

Supplemental Material

Supplemental Text

CPC stability in response to high temperature

CPC stability is likely to be dependent on chaperones since signaling proteins with multiple regulatory states rely on their structural flexibility to undergo conformational changes and this renders them intrinsically less stable, and thus likely to require interaction with chaperones for stability and function (reviewed in (Young et al., 2001)). Supporting this possibility, mass spectrometric analyses of Sli15-TAP reproducibly identified chaperones that are not common background proteins in yeast purifications (Figure 1A - Background bands; unpublished data). Sli15p was also consistently less stable at 37°C than at 23°C for both wild-type and *nbl1-6* cells. This instability may be caused by changes in the interaction between the complex and chaperones. It is possible that prolonged exposure to high temperature depletes the chaperones necessary to maintain CPC stability, and thus causes the decreased protein levels observed in both cell biological and biochemical analyses.

Conserved regions in Borealin/Dasra/CSC-1 related proteins

In most Borealin/Dasra/CSC-1 related proteins, the extreme N-terminal region is proline-rich and positively charged and many of these regions are predicted to contain one or more nuclear-localization signals (Horton *et al.*, 2007). The conservation among these regions suggests that with a few exceptions the N-termini of Borealin/Dasra/CSC-1 proteins function in nuclear-localization. Interestingly, while most of the fungi in Ascomycota follow this pattern, neither the sister phylum Basidiomycota nor the Saccharomycotina (within the Ascomycota) possess this region. This relationship indicates that there have been at least two independent losses within Fungi of the otherwise highly conserved N-terminal nuclear-localization signal.

Another significant region of similarity (Figure 6A - orange boxes and sequence logo; aa 199-222 in Homsa_Bor) generalizes and extends a previously noted region of conservation between DasraB and CSC-1 (Sampath *et al.*, 2004). It is present in most proteins from Animalia, except the Borealin2/DasraA proteins, and is also evident in the Basidiomycota. This pattern of conservation suggests that the animal Borealin/Dasra/CSC-1 related proteins are more similar to the ancestral Borealin while the fungal proteins are more diverged, particularly in the Ascomycota.

References

- Horton, P., Park, K.J., Obayashi, T., Fujita, N., Harada, H., Adams-Collier, C.J., and Nakai, K. (2007). WoLF PSORT: protein localization predictor. *Nucleic Acids Res* 35, W585-587.
- Sampath, S.C., Ohi, R., Leismann, O., Salic, A., Pozniakovski, A., and Funabiki, H. (2004). The chromosomal passenger complex is required for chromatin-induced microtubule stabilization and spindle assembly. *Cell* 118, 187-202.
- Young, J.C., Moarefi, I., and Hartl, F.U. (2001). Hsp90: a specialized but essential protein-folding tool. *J Cell Biol* 154, 267-273.

Supplemental Tables

Table S1. Strains and plasmids used in this study.

Table S2. Sequence names, species of origin, and GenBank IDs for proteins analyzed in this paper. Naming conventions are the same as in Figure 7 with fragmentary sequences (-f), isoforms (-i), and variant sequences (-v). † indicates nucleotide sequences that were translated as described in the Materials and Methods.

Supplemental Figures

Figure S1. (A) Abnormal cell morphology in slow-growing *nbl1Δ* strain. Bright field image of *nbl1Δ* cells. Bar, 2μm. (B) *nbl1-6* causes a synthetic growth defect with *ipl1-2*. Red circles indicate double

mutant spore colonies. (C) Nbl1p and Bir1p are not required for Dam1 complex phosphorylation *in vitro*. *In vitro* kinase assay of the Dam1 complex using dual (Sli15p-Ipl1p; lane 1) and quaternary (Sli15p-Ipl1p-Bir1p-Nbl1p; lane 2) complexes purified from insect cells. Control kinase reactions using the dual and quaternary complexes in the absence of the Dam1 complex are shown in lanes 3 and 4, respectively.

Figure S2. Nbl1p localization relative to the spindle and kinetochores during the cell cycle. (A) Localization of Nbl1p and Mtw1p. Representative images of haploid cells bearing a single copy of *NBL1-3GFP* and *MTW1-mCherry* from G1 to late anaphase. Maximum intensity projections of image stacks that were acquired as seven Z-sections separated by 0.5 μm . Bar, 2 μm . (B) Localization of Nbl1p and Tub1p. Representative images of diploid cells homozygous for *NBL1-3GFP* and *Tub1-mCherry* from G1 to telophase. Maximum intensity projections of image stacks were acquired as seven Z-sections separated by 0.5 μm . Bar, 2 μm .

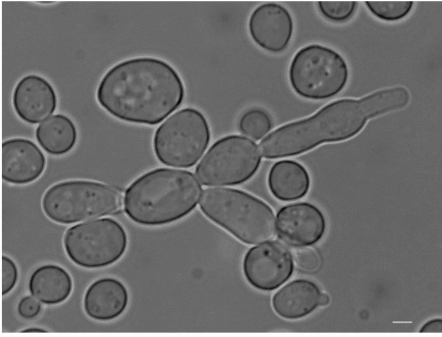
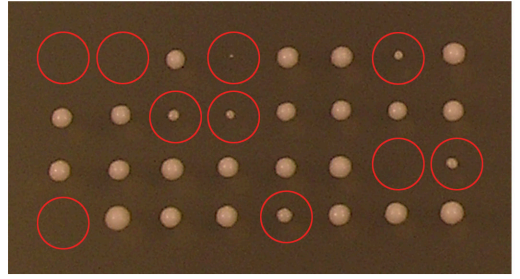
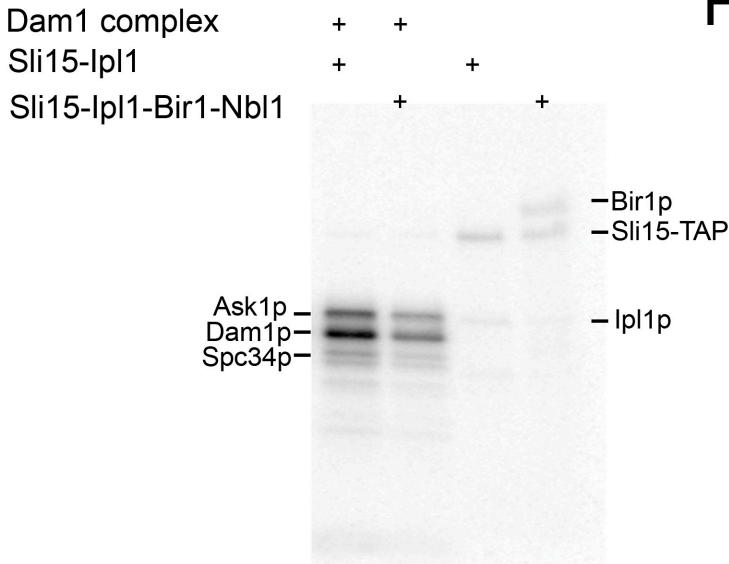
A**B****C****Figure S1.**

Figure S2.

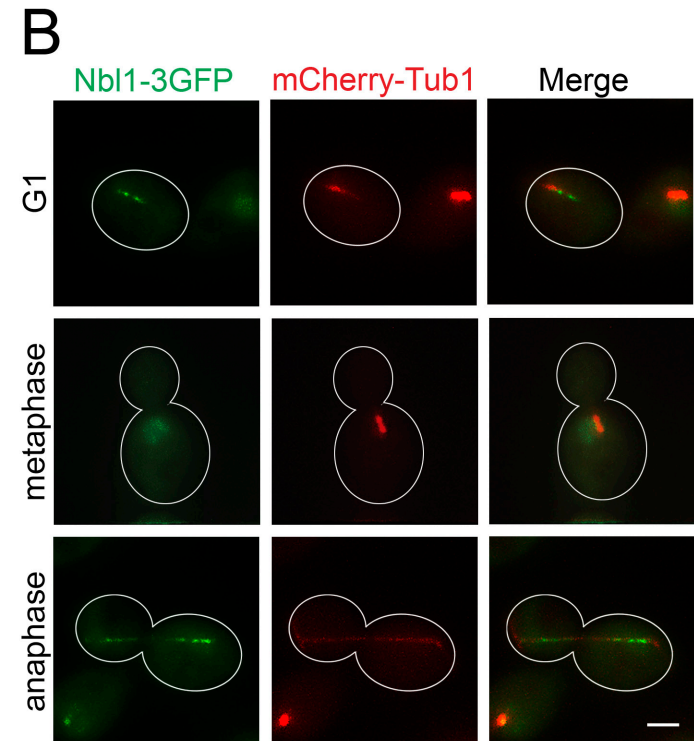
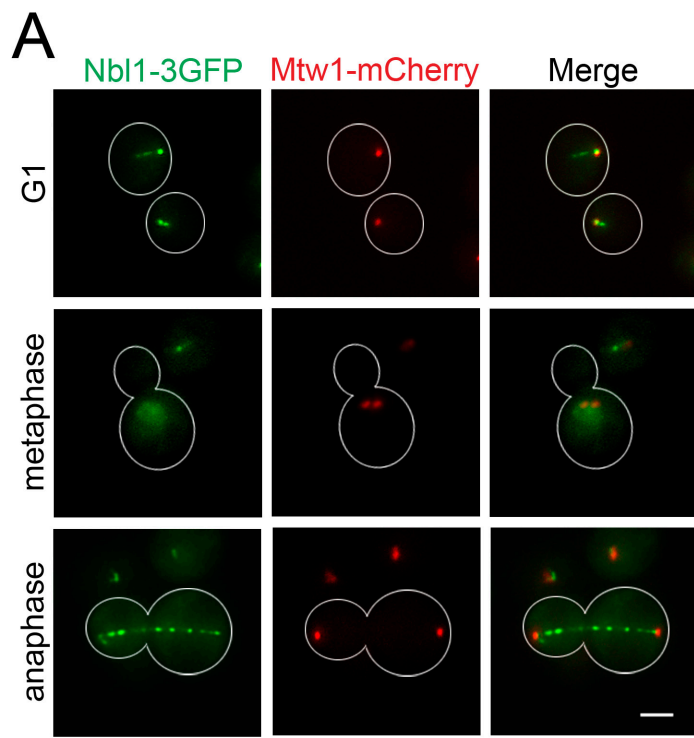


Table S1. Yeast strains and plasmids used in this study

Strain	Genotype	Reference
DDY3752	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 NBL1-GFP::KanMX6/NBL1-GFP::KanMX6 NUP84-mRFP::His3/MX6/NUP84-mRFP::His3/MX6	this paper
DDY3753	MATa leu2 ura3-52 trp1 prb1-1122 pep4-3 pre1-451 SLI15-Stag-TEV-ZZ::KanMX6	this paper
DDY3754	MATa leu2 ura3-52 trp1 prb1-1122 pep4-3 pre1-451 NBL1-Stag-TEV-ZZ::KanMX6	this paper
DDY3755	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 NBL1-mCherry::KanMX6/NBL1-mCherry::KanMX6 BIR1-3GFP::HIS3/BIR1-3GFP::HIS3	this paper
DDY3756	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 NBL1-mCherry::KanMX6/IP11-3GFP::HIS3/IP11-3GFP::HIS3	this paper
DDY3757	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 NBL1-mCherry::KanMX6/NBL1-mCherry::KanMX6 SLI15-3GFP::HIS3/SLI15-3GFP::HIS3	this paper
DDY3758	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 ip11-2/ip11-2	this paper
DDY3759	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 sli15-3/sli15-3	this paper
DDY3760	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 lys2-801/lys2-801 NBL1-3GFP::HIS3/NBL1-3GFP::HIS3 ura3-52::mCherry-TUB1::URA3	this paper
DDY3761	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 ip11-as6::LEU2/ip11-as6::LEU2 pdr5 Δ ::KanMX6/pdr5 Δ ::KanMX6 snq2 Δ ::cgHIS3/snq2 Δ ::cgHIS3	this paper
DDY3762	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 NBL1-GFP::KanMX6/NBL1-GFP::KanMX6 ip11-as6::LEU2/ip11-as6::LEU2 pdr5 Δ ::KanMX6/pdr5 Δ ::KanMX6 snq2 Δ ::cgHIS3/snq2 Δ ::cgHIS3	this paper
DDY3763	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 SLI15-3GFP::HIS3/SLI15-3GFP::HIS3 ip11-as6::LEU2/ip11-as6::LEU2 pdr5 Δ ::KanMX6/pdr5 Δ ::KanMX6 snq2 Δ ::cgHIS3/snq2 Δ ::cgHIS3	this paper
DDY3764	MATa/MAT α his3 Δ 200/his3 Δ 200 leu2-3, 112/leu2-3, 112 ura3-52/ura3-52 lys2-801/lys2-801 NAT/NBL1	this paper
DDY3765	MATa his3 Δ 200 leu2-3, 112 ura3-52 lys2-801 NBL1::LEU2	this paper
DDY3766	MATa his3 Δ 200 leu2-3, 112 ura3-52 lys2-801 nbl1-6::LEU2	this paper
DDY3767	MATa his3 Δ 200 ura3-52 lys2-801 leu2-3, 112::LacO::LEU2 HIS3::pCu-LacI-GFP NBL1::LEU2	this paper
DDY3768	MATa his3 Δ 200 ura3-52 lys2-801 leu2-3, 112::LacO::LEU2 HIS3::pCu-LacI-GFP nbl1-6::LEU2	this paper
DDY3769	MATa his3 Δ 200 leu2-3, 112 ura3-52 lys2-801 SLI15-Stag-TEV-ZZ::KanMX6 NBL1::LEU2	this paper
DDY3770	MATa his3 Δ 200 leu2-3, 112 ura3-52 lys2-801 SLI15-Stag-TEV-ZZ::KanMX6 nbl1-6::LEU2	this paper
PJ694-a	MATa trp1-901 leu2-3, 112 ura3-52 his3-200 ga14A ga18OA LYS2::GALI-HIS3 GAL2-ADE2 metZ::GAL7-lacZ	(Uetz et al., 2000)
PJ694- α	MATa trp1-901 leu2-3, 112 ura3-52 his3-200 ga14A ga18OA LYS2::GALI-HIS3 GAL2-ADE2 metZ::GAL7-lacZ pOAD::IPL1 in PJ694-a	(Uetz et al., 2000)
pDD2301	pFastbacDual::IPL1::SLI15-CBP-TEV-ZZ Amp ^R	(Uetz et al., 2000)
pDD2302	pFastbacHTb::BIR1 Amp ^R	(Uetz et al., 2000)
pDD2303	pFastbacHTc::NBL1 Amp ^R	(Uetz et al., 2000)
pDD2304	pADC::cMCL1(N,L) Amp ^R	(Uetz et al., 2000)
pDD2305	pBDC::cMCL1(N,L) Amp ^R	(Uetz et al., 2000)
pDD2306	pBDC::SLI15(N,aa1-229) Amp ^R	(Uetz et al., 2000)
pDD2307	pBDC::SLI15(N,aa227-559) Amp ^R	(Uetz et al., 2000)
pDD2308	pBDC::SLI15(N,aa558-698) Amp ^R	(Uetz et al., 2000)
pDD2309	pBDC::BIR1(N,aa1-287) Amp ^R	(Uetz et al., 2000)

pDD2310	pBDC::BIR1(N,aa274-643) Amp ^R	this paper
pDD2311	pBDC::BIR1(N,aa629-746) Amp ^R	this paper
pDD2312	pBDC::BIR1(N,aa727-954) Amp ^R	this paper
pDD2313	pADC::SLI15(L) Amp ^R	this paper
pDD2314	pBDC::SLI15(L) Amp ^R	this paper
pDD2315	pADC::BIR1(L) Amp ^R	this paper
pDD2316	pBDC::BIR1(L) Amp ^R	this paper
pDD2317	pBDC::SLI15(N,L) Amp ^R	this paper
pDD2318	pBDC::BIR1(N,L) Amp ^R	this paper
pDD2319	pADC::BIR1(N,L) Amp ^R	this paper
pDD2320	pADC::SLI15(N,L) Amp ^R	this paper
pDD2321	pADC::SLI15(N,aa1-229) Amp ^R	this paper
pDD2322	pADC::SLI15(N,aa227-559) Amp ^R	this paper
pDD2323	pADC::SLI15(N,aa558-698) Amp ^R	this paper
pDD2324	pADC::BIR1(N,aa1-287) Amp ^R	this paper
pDD2325	pADC::BIR1(N,aa274-643) Amp ^R	this paper
pDD2326	pADC::BIR1(N,aa629-746) Amp ^R	this paper
pDD2327	pADC::BIR1(N,aa727-954) Amp ^R	this paper
pDD2328	pADC::BIR1(N,L,aa1-643) Amp ^R	this paper
pDD2329	pADC::BIR1(N,aa274-954) Amp ^R	this paper
pDD2330	pADC::BIR1(N,aa629-954) Amp ^R	this paper
pDD2331	pBDC::BIR1(N,L,aa1-643) Amp ^R	this paper
pDD2332	pBDC::BIR1(N,aa274-954) Amp ^R	this paper
pDD2333	pBDC::BIR1(N,aa629-954) Amp ^R	this paper
pDD1571	pBDC::IPL1(N)	(Wong et al., 2007)
pDD1548	pOBD2::IPL1	(Wong et al., 2007)

All yeast strains generated for this study are derived from S288C strain background except for DDY3686, DDY3687, PJ694-a, and PJ694- α . (N) indicates a construct resulting in a N-terminal fusion of the tag to the protein. (L) indicates constructs where a linker (GGGGGG) was added.

Table S2. Sequence names, species, and GenBank IDs for Borealin/Dasra/CSC-1 related proteins.

Name	Organism	Genbank ID
Cryne_BorR	<i>Cryptococcus neoformans</i> var. <i>neoformans</i> JEC21	gi 58266630
Phach_BorR	<i>Phanerochaete chrysosporium</i> RP-78	gb AADS01000091.1†
Glotr_BorR	<i>Gloeophyllum trabeum</i>	gi 90535306†
Copci_BorR	<i>Coprinopsis cinerea</i> okayama7#130	gi 169858035
Lacbi_BorR	<i>Laccaria bicolor</i> S238N-H82	gi 170090155
Ustma_BorR	<i>Ustilago maydis</i> 521	gi 71003742
Amore_BorR	<i>Amorphotheca resinae</i>	gi 90376788†
Phano_BorR	<i>Phaeosphaeria nodorum</i> SN15	gi 169624021
Pytrr_BorR	<i>Pyrenophora tritici-repentis</i> Pt-1C-BFP	gi 189203837
Aspnd_BorR	<i>Aspergillus nidulans</i> FGSC A4	gi 67901182
Neofi_BorR	<i>Neosartorya fischeri</i> NRRL 181	gi 119481883
Talst_BorR	<i>Talaromyces stipitatus</i>	gb ABAS01000014.1†
Aspcl_BorR	<i>Aspergillus clavatus</i> NRRL 1	gi 121716050
Aspfu_BorR	<i>Aspergillus fumigatus</i> Af293	gi 71002316
Aspte_BorR	<i>Aspergillus terreus</i> NIH2624	gi 114229141†
Aspng_BorR	<i>Aspergillus niger</i>	gi 145250655
Aspor_BorR-c	<i>Aspergillus oryzae</i>	gi 166588718†
Penma_BorR	<i>Penicillium marneffeii</i> ATCC 18224	gb ABAR01000034.1†
Ajeca_BorR	<i>Ajellomyces capsulatus</i> NAM1	gi 154284810
Artgy_BorR	<i>Arthroderma gypseum</i> CBS 118893	gnl WGS:ABQE cont1.171†
Triru_BorR	<i>Trichophyton rubrum</i>	gi 117816916 , gi 117813310†
Ascap_BorR	<i>Ascospaera apis</i> USDA-ARSEF 7405	gb AARE01000426.1†
Uncre_BorR	<i>Uncinocarpus reesii</i> 1704	gnl WGS:AAIW cont2.91†
Cocim_BorR	<i>Coccidioides immitis</i> RS	gi 119195971
Cocpo_BorR	<i>Coccidioides posadasii</i> RMSCC 2133	gnl WGS:ABFM cont1.642†
Parbr_BorR	<i>Paracoccidioides brasiliensis</i>	gnl WGS:ABKI cont1.3, gnl WGS:ABKH cont1.136, gnl WGS:ABHV cont1.235†
Blugr_BorR	<i>Blumeria graminis</i>	gi 195518748†
Botfu_BorR	<i>Botryotinia fuckeliana</i> B05.10	gi 154296763
Scisc_BorR	<i>Sclerotinia sclerotiorum</i> 1980	gi 156050975
Trivi_BorR	<i>Trichoderma virens</i> Gv29-8	gb ABDF01000064.1†
Trire_BorR-c	<i>Trichoderma reesei</i>	gi 30116482, gi 38126272, gi 38136140, gi 38136234†
Trire_BorR-g	<i>Trichoderma reesei</i> QM6a	gb AAIL01001083.1†
Triat_BorR	<i>Trichoderma atroviride</i>	gb ABDG01000033.1†
Gibze_BorR	<i>Gibberella zeae</i> PH-1	gi 46108480

Gibmo_BorR	<i>Gibberella moniliformis</i>	gi 70767847, gi 70738417, gi 70689160, gi 70694937, gi 70767848, gi 70738418†
Fusox_BorR	<i>Fusarium oxysporum f. sp. lycopersici</i> 4286	gb AAXH01000020.1†
Maggr_BorR	<i>Magnaporthe grisea</i> 70-15	gi 39945046
Glogr_BorR-f	<i>Glomerella graminicola</i>	gi 170494517, gi 170384255, gi 170350090, gi 170430202, gi 170412208, gi 170389582, gi 170368366, gi 170495163, gi 170348749†
Veral_BorR	<i>Verticillium albo-atrum</i> VaMs.102	gnl WGS:ABPE cont1.2162†
Verda_BorR	<i>Verticillium dahliae</i> VdLs.17	gnl WGS:ABJE cont1.1278†
Crypa_BorR	<i>Cryphonectria parasitica</i>	gi 158403986, gi 158403987, gi 158403990†
Chagl_BorR	<i>Chaetomium globosum</i> CBS 148.51	gi 116192399
Spoth_BorR	<i>Sporotrichum thermophile</i>	gi 90623245†
Podan_BorR	<i>Podospora anserina</i>	gi 171684787
Neucr_BorR	<i>Neurospora crassa</i> OR74A	gi 85118045
Schja_BorR	<i>Schizosaccharomyces japonicus</i> yFS275	gnl WGS:AATM cont1.18†
Schpo_BorR	<i>Schizosaccharomyces pombe</i>	gi 19112284
Schoc_BorR	<i>Schizosaccharomyces octosporus</i> yFS286	gnl WGS:ABHY cont2.9†
Yarli_BorR	<i>Yarrowia lipolytica</i>	gi 49648093†
Canal_BorR	<i>Candida albicans</i> SC5314	gi 68483638
Clalu_BorR	<i>Clavispora lusitaniae</i>	gb AAFT01000002.1†
Canpa_BorR	<i>Candida parapsilosis</i>	gi 68463825†
Cantr_BorR	<i>Candida tropicalis</i>	gb AAFN01000048.1†
Debha_BorR	<i>Debaryomyces hansenii</i> CBS767	gi 50423989
Lodel_BorR	<i>Lodderomyces elongisporus</i> NRRL YB-4239	gi 149245014
Picfa_BorR-f	<i>Pichia farinosa</i>	gi 12202821†
Picgu_BorR	<i>Pichia guilliermondii</i> ATCC 6260	gi 190345358
Picst_BorR	<i>Pichia stipitis</i> CBS 6054	gi 126091878†
Ashgo_Nbl1	<i>Ashbya gossipii</i>	gi 154954206†
Klula_Nbl1	<i>Kluyveromyces lactis</i>	gi 49640664†
Sacca_Nbl1	<i>Saccharomyces castellii</i>	gb AACF01000026.1†
Sacce_Nbl1	<i>Saccharomyces cerevisiae</i>	gi 42759857
Sacpa_Nbl1	<i>Saccharomyces paradoxus</i> NRRL Y-17217	gb AABY01000061.1†
Sacba_Nbl1	<i>Saccharomyces bayanus</i> MCYC 623	gb AACA01000030.1†
Sacps_Nbl1-f	<i>Saccharomyces pastorianus</i>	gi 152021531†
Sacmi_Nbl1	<i>Saccharomyces mikatae</i>	gb AABZ01000023.1†
Sacku_Nbl1	<i>Saccharomyces kudriavzevii</i>	gb AACI02000077.1†
Homsa_Bor-v2	<i>Homo sapiens</i>	gi 62896695
Homsa_Bor-v3	<i>Homo sapiens</i>	gi 62896657

Homsa_Bor-v1	<i>Homo sapiens</i>	gi 158257266
Homsa_Bor-v4	<i>Homo sapiens</i>	gi 16877392
Homsa_Bor	<i>Homo sapiens</i>	gi 8922438
Pantr_Bor-i3	<i>Pan troglodytes</i>	gi 114555609
Pantr_Bor-i1	<i>Pan troglodytes</i>	gi 114555613
Ponab_Bor	<i>Pongo abelii</i>	gn WUGSC CH276-524M12, gb ABGA01094185.1, gb ABGA01027444.1†
Macmu_Bor-i1	<i>Macaca mulatta</i>	gi 109124028
Micmu_B-v1	<i>Microcebus murinus</i>	gi 152736581†
Micmu_Bor	<i>Microcebus murinus</i>	gi 152551987†
Otoga_Bor	<i>Otolemur garnettii</i>	gb AAQR01071658.1†
Musmu_Bor-v?	<i>Mus musculus</i>	gi 45768782
Musmu_Bor-v1	<i>Mus musculus</i>	gi 50878279
Musmu_Bor-v2	<i>Mus musculus</i>	gi 26347219
Musmu_Bor	<i>Mus musculus</i>	gi 110832775
Musmu_Bor-v3	<i>Mus musculus</i>	gi 148698396
Musmu_Bor-v5	<i>Mus musculus</i>	gi 148698393
Musmu_Bor-v4	<i>Mus musculus</i>	gi 26345018
Ratno_Bor	<i>Rattus norvegicus</i>	gi 68163557
Ratno_Bor-v	<i>Rattus norvegicus</i>	gi 149023915
Spetr_Bor	<i>Spermophilus tridecemlineatus</i>	gb AAQQ01562114.1†
Cavpo_Bor	<i>Cavia porcellus</i>	gi 168104777†
Ochpr_Bor	<i>Ochotona princeps</i>	gi 153360372†
Tupbe_Bor	<i>Tupaia belangeri</i>	gb AAPY01587142.1†
Canfa_Bor	<i>Canis familiaris</i>	gi 73976942
Felca_Bor	<i>Felis catus</i>	gb AANG01488800.1†
Bosta_Bor	<i>Bos taurus</i>	gi 139947520
Oviar_Bor	<i>Ovis aries</i>	gi 114494391†
Sussc_Bor	<i>Sus scrofa</i>	gi 80186830, gi 51383598, gi 78640022†
Myolu_Bor	<i>Myotis lucifugus</i>	gb AAPE01003963.1†
Erieu_Bor	<i>Erinaceus europaeus</i>	gb AANN01684154.1†
Sorar_Bor	<i>Sorex araneus</i>	gi 79978854†
Equca_Bor	<i>Equus caballus</i>	gi 149694010
Loxaf_Bor	<i>Loxodonta africana</i>	gb AAGU01489141.1†
Echte_Bor	<i>Echinops telfairi</i>	gi 72769248†
Dasno_Bor	<i>Dasyopus novemcinctus</i>	gb AAGV01325287.1†
Mondo_Bor	<i>Monodelphis domestica</i>	gi 126330402
Trivu_Bor	<i>Trichosurus vulpecula</i>	gi 116835832†
Ornan_Bor	<i>Ornithorhynchus anatinus</i>	gi 149638524
Galga_Bor1-c	<i>Gallus gallus</i>	gi 82787520†
Galga_Bor1	<i>Gallus gallus</i>	gi 118114492
Galga_Bor1-v3f	<i>Gallus gallus</i>	gi 118121290
Galga_Bor1-v1	<i>Gallus gallus</i>	gi 118129546
Galga_Bor1-v4f	<i>Gallus gallus</i>	gi 118105741
Galga_Bor1-v2	<i>Gallus gallus</i>	gi 118110215
Taegu_Bor1	<i>Taeniopygia guttata</i>	gi 169916442, gi 169926263, gi 44821529†

Xentr_DasB	<i>Xenopus tropicalis</i>	gi 50878296
Xenla_DasB	<i>Xenopus laevis</i>	gi 147903052
Xenla_DasB-v	<i>Xenopus laevis</i>	gi 110832772
Xenla_DasB-v2	<i>Xenopus laevis</i>	gi 38560753, gi 59761136, gi 45888618, gi 45888619, gi 39012578, gi 133823537, gi 38248301, gi 38248377, gi 38706298, gi 38213983, gi 37743181, gi 133789731, gi 133814155, gi 38455026, gi 148859468, gi 133803466, gi 133793697, gi 73755198, gi 58731358, gi 57260419, gi 133781635, gi 133797527, gi 38456952, gi 38223348, gi 38462412, gi 38447229, gi 119119781, gi 38458280, gi 38214727, gi 38284408, gi 74176039, gi 38701795, gi 38253520, gi 39013717, gi 33441010, gi 37745739, gi 38701162, gi 38245853, gi 38485595, gi 21078760, gi 38287975, gi 33421714, gi 133802686, gi 38288961, gi 50878295, gi 48917206, gi 38253595, gi 59751281, gi 38632444, gi 72303482, gi 33417907, gi 38454804, gi 133793698, gi 71979199, gi 72303484, gi 33419120, gi 33423352, gi 48919191, gi 33419121, gi 48679738, gi 73910250, gi 59768983, gi 72308857, gi 48681545, gi 50459174, gi 74291949, gi 38408265, gi 74171999, gi 71810215, gi 71806172, gi 133791900, gi 57200380, gi 74171998, gi 57356464, gi 71979200, gi 59768984, gi 48684031, gi 48965272, gi 57391791, gi 57200379, gi 133820082, gi 133781636, gi 57356463, gi 133802687, gi 133797528, gi 50585712, gi 50459175, gi 38343436, gi 38335432, gi 48965273, gi 39661307, gi 39662713, gi 133791901, gi 133789732, gi 57267884, gi 57198285, gi 39691176, gi 37745737, gi 77622247, gi 133828400, gi 38329493, gi 38464021, gi 57143189, gi 57202538, gi 38459216, gi 73908511, gi 57245137, gi 133789314, gi 38464130, gi 57274057, gi 73752352, gi 133820081, gi 57207742, gi 73904702, gi 57256276, gi 59769636, gi 59761134, gi 57480749, gi 59654752, gi 57180993, gi 57149630, gi 57473801, gi 74266158, gi 38420444, gi 57410195, gi 59769634, gi 74174797, gi 59654751, gi 38422090, gi 48684032, gi 57143188, gi 48680351, gi 57180994, gi 38358147, gi 33423353,

		gi 38332353, gi 39642769, gi 38486021, gi 38332170, gi 38252610, gi 133789315, gi 38422089, gi 38418422†
Xenla_DasB-v3	<i>Xenopus laevis</i>	gi 57402448, gi 57402450†
Ambme_BorR	<i>Ambystoma mexicanum</i>	gi 45806815†
Lipmh_Bor1	<i>Lipochromis sp. 'matumbi hunter'</i>	gi 113895194†
Dicla_Bor1	<i>Dicentrarchus labrax</i>	gi 189253049†
Spaau_Bor1	<i>Sparus aurata</i>	gi 189274324†
Hiphi_Bor1-f	<i>Hippoglossus hippoglossus</i>	gi 90600620†
Oryla_Bor1	<i>Oryzias latipes</i>	gi 187621036, gi 112282173, gi 112306160, gi 187660750, gi 81493937, gi 17360920, gi 66676357, gi 17354733, gi 17367100, gi 17360328, gi 112262750, gi 17368456, gi 187580028, gi 187613057, gi 112305597, gi 112301779, gi 112262191, gi 112282319, gi 112332541, gi 187575663, gi 187388405, gi 187650642, gi 45297952, gi 17395944, gi 141649590, gi 187556146, gi 17377512, gi 187513768, gi 187680558, gi 187377821, gi 187405203, gi 45339487, gi 187575681, gi 66694363, gi 187581043, gi 141627689, gi 112337886, gi 112308601, gi 17406794, gi 17387383, gi 17379503, gi 112274433, gi 112328711, gi 112288744, gi 112343751†
Funhe_Bor1	<i>Fundulus heteroclitus</i>	gi 152138878†
Poere_Bor1	<i>Poecilia reticulata</i>	gi 145873358, gi 145874454, gi 145874117, gi 145873845†
Gasac_Bor1	<i>Gasterosteus aculeatus</i>	gi 86300519†
Takru_Bor1	<i>Takifugu rubripes</i>	emb CAAB01001683.1†
Osmmo_Bor1	<i>Osmerus mordax</i>	gi 125530603†
Corcl_Bor1-f	<i>Coregonus clupeaformis</i>	gi 151355422†
Oncmy_Bor11	<i>Oncorhynchus mykiss</i>	gi 111551039†
Salsa_Bor1	<i>Poecilia reticulata</i>	gi 117501481, gi 89845972, gi 117543463, gi 29328306, gi 85043295, gi 117424975, gi 24387709, gi 85043294, gi 89845971, gi 117424976, gi 117501480, gi 57126872, gi 117543464†
Pimpr_Bor1	<i>Pimephales promelas</i>	gi 73653877, gi 72445610, gi 72420626, gi 72418301, gi 73651735, gi 73694037, gi 73438219, gi 73651892, gi 73717611, gi 73650209, gi 73720594, gi 73720405, gi 73718185, gi 73656588, gi 72732439, gi 73738672, gi 72461198, gi 73651634, gi 72720093, gi 73722480, gi 73650029, gi 73654379, gi 73654799, gi 73652211, gi 73628100, gi 73650202, gi 73691099,

		gi 73654073, gi 73720896, gi 73628549, gi 73649513, gi 73654686, gi 73694743, gi 73694742, gi 73694997, gi 72720091, gi 73738671, gi 72461196, gi 72445608, gi 72420624, gi 73438218, gi 73651633, gi 73651891, gi 73691098, gi 73694998, gi 73720895, gi 73722479, gi 73694036, gi 73653876, gi 73654378, gi 73718184, gi 73717610, gi 73656587, gi 73628099, gi 73628548, gi 73654072, gi 73720593† gi 20188700†
Danre_B1-vC	<i>Danio rerio</i>	
Danre_Bor1-v1	<i>Danio rerio</i>	gi 55925401
Danre_Bor1-v0	<i>Danio rerio</i>	gi 42442836, gi 42484616, gi 42489210, gi 42488999, gi 42489173, gi 16927941, gi 42490565, gi 29012847, gi 16749065, gi 21315563, gi 16750960, gi 29014307, gi 28995451, gi 28998331, gi 28998285, gi 51631566, gi 116717947, gi 18255105, gi 122826567, gi 99073937, gi 78481088, gi 112407584, gi 78480551, gi 51622275, gi 40322444, gi 46825413, gi 122824855, gi 42438390, gi 53746096, gi 78466786, gi 51616867, gi 75839546, gi 116730653, gi 122865771, gi 114118068, gi 101447593, gi 101447569, gi 46817836, gi 113402111, gi 29006283, gi 29010777, gi 161468115, gi 19540510, gi 113383521, gi 42436103, gi 161427993, gi 42427240, gi 122861906, gi 122822255, gi 122819975, gi 101514829, gi 99072912, gi 122725276, gi 122856656, gi 122816377, gi 122820125, gi 122778807, gi 122764424, gi 116725008, gi 122811856, gi 18739337, gi 116712307, gi 78469457, gi 116730132, gi 122778813, gi 122824330, gi 122779211, gi 122761331, gi 122816575, gi 111581778, gi 122812236, gi 99076169, gi 122779337, gi 99062005, gi 99063474† gi 54042464
Danre_Bor1	<i>Danio rerio</i>	
Galga_Bor2	<i>Gallus gallus</i>	gi 25941550, gi 25836801, gi 25823189, gi 25461600, gi 25832678, gi 25832298, gi 45423554, gi 118096337, gi 25836207, gi 45422451, gi 25369066† gi 148232132
Xenla_DasA	<i>Xenopus laevis</i>	
Xenla_DasA-v	<i>Xenopus laevis</i>	gi 50513045
Hiphi_Bor2	<i>Hippoglossus hippoglossus</i>	gi 90606299, gi 90602558†

Oryla_Bor2	<i>Oryzias latipes</i>	gi 187494327†
Gasac_Bor2	<i>Gasterosteus aculeatus</i>	gi 31436298, gi 31436297†
Gasac_Bor2-vC	<i>Gasterosteus aculeatus</i>	gi 31436298, gi 31436297†
Takru_Bor2	<i>Takifugu rubripes</i>	gi 21878911, gi 26772699, gi 26776522, gi 26776726, gi 22422713, gi 2681899, gi 2681901†
Tetni_Bor2-v1	<i>Tetraodon nigroviridis</i>	gi 56334685, gi 56332615, gi 56336137, gi 47213523, gi 7976924, gi 7807181, gi 7814782†
Tetni_Bor2	<i>Tetraodon nigroviridis</i>	gi 47213528
Tetni_Bor2-v2	<i>Tetraodon nigroviridis</i>	gi 56334685, gi 56332615, gi 56336137, gi 47213523, gi 7976924, gi 7807181, gi 7814782†
Gadmo_Bor2	<i>Gadus morhua</i>	gi 50354614, gi 50354107, gi 187988962, gi 146758625, gi 50354763, gi 50354788, gi 117282049, gi 50354369, gi 50354636, gi 187991567, gi 187996646†
Oncmy_Bor2	<i>Oncorhynchus mykiss</i>	gi 90177021, gi 90057294, gi 90057349, gi 56980423, gi 56978314, gi 56975373, gi 56979540, gi 56969586, gi 90100275, gi 56985487†
Salsa_Bor2-a1	<i>Salmo salar</i>	gi 84568347, gi 29320079, gi 169306284†
Salsa_Bor2-a2	<i>Salmo salar</i>	gi 45320433, gi 169431109, gi 84569021†
Pimpr_Bor2	<i>Pimephales promelas</i>	gi 73738685, gi 73437455, gi 72441654, gi 73437454, gi 73738684, gi 72441652, gi 73739702†
Rutru_Bor2	<i>Rutilus rutilus</i>	gi 116536557†
Danre_Bor2-i1	<i>Danio rerio</i>	gi 189525981
Danre_Bor2-i3	<i>Danio rerio</i>	gi 189525979
Ictpu_Bor2	<i>Ictalurus punctatus</i>	gi 40582220, gi 40582138, gi 40583399, gi 40583170, gi 40583112, gi 40581787, gi 40582509, gi 33607934, gi 40581163, gi 40581217, gi 40582730, gi 40582531†
Leuer_BorR	<i>Leucoraja erinacea</i>	gi 52169031†
Brafl_BorR	<i>Amphioxus Branchiostoma</i>	gi 169552932†
Parli_BorR	<i>Paracentrotus lividus</i>	gi 139341312, gi 139274041, gi 139239867, gi 139347056, gi 139337788, gi 139328898, gi 139292928†
Strpu_BorR-c	<i>Strongylocentrotus purpuratus</i>	gi 61230694, gi 57944113, gi 57956448, gi 34795580, gi 57585087, gi 34793911, gi 57945710†
Sacko_BorR	<i>Saccoglossus kowalevskii</i>	gi 187094277, gi 187213534, gi 187048792, gi 187192373, gi 187057751, gi 187056370, gi 187058031, gi 187096422, gi 187168214, gi 187189915, gi 187137683, gi 187204581†

Lotgi_BorR	<i>Lottia gigantea</i>	gi 163442049, gi 163525807, gi 163519156, gi 163456902, gi 163443375, gi 163448733†
Ilyob_BorR-f	<i>Ilyanassa obsoleta</i>	gi 194264626†
Capxx_BorR	<i>Capitella sp.</i>	gi 161288681†
Danpl_BorR	<i>Danus plexippus</i>	gi 160489457†
Trica_BorR	<i>Tribolium castaneum</i>	gi 91086815
Trica_BRvf	<i>Tribolium castaneum</i>	gi 75733666†
Dromo_BorR	<i>Drosophila mojavensis</i>	gi 195116098
Drovi_BorR	<i>Drosophila virilis</i>	gi 195384822
Drogr_BorR	<i>Drosophila grimshawi</i>	gi 195051484
Droan_BorR	<i>Drosophila ananassae</i>	gi 194765493
Droer_BorR	<i>Drosophila erecta</i>	gi 190661150
Droya_BorR	<i>Drosophila yakuba</i>	gi 194175011
Drome_BR-B	<i>Drosophila melanogaster</i>	gi 24583012
Drome_BR-A	<i>Drosophila melanogaster</i>	gi 20129393
Drose_BorR	<i>Drosophila sechellia</i>	gi 194130195
Drosi_BorR	<i>Drosophila simulans</i>	gi 194190761
Drops_BorR	<i>Drosophila pseudoobscura</i>	gi 125984157
Drope_BorR-B	<i>Drosophila persimilis</i>	gi 195156681
Drope_AR-E	<i>Drosophila persimilis</i>	gi 195187147
Drowi_Bor2	<i>Drosophila willistoni</i>	gi 195431977
Drowi_BorR	<i>Drosophila willistoni</i>	gi 194160789
Dromo_AusR	<i>Drosophila mojavensis</i>	gi 195116096
Drovi_AusR	<i>Drosophila virilis</i>	gi 195384820
Drogr_AR-B	<i>Drosophila grimshawi</i>	gi 195051489
Drogr_AR-A	<i>Drosophila grimshawi</i>	gi 195051475
Droan_AusR	<i>Drosophila ananassae</i>	gi 194765491
Drome_Aus	<i>Drosophila melanogaster</i>	gi 24583009
Drose_Aus	<i>Drosophila sechellia</i>	gi 195339413
Drosi_Aus	<i>Drosophila simulans</i>	gi 195577789
Droya_Aus	<i>Drosophila yakuba</i>	gi 195473251
Droer_Aus	<i>Drosophila erecta</i>	gi 194858909
Drope_AR-B	<i>Drosophila persimilis</i>	gi 195164898
Drope_AR-A	<i>Drosophila persimilis</i>	gi 195182597
Drope_AR-C	<i>Drosophila persimilis</i>	gi 195177488
Drope_AR-D	<i>Drosophila persimilis</i>	gi 195177479
Anoga_BRT1	<i>Anopheles gambiae str. PEST</i>	gi 158287373
Anoga_BRT2	<i>Anopheles gambiae str. PEST</i>	gi 158287375
Aedae_BRT1	<i>Aedes aegypti</i>	gi 157129056
Aedae_BRT2	<i>Aedes aegypti</i>	gi 157129058
Culpi_BRT0	<i>Culex pipiens quinquefasciatus</i>	gi 170045041
Culpi_BRT1	<i>Culex pipiens quinquefasciatus</i>	gi 170072377
Culpi_BRT2	<i>Culex pipiens quinquefasciatus</i>	gi 170045035
Lutlo_BorR	<i>Lutzomyia longipalpis</i>	gi 83937785, gi 83937783, gi 83937782†
Unkin2_BoR	<i>Centaurea solstitialis (probable insect contaminant)</i>	gi 124670230†
Apime_BorR	<i>Apis mellifera</i>	gi 110762041

Solin_BorR-f	<i>Solenopsis invicta</i>	gi 124231870, gi 124240237, gi 124230427†
Nasvi_BorR	<i>Nasonia vitripennis</i>	gi 156545696
Caeel_CSC1	<i>Caenorhabditis elegans</i>	gi 74959635
Caeb_CSC1a	<i>Caenorhabditis briggsae</i>	gi 171927707†
Caeb_CSC1b	<i>Caenorhabditis briggsae</i>	gi 171924201†
Caebr_CSC1	<i>Caenorhabditis briggsae AF16</i>	gi 157752490
Caere_CSC1	<i>Caenorhabditis remanei</i>	gi 88677974, gi 68276599†
Nemve_BorR	<i>Nematostella vectensis</i>	gi 156355081
Acrmi_BorR	<i>Acropora millepora</i>	gi 89135466, gi 89138380, gi 89138388†
Hydma_BorR-f	<i>Hydra magnipapillata</i>	gb ABRM01012616.1, gb ABRM01000030.1†
Monbr_BorR	<i>Monosiga brevicollis MX1</i>	gi 167539601
Triva_BR2	<i>Trichomonas vaginalis G3</i>	gi 123404412
Triva_BR2v	<i>Trichomonas vaginalis G3</i>	gi 123413328
Triva_BorR-f	<i>Trichomonas vaginalis G3</i>	gi 123455119
