**Table S1 *S. pombe* strains used in this study**

| Strains | Genotype | Sources |
|---|---|---|
| JS23 (wild-type, WT) | *h⁺ ura4.294 leu1.32* | VandeWeghe & Ow 1999 |
| *pap1*Δ | *h⁺ ura4.294 leu1.32 pap1::kanMX6* | He *et. al*. 2017 |
| *HA-pap1⁺ oxs1*Δ | *h⁺ ura4.294 leu1.32 oxs1::ura4⁺ pap1:: HA-pap1⁺-kanMX6* | He *et. al*. 2017 |
| *caf5*Δ | *h⁺ ura4.294 leu1.32 caf5::ura4⁺* | This study |
| *obr1*Δ | *h⁺ ura4.294 leu1.32 obr1::kanMX6* | This study |
| *SPCC663.08c*Δ | *h⁺ ura4.294 leu1.32 SPCC663.08c::hphMX6* | This study |
| *caf5*Δ *obr1*Δ | *h⁺ ura4.294 leu1.32 caf5::ura4⁺ obr1::kanMX6* | This study |
| *caf5*Δ *obr1*Δ *SPCC663.08c*Δ | *h⁺ ura4.294 leu1.32 caf5::ura4⁺ obr1::kanMX6 SPCC663.08c::hphMX6* | This study |

He, Y., Y. Chen, W. Song, L. Zhu, Z. Dong, and Ow, D.W, 2017 A Pap1-Oxs1 signaling pathway for disulfide stress in *Schizosaccharomyces pombe*. Nucleic Acids Res. 45**:** 106-114.

Vande, J. W., and D. W. Ow, 1999 A fission yeast gene for mitochondrial sulfide oxidation. J. Biol. Chem. 274**:** 13250-13257.

**Table S2 Plasmids used in this study**

| Plasmids | cDNA inserts flanking by indicated restriction sites | Sources |
|---|---|---|
| pART1 | - | McLeod *et al.* 1987 |
| pSLF173 | - | Forsburg and Sherman 1997 |
| pART1-*pap1*$^{+}$ | *Bam*H I-*pap1*$^{+}$-*Sac* I | He *et al.* 2017 |
| pSLF173-*pap1*$^{+}$-*mCherry* | *Not* I-*pap1*$^{+}$-*Cla* I-*mCherry*-*Sal* I | He *et al.* 2017 |
| pART1-*oxs1*$^{+}$ | *Bam*H I-*oxs1*$^{+}$-*Sac* I | He *et al.* 2017 |
| pART1-*oxs1*$^{I107S}$ | *Bam*H I-*oxs1*$^{I107S}$-*Sac* I | This study |
| pART1-*oxs1*$^{A110V}$ | *Bam*H I-*oxs1*$^{A110V}$-*Sac* I | This study |
| pART1-*oxs1*$^{L111W}$ | *Bam*H I-*oxs1*$^{L111W}$-*Sac* I | This study |
| pART1-*oxs1*$^{L113F}$ | *Bam*H I-*oxs1*$^{L113F}$-*Sac* I | This study |
| pART1-*oxs1*$^{L114F}$ | *Bam*H I-*oxs1*$^{L114F}$-*Sac* I | This study |
| pART1-*oxs1*$^{S115R}$ | *Bam*H I-*oxs1*$^{S115R}$-*Sac* I | This study |
| pART1-*oxs1*$^{S115G}$ | *Bam*H I-*oxs1*$^{S115G}$-*Sac* I | This study |
| pART1-*oxs1*$^{L116F}$ | *Bam*H I-*oxs1*$^{L116F}$-*Sac* I | This study |
| pART1-*aa1-131* | *Bam*H I-*aa1-131-Sac* I | This study |
| pART1-*aa100-207* | *Bam*H I-*aa100-207-Sac* I | This study |
| pART1-*aa1-106* | *Bam*H I-*aa1-106-Sac* I | This study |
| pART1-*aa117-207* | *Bam*H I-*aa117-207-Sac* I | This study |
| pART1-*aa100-131* | *Bam*H I-*aa100-131-Sac* I | This study |
| pART1-*gfp*$^{+}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I | This study |
| pART1-*gfp*$^{+}$-*oxs1*$^{+}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*oxs1*$^{+}$-*Sac* I | He *et al*. 2017 |
| pART1-*oxs1*$^{+}$-*gfp*$^{+}$ | *Pst* I-*oxs1*$^{+}$-*Bam*H I-*gfp*$^{+}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES* | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES-Sac* I | This study |
| pART1-*o1NES-gfp*$^{+}$ | *Pst* I-*o1NES-Bam*H I-*gfp*$^{+}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*aa100-131* | *Pst* I-*gfp*$^{+}$-*Bam*H I-*aa100-131-Sac* I | This study |
| pART1-*aa100-131-gfp*$^{+}$ | *Pst* I-*aa100-131-Bam*H I-*gfp*$^{+}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*oxs1*$^{I107S}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*oxs1*$^{I107S}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*oxs1*$^{A110V}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*oxs1*$^{A110V}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*oxs1*$^{L111W}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*oxs1*$^{L111W}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*oxs1*$^{L113F}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*oxs1*$^{L113F}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*oxs1*$^{L114F}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*oxs1*$^{L114F}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*oxs1*$^{S115G}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*oxs1*$^{S115G}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*oxs1*$^{L116F}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*oxs1*$^{L116F}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES*$^{I107A}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES*$^{I107A}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES*$^{A110V}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES*$^{A110V}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES*$^{L111A}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES*$^{L111A}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES*$^{L113A}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES*$^{L113A}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES*$^{L114A}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES*$^{L114A}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES*$^{S115R}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES*$^{S115R}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES*$^{S115G}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES*$^{S115G}$-*Sac* I | This study |
| pART1-*gfp*$^{+}$-*o1NES*$^{L116A}$ | *Pst* I-*gfp*$^{+}$-*Bam*H I-*o1NES*$^{L116A}$-*Sac* I | This study |
| pART1-*gst*$^{+}$-*gfp*$^{+}$ | *Pst* I-*gst*$^{+}$-*Nde* I-*gfp*$^{+}$-*Bam*H I | This study |
| pART1-*gst*$^{+}$-*gfp*$^{+}$-*o1NES* | *Pst* I-*gst*$^{+}$-*Nde* I-*gfp*$^{+}$-*Bam*H I-*o1NES-Sac* I | This study |
| pGEX-4T-1-*gst*$^{+}$ | - | He *et al.* 2017 |
| pGEX-4T-1-*gst*$^{+}$-*gfp*$^{+}$ | *Bam*H I-*gfp*$^{+}$-*Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*oxs1*$^{+}$ | *Bam*H I-*oxs1*$^{+}$-*Xho* I | He *et al.* 2017 |
| pGEX-4T-1-*gst*$^{+}$-*oxs1*$^{I107S}$ | *Bam*H I-*oxs1*$^{I107S}$-*Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*oxs1*$^{A110V}$ | *Bam*H I-*oxs1*$^{A110V}$-*Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*oxs1*$^{L111W}$ | *Bam*H I-*oxs1*$^{L111W}$-*Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*oxs1*$^{L113F}$ | *Bam*H I-*oxs1*$^{L113F}$-*Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*oxs1*$^{L114F}$ | *Bam*H I-*oxs1*$^{L114F}$-*Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*oxs1*$^{S115G}$ | *Bam*H I-*oxs1*$^{S115G}$-*Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*oxs1*$^{L116F}$ | *Bam*H I-*oxs1*$^{L116F}$-*Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*aa100-131* | *Bam*H I-*aa100-131-Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*aa1-106* | *Bam*H I-*aa1-106-Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*aa117-207* | *Bam*H I-*aa117-207-Xho* I | This study |
| pGEX-4T-1-*gst*$^{+}$-*gfp*$^{+}$-*aa100-131* | *Bam*H I-*gfp*$^{+}$-*Bam*H I-*aa100-131-Xho* I | This study |
| pET-21d-*his*$^{+}$-*pap1*$^{+}$ | *Bam*H I-*pap1*$^{+}$-*Hin*d III | He *et al.* 2017 |


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He, Y., Y. Chen, W. Song, L. Zhu, Z. Dong, and Ow, D.W, 2017 A Pap1-Oxs1 signaling pathway for disulfide stress in *Schizosaccharomyces pombe*. Nucleic Acids Res. 45**:** 106-114.

McLeod, M., M. Stein, and D. Beach, 1987 The product of the *mei3*$^{+}$ gene, expressed under control of the mating-type locus, induces meiosis and sporulation in fission yeast. EMBO J. 6**:** 729-736.

**Table S3 Primer sequences**

| | Primer name | Sequence |
|---|---|---|
| | **qRT-PCR primers** | |
| 1 | *act1*$^+$ (*SPBC32H8.12c*)-rtF | 5'-GCGTTGGTTATTGATAATGGCTCT-3' |
| 2 | *act1*$^+$ (*SPBC32H8.12c*)-rtR | 5'-AGGTCAAAATACCACGCTTGCTT-3' |
| 3 | *obr1*$^+$ (*SPAC3C7.14c*)-rtF | 5'-AAAGGCTGGCATTGAGAA-3' |
| 4 | *obr1*$^+$ (*SPAC3C7.14c*)-rtR | 5'-TGCGTTAAGACATCGAGTGT-3' |
| 5 | *caf5*$^+$ (*SPBC609.04*)-rtF | 5'-CTTCGGCTCGCCAGCTCTA-3' |
| 6 | *caf5*$^+$ (*SPBC609.04*)-rtR | 5'-CGACCATCGCTCCACCAA-3' |
| 7 | *SPCC663.08c*-rtF | 5'-GAAATCGAGGCATTGGAC-3' |
| 8 | *SPCC663.08c*-rtR | 5'-CGGCTTCATTGGCACTCT-3' |
| 9 | *srx1*$^+$ (*SPBC106.02c*)-rtF | 5'-GCGGTTTGACTTCAGAAGATTTG-3' |
| 10 | *srx1*$^+$ (*SPBC106.02c*)-rtR | 5'-ACAGGCGTAGAGTGTTAGGGGAG-3' |
| 11 | *ctt1*$^+$ (*SPCC757.07c*)-rtF | 5'-GTGGGTTCGCATTAAAGTTCTAC-3' |
| 12 | *ctt1*$^+$ (*SPCC757.07c*)-rtR | 5'-GTTACGCTTCTGAGTATGGATGA-3' |
| 13 | *trr1*$^+$ (*SPBC3F6.03*)-rtF | 5'-GGTTGTTATTATTGGGTCTGGTC-3' |
| 14 | *trr1*$^+$ (*SPBC3F6.03*)-rtR | 5'-CGACATCGGTGGTAGTAGTAAGC-3' |
| 15 | *ssa2*$^+$ (*SPCC1739.13*)-rtF | 5'-ACACTTTTCCAACAACCGTGTCGAA-3' |
| 16 | *ssa2*$^+$ (*SPCC1739.13*)-rtR | 5'-GTTCATGGCGACTTGGTTCTTAGCA-3' |
| 17 | *wis2*$^+$ (*SPAC1B3.03c*)-rtF | 5'-GTAATGGAACGGGTGGAGAAAGCA-3' |
| 18 | *wis2*$^+$ (*SPAC1B3.03c*)-rtR | 5'-TCCAAATGAGGGGTGGGAACAGTA-3' |
| 19 | *hsp90*$^+$ (*SPAC926.04c*)-rtF | 5'-CTTCCGATGCCTTGGACAAAATTCG-3' |
| 20 | *hsp90*$^+$ (*SPAC926.04c*)-rtR | 5'-TACCGGTATCGCGAATGCTAAGGA-3' |
| 21 | *SPBC36.02c*-rtF | 5'-TCCTATTATTTGGGCTCCGCTGTCT-3' |
| 22 | *SPBC36.02c*-rtR | 5'-TCGTTTGAATGTCTTTGCCAACAGC-3' |
| 23 | *sro1*$^+$ (*SPBC1347.11*)-rtF | 5'-CCTCTTTAAAGGCAACGGCTTCAAG-3' |
| 24 | *sro1*$^+$ (*SPBC1347.11*)-rtR | 5'-CGGTGGTTTGATCAGCAACATTGGA-3' |
| 25 | *SPBC1347.14c*-rtF | 5'-TTCTTTGCTCAGCTCCCCAATTAGG-3' |
| 26 | *SPBC1347.14c*-rtR | 5'-CCACCGATATCGGCATTAACTCTGA-3' |
| 27 | *SPAC23D3.12*-rtF | 5'-AACGAAGTTTCCTTGGCTGATGTCG-3' |
| 28 | *SPAC23D3.12*-rtR | 5'-AAAGCCCATGAGCTTGAATTCTCGT-3' |
| 29 | *ght5*$^+$ (*SPCC1235.14*)-rtF | 5'-TGTCATGTTGGTCTTCGTGTCCATG-3' |
| 30 | *ght5*$^+$ (*SPCC1235.14*)-rtR | 5'-ATACCGATCTGCGAAACGAGATTGG-3' |
| 31 | *gal10*$^+$ (*SPBPB2B2.12c*)-rtF | 5'-CAACATGATTCCAATCCCAGAGTCG-3' |
| 32 | *gal10*$^+$ (*SPBPB2B2.12c*)-rtR | 5'-ATCTAAGTATTGCGCCTCGCCAAGT-3' |
| 33 | *gfp*$^+$-rtF | 5'-GCGAGGGCGATGCCACCTAC-3' |
| 34 | *gfp*$^+$-rtR | 5'-CACGCCGTAGGTCAGGGTGGTC-3' |
| 35 | *pap1*$^+$ (*SPAC1783.07c*)-rtF | 5'-GGCAGAAAGTAAGACAGTTAGAAG-3' |
| 36 | *pap1*$^+$ (*SPAC1783.07c*)-rtR | 5'-TAGTTGGAAGGGAAGACAATGAG-3' |
| | **ChIP qRT-PCR primers** | |
| 37 | *gpd3*$^+$ (*SPBC354.12*)-F | 5'-TCAAGTGGTCTGCCTCTGG-3' |
| 38 | *gpd3*$^+$ (*SPBC354.12*)-R | 5'-CACCGACGACGAACATGG-3' |
| 39 | *obr1*$^+$ (*SPAC3C7.14c*)-F | 5'-CAGAAAATGGGACAGGTAAT-3' |
| 40 | *obr1*$^+$ (*SPAC3C7.14c*)-R | 5'-CAAACAAACCGATTTTGTGC-3' |
| 41 | *SPCC663.08c*-F | 5'-TCACGTAAGCATAATGATTT-3' |
| 42 | *SPCC663.08c*-R | 5'-GTGGATAATTTGGTGTCGGC-3' |
| 43 | *caf5*$^+$ (*SPBC609.04*)-F | 5'-TACGATGGATAATTGAAAGA-3' |
| 44 | *caf5*$^+$ (*SPBC609.04*)-R | 5'-TACTAAGTGTAAAGTAAGCA-3' |
| 45 | control (intergenic region)-F | 5'-TCTTATTCGTTGGGTGTCCC-3' |
| 46 | control (intergenic region)-R | 5'-TTTCTGATTAAGGCTATGGG-3' |

## Table S4 Subcellular localization of Pap1-mCherry (or Wis1-mCherry)

Corresponding to Figures 5B and 5C

| Co-overexpressed proteins | Experiments | N+C | C | T | % (N+C)/T | % C/T |
|---|---|---|---|---|---|---|
| GFP + Pap1-mCherry | 1 | 4 | 64 | 68 | 6% | 94% |
| | 2 | 0 | 161 | 161 | 0% | 100% |
| | 3 | 13 | 423 | 436 | 3% | 97% |
| GFP-Oxs1 + Pap1-mCherry | 1 | 0 | 75 | 75 | 0% | 100% |
| | 2 | 0 | 67 | 67 | 0% | 100% |
| | 3 | 0 | 132 | 132 | 0% | 100% |
| GFP-o1NES$^{I107A}$ + Pap1-mCherry | 1 | 71 | 561 | 632 | 11% | 89% |
| | 2 | 51 | 221 | 272 | 19% | 81% |
| | 3 | 28 | 209 | 237 | 12% | 88% |
| GFP-o1NES$^{L111A}$ + Pap1-mCherry | 1 | 16 | 83 | 99 | 16% | 84% |
| | 2 | 4 | 88 | 92 | 4% | 96% |
| | 3 | 37 | 135 | 172 | 22% | 78% |
| GFP-o1NES$^{L114A}$ + Pap1-mCherry | 1 | 126 | 210 | 336 | 37% | 63% |
| | 2 | 36 | 117 | 153 | 24% | 76% |
| | 3 | 274 | 135 | 409 | 67% | 33% |
| GFP-o1NES$^{L116A}$ + Pap1-mCherry | 1 | 27 | 317 | 344 | 8% | 92% |
| | 2 | 17 | 54 | 71 | 24% | 76% |
| | 3 | 3 | 79 | 82 | 4% | 96% |
| GFP-o1NES + Pap1-mCherry | 1 | 50 | 0 | 50 | 100% | 0% |
| | 2 | 41 | 0 | 41 | 100% | 0% |
| | 3 | 238 | 1 | 239 | 99.6% | 0.4% |
| GST-GFP-o1NES + Pap1-mCherry | 1 | 0 | 138 | 138 | 0% | 100% |
| | 2 | 0 | 142 | 142 | 0% | 100% |
| | 3 | 0 | 157 | 157 | 0% | 100% |
| GST-GFP + Pap1-mCherry | 1 | 0 | 63 | 63 | 0% | 100% |
| | 2 | 0 | 104 | 104 | 0% | 100% |
| | 3 | 0 | 58 | 58 | 0% | 100% |
| GFP + Wis1-mCherry | 1 | 43 | 251 | 294 | 15% | 85% |
| | 2 | 27 | 120 | 147 | 18% | 82% |
| | 3 | 39 | 161 | 200 | 19% | 81% |
| GFP-o1NES + Wis1-mCherry | 1 | 213 | 39 | 252 | 85% | 15% |
| | 2 | 193 | 36 | 229 | 84% | 16% |
| | 3 | 197 | 17 | 214 | 92% | 8% |
| Corresponding to Figure S8 | | | | | | |
| GFP + Pap1-mCherry | 1 | 46 | 602 | 648 | 7% | 93% |
| | 2 | 26 | 277 | 303 | 9% | 91% |
| | 3 | 11 | 150 | 161 | 7% | 93% |
| GFP-o1NES + Pap1-mCherry | 1 | 251 | 7 | 258 | 97% | 3% |
| | 2 | 371 | 2 | 373 | 99% | 1% |
| | 3 | 332 | 0 | 332 | 100% | 0% |
| Oxs1 + Pap1-mCherry | 1 | 34 | 421 | 455 | 7% | 93% |
| | 2 | 39 | 523 | 562 | 7% | 93% |
| | 3 | 12 | 190 | 202 | 6% | 94% |

N+C: Number of cells with observable nuclear and cytoplasmic Pap1-mCherry (or Wis1-mCherry);
C: Number of cells with exclusively cytoplasmic Pap1-mCherry (or Wis1-mCherry);
T: Total cell number.