Supplementary Information (Tables S1 through S4)

Table S1. Summary of Prx knockdown studies.

Organism/ΔEnzyme/s	Reference	Brief Phenotypic Observations[a]
Homo sapiens-PrxI	*Hoshino 2005*[55]	Diminished FK228 antitumor properties.
Homo sapiens-PrxII	*Stresing 2013*[49]	+H_2O_2 sensitivity, -metastasis to lungs.
Homo sapiens-PrxIII	*De Simoni 2007*[47]	+Protein carbonylation, + neuronal apoptosis.
Homo sapiens-PrxIII	*Mukhopadhyay 2006*[50]	+Myocin-c sensitivity.
Homo sapiens-PrxIV	*Tavender 2010*[51]	+ER stress sensitivity.
Homo sapiens-PrxIV	*Tavender 2008*[52]	++H_2O_2 sensitivity.
Homo sapiens-PrxV	*De Simoni 2007*[47]	+Protein carbonylation, + neuronal apoptosis.
Homo sapiens-PrxV	*Kropotov 2006*[48]	+DNA ox., + non-coding DNA transcription.
Homo sapiens-PrxVI	*Chang 2007*[53]	-Breast cancer growth, -metastases.
Homo sapiens-PrxVI	*Kim 2001*[54]	+ Apoptosis, -IL-1B production.
Mus musculus-PrxII	*Agrawal-Singh 2011*[136]	+Myeloblast-like cell growth.
Mus musculus-PrxVI	*Manevich 2005*[61]	+Lipid oxidation, + apoptosis.
Mus musculus-PrxVI	*Fatma 2011*[132]	+UPR, +apoptosis in lens epithelial/aging cells.
Caenorhabditis elegans-PrxII	*Isermann 2004*[73]	Retarded development, -70% brood size.
Caenorhabditis elegans-PrxIII	*Ranjan 2013*[74]	-Motility, - brood size.
Schistosoma mansoni-Prx1a	*Sayed 2006*[75]	-Survival, + albumin and actin oxidation
Schistosoma mansoni-Prx1a/b	*De Moraes 2009*[76]	Decreased larval size.
Schistosoma japonicam-Prx1	*Kumagai 2009*[77]	+H_2O_2, CHP, and TBP sensitivity.
Trypanosoma brucei-TbCPX	*Wilkinson 2003*[78]	+16-fold more H_2O_2 sensitivity
Mycobacterium bovis-AhpC	*Wilson 1998*[96]	Reduced infectivity.
Arabidopsis thaliana-"2-CP"	*Baier 2000*[86]	+Foliar ascorbate oxidation.
Arabidopsis thaliana-PrxQ	*Lamkemeyer 2006*[87]	-PSII and cytochrome-b6 content.
Arabidopsis thaliana-PrxII	*Romero-Puertas 2007*[137]	+lipid oxidation, +protein nitrosylation.

[a] Abbreviations for cumene hydroperoxide (CHP) and tert-butyl hydroperoxide (TBP).

Table S2. Summary of Prx knockout studies in other eukaryotes.

Organism/ΔEnzyme/s	**Reference**	**Brief Phenotypic Observations**[a]
Saccharomyces cerevisiae (Sc)-Prx1	*Wong 2004*[83]	+ROS/RNS sensitivity, +DNA mutation.
Sc-Tsa1,Tsa2	*Wong 2004*[83]	+ROS/RNS sensitivity, ++DNA mutation.
Sc-Tsa1,Tsa2	*Ogusucu 2008*[138]	+1-hydroxyethyl radical in the presence of ethanol.
Sc-Tsa1,Tsa2,Dot5	*Wong 2004*[83]	++ROS/RNS sensitivity, ++DNA mutation.
Sc-Tsa1,Tsa2,Prx1	*Wong 2004*[83]	++ROS/RNS sensitivity, ++DNA mutation.
Sc-Tsa1,Tsa2,Prx1,Dot5	*Wong 2004*[83]	++ROS/RNS sensitivity, ++DNA mutation.
Sc-Tsa1,Tsa2,Prx1,Ahp1	*Wong 2004*[83]	++ROS/RNS sensitivity, ++DNA mutation rate.
Sc-Tsa1,Tsa2,Prx1,Dot5,Ahp1	*Wong 2004*[83]	-Growth rate, +++ROS/RNS sensitivity.
Sc-Tsa1/2,Ahp1,nPrx,mPrx,Gpx1,Gpx2,Gpx3	*Fomenko 2010*[84]	Replicative lifespan of strain decreased by ~50%.
Schizosaccharomyces pombe-Tpx1	*Jara 2007*[139]	No aerobic growth.
Neurospora crassa-2Prx	*Edgar 2012*[85]	Lengthened circadian period with altered phase.
Plasmodium falciparum-Tpx1	*Komaki-Yasuda 2003*[80]	+Paraquat/sodium nitroprusside sensitivity.
Plasmodium berghei-Tpx1	*Yano 2006*[81]	60% fewer gametocytes, delayed gaetocytemia.
Plasmodium berghei-Tpx1	*Yano 2008*[82]	Decreased infectivity in mice.
Leishmania infantum-mTxnPx	*Castro 2011*[79]	Decreased infectivity in mice.
Arabidopsis thaliana-2CysPrxA,2CysPrxB	*Edgar 2012*[85]	Altered circadium rhythm in phase and amplitude.

[a] Abbreviations for reactive oxygen species (ROS), reactive nitrogen species (RNS), cumene hydroperoxide (CHP) and tert-butyl hydroperoxide (TBP).

Table S3. Summary of Prx knockout studies in prokaryotes.

Organism/ΔEnzyme/s	**Reference**	**Brief Phenotypic Observations**[a]
Helicobacter pylori-AhpC	*Baker 2001*[93]	No colony growth in microaerobic conditions.
Helicobacter pylori-AhpC	*Olczak 2003*[94]	100% reduction in mouse stomach colonization.
Helicobacter pylori-Tpx	*Olczak 2003*[94]	+H_2O_2/O_2 sensitivity, -94% stomach colonization.
Helicobacter cinaedi-AhpC	*Charoenlap 2011*[140]	+Susceptibility to killing by macrophage.
Legionella pneumophila-AhpC	*Rankin 2002*[141]	Normal phenotype, but not extensively studied.
Legionella pneumophila-AhpC	*LeBlanc 2006*[142]	+H_2O_2, CHP, TBP, and paraquat sensitivity
Mycobacterium tuberculosis-AhpC	*Springer 2001*[143]	+CHP sensitivity.
Porphyromonas gingivalis-AhpC	*Johnson 2004*[144]	+H_2O_2 sensitivity.
Bacteroides fragilis-AhpC	*Rocha 1999*[145]	-10,000-fold survival in aerobic conditions.
Staphylococcus aureus-AhpC	*Cosgrove 2006*[95]	-10-fold tolerance to desiccation, -colonization.
Salmonella typhimurium-AhpC	*Chen 1998*[146]	+CHP and RNI sensitivity, -10,000-fold survival.
Salmonella typhimurium-AhpC	*Storz 1989*[147]	+CHP sensitivity.
Escherichia coli-AhpC	*Storz 1989*[147]	+CHP sensitivity.
Escherichia coli-PrxQ	*Jeong 2000*[148]	+H_2O_2, TBP, linoleic acid peroxide sensitivity.
Xanthomonas campestris-AhpC	*Mongkolsuk 2000*[149]	+TBP sensitivity, +catalase expression.
Xanthomonas campestris-AhpC	*Vattanaviboon 2003*[150]	+Menadione sensitivity.
Vibrio parahaemolyticus-AhpC1	*Wang 2013*[97]	-Colony formation with organic peroxides.
Vibrio parahaemolyticus-AhpC2	*Wang 2013*[97]	Rapid induction of "viable but nonculturable state."
Vibrio parahaemolyticus-AhpC1/2	*Wang 2013*[97]	-Colony formation.
Brucella abortus-AhpC	*Steele 2010*[92]	+H_2O_2 sensitivity.
Brucella abortus-AhpC, KatE	*Steele 2010*[92]	-Virulence to mice, +H_2O_2 sensitivity.
Synechococcus elongatus-2CysPrx	*Edgar 2012*[85]	Altered circadium rhythm in phase and amplitude.
Camploybacter jejuni-PrxQ	*Atack 2008*[151]	Slightly reduced growth.
Campylobacter jejuni-Tpx	*Atack 2008*[151]	Slightly reduced growth.
Campylobacter jejuni-PrxQ,Tpx	*Atack 2008*[151]	Zero growth at high aeration, +DNA damage.
Anabaena PCC 7120-PrxQ-A	*Latifi 2007*[152]	Hypersensitive to oxidative stress.

[a] Abbreviations for reactive nitrogen intermediates (RNI), cumene hydroperoxide (CHP) and tert-butyl hydroperoxide (TBP).

Table S4. Eukaryotes that lack Srx but possess Prxs containing GGLG/YF-like sequences.[a]

Xenopus tropicalis	GGLG	YF
Caenorhabditis elegans	GGLG	YF
Schistosoma mansoni	GGLG	FF
Nematostella vectensis	GGLG	YF
Trichoplax adhaerens	GGLG	FF
Amphimedon queenslandica	GGLG	YF
Phaeosphaeria nodorum	GGLG	YL
Tuber melanosporum	GGLG	YF
Laccaria bicolor	GGLG	YF
Encephalitozoon cuniculi[b]	GVLG	- -
Monosiga brevicollis	GGLA	YF
Entamoeba histolytica	GGVG	YL
Plasmodium falciparum	GGIG	YY
Paramecium tetraurelia	GGLG	YW
Phaeodactylum tricornutum	GGLE	YF
Phytophthora infestans	GGLG	YF
Guillardia theta	GGLG	FF
Trypanosoma brucei	GGLG	YF
Trichomonas vaginalis	GGLG	YF
Giardia lamblia	GGIG	YF

[a] Shown are the sequences at the GGLG/YF motifs for representative Prxs from eukaryotes that lack Srx.

[b] This organism is included to show that the GGLG motif may be retained even if the YF is not.