δtco1Δtco2, Δtco2, Δtco3, Δtco4, Δtco5, Δtco7* |
| 42oC |  |  | *Δmet3* |  |  |
| 45oC | *Δsnf1* |  |  |  |  |
| 0.1 M KCl at pH 8.5 | *Δena1Δnha1* | *Δena1* |  |  | *Δhog1, Δnha1* |
| 1.5 M KCl at pH 4.5 | *Δena1Δnha1, Δnha1* | *Δhog1* |  |  | *Δena1* |
| 0.5 M KCl |  |  |  |  | *Δena1, Δena1Δnha1, Δnha1, Δhog1* |
| 0.5 M KCl + 0.1 μg/mL AmpB | *Δena1, Δena1Δnha1, Δhog1* |  |  |  | *Δnha1* |
| 1 M KCl | *Δaca1Δras1, Δbzp2, Δena1Δnha1, \*Δhog1Δptp2, \*Δpka2, \*Δptp1Δptp2, \*Δptp2, Δras1* | *Δcac1Δras1, Δcna1, Δhad1, Δpgi1, Δptp2, Δptp1Δptp2* |  |  | *Δaca1, Δada2, Δcac1, Δena1, Δgpa1, Δhap2, Δhob1, Δhog1, Δhog1Δptp2, Δnha1, Δpbs2, Δpka1,* *Δpka2, Δpka1Δpka2, Δptp1, Δssn8* |
| 1.35 – 1.5 M KCl | *\*Δbzp2, Δcna1, Δena1Δnha1, Δgrx4Δcna1, Δgrx4Δcrz1, \*Δhob1, \*Δpka2, Δaca1Δras1, Δcac1Δras1, Δpbs2, Δras1, Δskn7* | *\*Δaca1, \*Δada2, Δcdc24, Δgrx4, Δhad1, Δhob1, Δhog1Δypd1, \*Δpka1Δpka2, Δsre1, \*Δssk1, Δtco2* | *Δsch9* | *\*Δcac1, \*Δgpa1, \*Δpka1* | *Δaca1, Δatf1, Δcac1, Δcrz1, Δena1, Δgcn5, Δgpa1, Δgre2, \*Δhap2, Δhog1, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δnha1, Δpdr5, Δpdr5-2, Δpdr5-3, Δpka1, Δpka1Δpka2, Δpka2, Δpkp1, Δpkr1, Δras2, Δskn7, \*Δste11, \*Δste50, Δssk1, Δtco1, Δtco1Δtco2, Δtco3, Δtco4, Δtco5, Δtco7, Δubc6-2, Δubc8, Δyor1* |
| YP | *Δena1±1/1.5M KCl/1M NaCl, Δhog1>1M KCl/≥1M NaCl, Δpbs2>1M KCl/≥1M NaCl,**Δsch91M NaCl, Δskn7≥1M NaCl* | *Δpdr51.5M KCl, Δssk11.5M KCl/>1M NaCl,Δyor11M NaCl* |  | *Δsch91M KCl* | *Δhog1, Δpdr5±1M NaCl, Δpdr5-2**±1.5M KCl/1M NaCl, Δpdr5-3±1.5M KCl/1M NaCl, Δsch9, Δssk1±1M KCl, Δskn7±1/1.5M KCl, Δssk11m KCl/NaCl, Δubc6-2±1.5M KCl/1M NaCl, Δubc8±1.5M KCl/1M NaCl, Δyor1±1.5M KCl* |
| YPD | *Δcdc241%O2+5%CO2,Δcdc24Δptp36%O2, Δcdc24Δras15%CO2, Δdnj139°C, (Δcdc24, Δcdc42Δcdc420, Δcna140μg/mL BFΑ or 0.5 mg/mL MNS, Δgrx4150/300μM CCM, Δgrx4300μM CCM+10μM Heme, Δgrx4750μM Ferrozine, Δgrx475μg/mL Rotenone, Δgrx48μg/mL Phleomycin, Δgrx410mM SHAM, Δgrx450μM DPI, Δgrx410mM KCN, Δgrx40.5mg/mL MNS, Δgrx4400 J/m² UV, Δgrx4Δcna140μg/mL BFΑ or 0.5mg/mL MNS, Δplc11.0 μg/mL FCZ, Δptp3, Δras11%O2±8μg/mL FCZ, Δras11%O2+5%CO2* | *Δcdc42Δcdc4201%O2+5%CO2, (Δcdc24, Δras1, Δras1Δcdc24)5%O2+5%CO2, Δgrx45-45mM EGTA, Δgrx4300μM CCM+150μM Heme, Δgrx475μM Ferrozine+200μM FeEDTA, Δgrx4750μM Ferrozine+500μM FeEDTA, Δgrx4600μM CoCl2, Δgrx42mM Malonate, Δgrx45μg/mL CDNB, Δgrx450μM Plumbagin, Δgrx4500μM Paraquat, Δgrx440μg/mL BFΑ or 100 μM NEM,* *Δrad17180 J/m² UV, Δste201%O2+5%CO2* |  |  | *(Δaca1, Δcac1, Δcdc24Δhog1, Δgpa1, Δhog1, Δhrd1, Δpbs2, Δpka1, Δptp3Δhog1, Δtco1, Δtco2, Δtco1Δtco2, Δras1Δhog1, Δssk1, Δskn7, Δypd1Δhog1)20%O2 /1%O2, Δcch1, (Δcdc24, Δcdc42Δcdc420)20%O2±5%CO2, (Δcdc42, Δcdc420)20%O2±5%CO2 or 1%O2+5%CO2, (Δcdc24, Δptp3, Δras1, Δras1Δcdc24)5%CO2, (Δcdc24, Δptp3)6-20%O2, (Δcdk8, Δssn801)5%EtOH, Δcrz1, Δdnj130/37°C, Δgrx4, Δgrx4Δcrz1, Δgrx475μM Ferrozine**, (Δrac1, Δrac2, Δrac1Δrac2)20%O2±5%CO2 or 1%O2+5%CO2,* *Δras120%O2±5%CO2, Δste2020%O2±5%CO2, Δvps34750 μM BCS* |
| 0.1 M NaCl at pH 8.5 | *Δena1, Δena1Δnha1* |  |  |  | *Δhog1, Δnha1* |
| 1.5 M NaCl at pH 4.5 |  |  |  |  | *Δena1, Δena1Δnha1, Δhog1, Δnha1* |
| 0.5 M NaCl | *Δgpp222°C, ΔRho1Q64L,* | *Δgpp2* |  |  | *Δcac1, Δgpp2Glycerol, Δhog1, Δhsp12, Δhsp122, Δhsp12Δhsp122, Δras1, ΔRho1G15V,* |
| 0.5 M NaCl + 0.05 μg/mL AmpB |  | *Δhog1, Δras1* |  |  | *Δcac1, Δgre2, Δpkp1* |
| 0.5 M NaCl + 0.1 μg/mL AmpB | *Δhog1, Δras1* |  |  |  | *Δcac1, Δgre2, Δpkp1* |
| 0.5 M NaCl + 0.2 μg/mL AmpB | *Δcac1, Δhog1, Δhsp12Δhsp122, Δras1* | *Δhsp12, Δhsp122* |  |  |  |
| 1.0 M NaCl | *\*Δaca1, Δaca1Δras1, Δcac1Δras1, \*Δena1, \*Δena1Δnha1, \*Δhog1, \*Δpka2, Δptp2, Δptp1Δptp2, Δskn7* | *Δcac1Δras1, Δgpp2, Δhog1Δptp2, Δras1, Δvad1* |  |  | *Δalg3, Δalg9, Δalg12, Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δaca1, Δcac1, Δcap59, Δcxd1, Δcxd2, Δcxd3, Δena1, Δena1Δnha1, Δgcs1, Δgpa1, Δhog1, Δhog1Δptp2, Δhog1Δypd1, Δmay1, Δmpr1, Δnha1, Δoch1, Δoch1Δcap59, Δpep4,* *Δpka1, Δpka2, Δpka1Δpka2, Δptp1, Δprb1, Δprc1, Δscx1, Δssk1, Δssn8* |
| 1.25 M NaCl | *\*Δena1, \*Δena1Δnha1* | *\*Δhog1* |  |  | *Δena1, Δena1Δnha1, Δhog1, Δnha1* |
| 1.5 M NaCl | *\*Δaca1, Δada2, Δbzp2, Δcap10, Δcna1, Δgrx4Δcna1, Δgrx4Δcrz1, Δhog1, Δpbs2, \*Δpka2, Δpkc1S, Δplc1, Δras1, Δsch9, Δskn7, Δsnf1, Δsod1Δsod2,* *Δssk1, Δugd1, Δvph1* | *Δaca1, Δcdc24, Δgrx4, Δhap2, \*Δhog1, Δsod1, Δsod2, Δsre1* |  | *\*Δgpa1* | *Δatf1, Δcac1, Δcap59, Δcap60, Δcap64, Δcrz1, Δdnj130/37/39°C, Δena1, Δfbp1, Δgpa1, Δgre2, Δhob1****,*** *Δhog1Δypd1,**Δhsp12, Δhsp122, Δhsp12Δhsp122, Δpdr5, Δpdr5-2, Δpdr5-3, Δpka1, Δpka2, Δpka1Δpka2, Δpkp1, Δpkr1, Δplc2, Δqsp1, Δras2,* *\*Δste11, \*Δste50, Δtco1, Δtco1Δtco2, Δtco2, Δtco3, Δtco4,* *Δtco5, Δtco7, Δuxs1, Δyor1* |
| 1.8 – 2.0 M NaCl | *Δpgi1, Δsod1, Δsod2, Δsod1Δsod2* |  |  |  |  |
| 25 – 50 mM LiCl | *Δcch1*37°C | *Δcna1, Δcch1*25°C |  |  |  |
| 50 – 150 mM LiCl | *Δcna1, Δena1, Δena1Δnha1, Δgrx4Δcna1, Δgrx4Δcrz1, Δpka1*37°C*, Δpka1Δova1*30°C*, Δsnf7* | *Δgrx4, Δpka1*30°C*, Δpkr1*37°C |  | *Δhog1* | *Δcrz1, Δnha1, Δova1*30°C*, Δpkr1*30°C*, Δras1* |
| 0.2 – 0.4 M CaCl2 | *Δcam1, Δcna1, Δgrx4Δcna1, Δncs1* | *Δcrz1, Δgrx4* |  |  | *Δanb1, Δgcd2, Δgwo1, Δlhp1, Δpbp1, Δpuf4, Δtif3, Δvts1* |
| 0.5 – 0.6 M CaCl2 |  | *Δhog1* |  |  | *Δena1, Δena1Δnha1, Δnah1* |
| 100 mM FeCl2/FeCl3 |  | *Δrint11mM Asc,Δgrx45/20/40mM FeCl3* |  |  | *Δgrx41mM FeCl3, Δqsp1100mM FeCl2, Δopt1100mM FeCl2* |
| 1 μM CuSO4 | *Δcuf115mM DDT* | *Δcuf130μM CdSO4, Δcuf10.8% CR, Δcuf10.8μg/mL AmpB, Δcuf13.5mM H2O2* | *Δcuf10.3μg/mL TCM, Δcuf114μg/mL FCZ* |  | *Δcuf125/30/37/39°C, Δcuf13mg/mL CFW, Δcuf10.03% SDS, Δcuf10.03% MMS, Δcuf1100mM HU, Δcuf11M NaCl/KCl, Δcuf11.5M NaCl/KCl, Δcuf12M Sorbitol, Δcuf1300μg/mL 5-FC, Δcuf11μg/mL FDX, Δcuf10.8mM t-BOOH, Δcuf12.5mM Diamide, Δcuf10.02mM MND,Δcuf1(1–50μM CuSO4)* |
| 1.0 M Sorbitol | *Δcdc337°C, Δcdc1237°C, Δcna1, Δgrx40.65mg/mL Caffein/0.01% SDS, Δgrx4Δcna1, Δgrx4Δcrz1, Δkre6Δskn137°C, Δpkc1≥37°C, Δpkc1 0.01% SDS/0.5mg/mL Caffein/0.5% CR/1.5M NaCl at 30°C, Δppg1, Δras1, Δrho1039**°C, Δrho10Δrho1139°C, (Δsac6Δcap1)37°C±CO2, (Δsac6Δcap1, Δsac6Δcap2)1%O2,5%CO2,37°C* | *Δcdc11**37°C, Δgrx425/30/37/39°C, Δkre537°C, Δkre6Δskn1, Δlrg1, Δpgi1, Δpik137°C, Δpkc130°C/1.5mg/mL CFW at 30°C, Δplc130°C, Δppg1, Δrho1037°C, Δrho10Δrho1137°C, (Δsac6Δcap2)37°C±CO2, (Δsac6, Δcap1Δcap2)20%O2±5%CO2, Δtps130°C* |  |  | *Δbck1, (Δcap1Δcap2, Δsac6, Δsac6Δcap1, Δsac6Δcap2)28°C, (Δcap1Δcap2, Δsac6, Δsac6Δcap2)37°C, (Δcap1Δcap2, Δsac6)5%CO2,37°C, Δcdc324°C, Δcdc1024/37°C, Δcdc1124°C, Δcdc1224°C, Δcns524/37°C, Δcrz1, Δcxd1, Δcxd2, Δcxd3, Δdnj130/37/39°C, Δena137°C, Δfbp1, Δkre5, Δkre630/37°C, Δkre6Δkre6130/37°C, Δkre6130/37°C, Δkre6230/37°C, Δkre6330/37°C, Δkre6430/37°C, Δmay1, Δmkk2, Δmpr1, Δnth1**30/37°C, Δopt1, Δpep4, Δprb1, Δprc1, Δpuf4, Δqsp1, Δrho1137/39°C, Δrom2, Δrub137°C, Δscx1, Δskn130/37°C, Δsnf1, Δssd1, Δtps137°C, Δtps230/37°C, Δuge1, Δugt1* |
| 1.5 M Sorbitol |  | *Δhog1, Δssk1* |  |  | *Δatf1, Δskn7, Δpka1, Δpkr1* |
| 1.8 M Sorbitol |  | *Δvad1* |  |  |  |
| 2.0 M Sorbitol | *\*Δhob1* | *Δada2, Δalg3Δcap59, Δalg9Δcap59, Δalg12Δcap59, Δbzp2, Δhob1, Δoch1Δcap59* |  |  | *Δalg3, Δalg9, Δalg12, Δcap59, Δhap2, Δoch1* |
| 2.5 M Sorbitol |  | *Δugd1* |  |  | *Δfbp1, Δcap10, Δcap59, Δcap60, Δcap64, Δuxs1* |
| 2% Glycerol |  | *Δgpp222°C* |  |  | *Δgpp230°C* |
| pH 4.0 – 4.5 |  |  |  |  | *Δgcs1, Δena1, Δena1Δnha1, Δnha1, Δhog1* |
| pH 6.4 |  |  |  |  | *Δcys320mM Cys, Δgpp2* |
| pH 7.0 | *Δcys320mM Cys/37°C* | *Δcys320mM Cys/**30**°C, Δvph1* |  | *Δqsp1* | *Δcna1, Δcna1Δena1, Δena1, Δgpp2, Δopt1, Δvph130°C* |
| pH 7.4 – 7.5 | *Δgcs1, Δcys320mM Cys,* |  |  |  |  |
| pH 8.0 | *Δcna1Δena1* | *Δcna1, Δgpp2* |  |  | *Δena1* |
| pH 8.5 | *Δcna1* |  |  |  | *Δena1,* *Δena1Δnha1, Δnha1, Δhog1* |
| UV (250 J/m2) |  | *Δhog1, Δssk1* |  |  | *Δskn7, Δena1, Δpdr5, Δpdr5-2, Δpdr5-3, Δyor1, Δubc6-2, Δubc8* |
| UV (300 J/m2) | *Δssk1* | *Δhog1* |  |  | *Δsch9* |
| UV (480 J/m2) | *Δbwc1, Δbwc1, Δbwc1 Δbwc2* |  |  |  | *Δops1, Δphy1* |
| UV (720 J/m2) |  | *Δhog1, Δpbs2, Δssk1* |  |  | *Δskn7, Δtco1, Δtco2, Δtco1Δtco2, Δtco3, Δtco4, Δtco5, Δtco7* |
| LIM |  | *Δcap10, Δcft1, Δliv8, Δrint1* |  |  |  |
| SD | *Δaap4Δaap5±10mM Amm+10mM AA±1mM H2O2, Δcys3, Δcys320mM Met, Δgpp20.75mM H2O2, Δgpp20.75–1.0mM NaCl/KCl, Δkcs11% Lac/Glycerol/Oleic, (Δkcs1, Δpho4)29mM KCl/β-Glycerol phosphate, Δleu1Gln/Asn, Δspe3-lys9±33mM Spermidine/0.16mM Lys/0.26mM Ala-Lys/Spermidine+Lys/Spermidine+0.31mM Lys-Ala, Δspe3-Lys9±0.16mM Lys/0.26mM Ala-Lys/33mM Spermine/Spermine+25mL/L EtOH+20g/L Glycerol, ΔSpe3-lys9±33mM Spermidine* | *Δgpp2, (Δkcs1, Δpho4)29mM KH2PO4, Δspe3-Lys933mM Spermidine/Spermidine+0.16mM Lys/Spermidine+0.31mM Lys-Ala, ΔSpe3-lys90.16mM Lys/0.26mM Ala-Lys* |  |  | *Δaap2**±10mM Amm+10mM AA±1mM H2O2, Δaap4±10mM Amm+10mM AA±1mM H2O2, Δaap5±10mM Amm+10mM AA±1mM H2O2, Δkcs129mM KH2PO4/KCl/β-Glycerol phosphate, Δcys320mM Cys, Δgpp20.5M NaCl+25 mM Pro*, *Δkcs1, Δleu1Gln/Asn+2mM Leu, ΔSpe3-lys933mM Spermidine+0.16mM Lys/Spermidine+0.31mM Lys-Ala* |
| SG | *Δcys310mM Pro+20mM Met, 30°C,* | *Δcys310mM Pro+20mM Met, 37°C,* |  |  |  |
| YNB pH 4.0 | *Δarg, Δcdk81mM H2O2, Δgat110mM Amm, Δgat110mM Urate, Δgat110mM Urea, Δgat110mM Creatinine, ΔIcl10.2% Oleate, Δisc1, Δleu1±2mM Leu, Δlys4Amm/Asn, Δpkc1S+1mM H2O2 or 1mM Diamide or 1mM Nitrite, Δras1, Δspe3-lys9±33mM Spermidine/0.16mM Lys/0.26 mM Ala-Lys, Δspe3-Lys9±0.16mM Lys/0.26mM Ala-Lys, ΔSpe3-lys9±33mM Spermidine, Δssn8011mM H2O2* | *Δcdk81mM NaNO2, Δgat110mM Pro, Δpex1, Δpex6, Δpex7, Δpkc1S/S+0.5mM H2O2, Δppg1, ΔSpe3-Lys933mM Spermidine + 0.16mM Lys/Spermidine+0.31mM Lys-Ala, Δspe3-Lys933 mM Spermidine/Spermidine+0.16mM Lys/Spermidine+0.31mM Lys-Ala/33mM Spermine/Spermine+25mL/L EtOH+20g/L Glycerol, Δssn8011mM NaNO2* |  |  | *Δbck1, Δbwc2, Δcdk8, Δcir1, Δgat201, Δgat204, Δgpx1, Δgpx2, Δgpx1Δgpx2, Δlrg1, Δlys4Amm/Asn+0.2mg/mL Lys, Δmkk2, Δpuf4, Δrho10, Δrho11, Δrho10Δrho11, Δrom2, Δsnf1, ΔSpe3-lys9+0.16mM Lys/0.26mM Ala-Lys/33mM Spermidine+Lys/Spermidine+0.31mM Lys-Ala/43mM Pro+Lys,* 37°C*, Δssd1, Δssn8±0.2%Glc, Δssn801, Δtsa1* |
| YNB + 2% Acetate | *Δacs1, Δcdk8, Δicl1, Δmls1, Δsnf137°C, Δssn801* |  |  |  | *Δacs2, Δsnf1, Δssn8* |
| YNB pH 7.0 + 150 μM BPS | *Δgrx40.03% MMS* | *Δgrx46mM CQ, Δgrx4600μM CoCl2, Δgrx48μg/mL Phleomycin, Δgrx4100J/m² UV, Δgrx4* |  |  | *Δgrx410mM SHAM, Δgrx4500mM Paraquat,* |
| YNB pH 7.0 + 100μM FeCl3 | *Δgrx46mM CQ, Δgrx48μg/mL Phleomycin, Δgrx410mM SHAM, Δgrx40.03% MMS Δgrx4100J/m² UV* | *Δgrx4600μM CoCl2, Δgrx4500mM Paraquat* |  |  | *Δgrx4* |
| YNB + 2% Glc |  |  |  |  | *Δcdk8, Δmls, Δssn8, Δssn801* |
| YNB + 2% Glycerol | *Δacs1* | *Δsnf1* |  |  | *Δacs2, Δssn8* |
| YNB + 2 – 3% Ethanol | *Δacs1, Δsod2* | *Δsnf137°C* |  |  | *Δacs2, Δsnf1, Δssn8, Δsod1* |
| YNB + 2% Sucrose | *Δsnf1* | *Δsnf1**37°C* |  |  | *Δssn8* |
| YNB + 2% Gal | *Δsnf1* | *Δssn8* |  |  |  |
| YNB + 0.5% Glc | *Δipk11mM NaNO2, (Δipk1Δkcs1)1mM NaNO2, Δkcs11mM NaNO2* | *Δipk1**1mM H2O2, (Δipk1Δkcs1)1mM H2O2, Δkcs11mM H2O2, Δkcs1, Δipk1Δkcs1* |  |  | *Δipk1* |
| YNB + 0.2 mg/mL Uracil + 2% Glc + Vitamin | *Δctr4, Δctr410mM Amm/Pro/Creatinine/Urea, Δcgp1, Δcgp110mM Creatinine, Leu/Ile/Lys/Gly/Asn/Met/Trp/Val/Thr/Arg/His/Phe* | *Δctr410mM Ala/Gln,* *Δcgp110mM Amm/Pro/Ala/Gln/Urea* |  |  | *Δctr410mM Leu/Ile/Lys/Gly/Asn/Met/Trp/Val/Thr/Arg/His/Phe* |
| YNB + 1 mM NaNO2 | *Δrho10* |  |  |  | *Δrho11, Δrho10Δrho11* |
| YNB + 150μM BPS | *Δgrx4, Δgrx410μM FeSO4/FeCl3/Heme* | *Δgrx4100μM Heme* |  |  | *Δgrx4100μM FeSO4/FeCl3* |
| ASA (pH 6.5) | *Δmpf31.2M NaCl, Δpck12% Lac, Δtuf12% Glycerol* | *Δmpf31.8M Sorbitol, Δtuf12% Glc, Δvad12% Glc+8mM Caffeine/2% Glycerol* |  |  | *Δpck12% Glc,Δvad12% Glc/2% Lac* |

**\***glucose starvation; **ovex**overexpression;**S**1.0 M sorbitol

Hyper-sensitive are mutants that failed to grow or showed drastic growth reduction compared to the *wt*

Slightly-to-moderately sensitive are mutants that grow but to a lesser extent compared to the *wt*

Hyper-resistance are mutants that grow over and beyond the *wt*

Slightly to moderately resistant are mutants that grow to a larger extent than the *wt*

**/ =** or (excluding units and percentage); 🡪 = transfer from one condition to another; **AA =** amino acids; **Amm =** ammonium sulphate; **ASA =** asparagine salt agar; **Asc =** ascorbate; **BCS =** bathocuproinedisulfonic acid; **BPS =** bathophenanthroline disulfonate; **BFA =** brefeldin A; **CCM =** curcumin; **CDNB =** 1-chloro-2,4-dinitrobenzene; **CFW** = calcofluor white; **COOH** = cumene hydroperoxide; **CQ =** chloroquine; **CR =** Congo red; **DDT** = dithiothreitol; **EGTA =** ethylene glycol-bis (β-aminoethyl ether)-N, N, N′,N′-tetraacetic acid; **EtOH =** ethanol; **Gal =** galactose; ***Pgal7*** = galactose promoter; ***Genex*#y =** point mutation in the wild type gene; **Glc =** glucose; **HU** = hydroxyurea; **Lac =** lactate; **LIM** = limiting/low-iron media; **MG** = methylglyoxal; **MMS** = methylmethane sulfonate; **MND =** menadione; **MNS =** monensin; **NCZ =** nocodazole; **NEM =** N-ethylmaleimide; **Paraquat™** **=** a trademark name (N,N′-dimethyl-4,4′-bipyridinium dichloride, also known as methyl viologen); **RPM** = rapamycin; **SDS** = sodium dodecyl sulphate; **SD** = synthetic dextrose mostly contains 10 mM NH4+; **SG** = synthetic galactose; ***t-*BOOH** = *tert-*butyl hydroperoxide; **TCM** = tunicamycin; **YNB =** yeast nitrogen base.

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