***Supplementary File 1*:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Protein** | ***FOXO (Forkhead Box Class O)*** | ***CAT (Catalase)*** | ***SOD (Superoxide Dismutase)*** | ***PRDX/PRX (Peroxiredoxin)*** | ***TRX(Thioredoxin)*** | ***GLRX (Glutaredoxins)*** |
| **Function** | Transcription Factor | Antioxidative Enzyme | Antioxidative Enzyme | Antioxidative Enzyme | Antioxidative Enzyme | Antioxidative Enzyme |
| **Human** | FOXO1,3,4,6 | CAT | SOD1, 2, 3 | PRDX/PRX 1,2,3,4,5,6 | TRX | GLRX 1,2,3,5 |
| **Murine** | FOXO1,3,4,6 | cat | Sod 1, 2,3 | Prdx | Trx | Glrx 1,2,3,5 |
| ***C. elegans*** | DAF-16 | Ctl 1, 2,3 | Sod 1,2,3,4,5 | prdx 2, 3, 6 | trx 1,2,3,4,5 | glrx 3, 5, 10, 21, 22 |
| **Location human vs *C. elegans*** | Nucleus  Vs  Nucleus | Peroxisome vs Peroxisome | Cytoplasm, nucleus and mitochondria vs cytoplasm and mitochondria | Cytoplasm vs cytoplasm | Nucleus and cytoplasm vs nucleus | Cytoplasm, mitochondria vs mitochondrial matrix |
| **Enzymatic activity** | None | Human: ~50U/mg (skin) and 98.6 MU/l (blood); Mouse: 4-18U/mg (Liver); Worm: 35-55U/mg over lifespan | SOD-1 Human: ~30 U/mg (skin)  Mouse: 4 U/mg; SOD-2 | Human & Rat: 40 (mmol/min/mg) | Human: 0.15/100ug x 10^3 | Human:10nmol/min/mg in lung tissues  Mouse : Identical to human |
| **Disruption**  **phenotype in**  ***C. elegans*** | Mouse: Homozygote has diverse defects; secondary infertility, decreased glucose uptake, mild anemia. Worm: impaired dauer formation. | Ctl2 KO causes progeria, decreased lifespan | Overexpression induces resistance to oxidative stress and increased lifespan | Prdx-2 KO Worm: sensitive to oxidation. decreased lifespan. | Trx ko worms: reduced lifespan, sensitive to oxidative stress (paraquat) | Not tested |
| **Homology** | 22.14% ID, (to FOXO3) | 60.53 ID to clt1 | 55.35 to SOD1 | 72.86 ID to prdx 6 | 33.91% ID to trx1 | 45.10% ID to glrx3 |
| **References** | ([93](#_ENREF_93), [94](#_ENREF_94)) | ([95](#_ENREF_95)) | ([96](#_ENREF_96)) | ([97](#_ENREF_97), [98](#_ENREF_98)) | ([99-101](#_ENREF_99)) | ([102](#_ENREF_102)) |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Protein** | ***Glutathione S-transferase*** | ***NAD-dependent protein deacetylase (SIR)*** | ***Dual specificity mitogen-activated protein kinase kinase*** | **Nuclear respiratory factor 1**  **(NRF1)** | ***Dual oxidase 1*** | **D-beta-hydroxybutyrate dehydrogenase** |
| **Function** | Antioxidative Enzyme | reduction of the 'Lys-16' acetylation of histone H4 | Kinase activity involved in oxidative stress | mitochondrial DNA transcription and replication | N/A | Oxidative Enzyme |
| **Human** | GSTA 1-5/  GSTM 1-5 | SIRT 1-7 | MAP2K1 | NRF1 | Oxidative Enzyme | BDH1 |
| **Murine** | GSTA 1-7/  Gstm 1-4 | Sir 1-7 |  | Nfr1 | DUOX1 | Bdh1 |
| ***C. elegans*** | Gst 1-44 | Sir 2.1-2.4 | Mek 1, 2 | Skn 1 | Duox1 | N/A |
| **Location human vs**  ***C. elegans*** | Cytosol vs Cytoplasm and mitochondria | Nucleus, mitochondria and cytoplasm vs  Nucleus and cytoplasm | Nucleus and mitochondria vs Cytoplasm | cytoplasm vs  Nucleus and mitochondria | bli-3 | Mitochondria |
| **Enzymatic activity** | 121 nmol/min/mg in human  N/A for C-elegans | N/A | N/A | N/A | Plasma membrane vs plasma membrane | N/A |
| **Disruption**  **phenotype in**  ***C. elegans*** | RNAi-mediated knockdown causes an increase in Mn2+-mediated dopaminergic CEP neuron degeneration | Reduces the longevity  RNAi-mediated depletion results in an increase of 'Lys-16' acetylation of histone H4 (H4K16ac) | defects in egg laying infertility  Reduced lifespan with stress.  No obvious phenotype in absence of stress | RNAi-mediated knockdown causes an increase in Mn2+-mediated dopaminergic CEP neuron degeneration and a reduction in expression levels of glutathione S-transferase gst-1 | RNAi-mediated knockdown + proline ROS production, reduces the expression of skn-1 and reduces longevity | N/A |
| **Homology** | 29.28% ID to GSTA1 | 28.17% ID to SIR1 |  | 12.20% ID to NRF1 | 32.78% | N/A |
| **Refs** | ([103](#_ENREF_103), [104](#_ENREF_104)) | ([105-107](#_ENREF_105)) |  | ([104](#_ENREF_104), [108](#_ENREF_108), [109](#_ENREF_109)) | ([110](#_ENREF_110), [111](#_ENREF_111)) |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Protein** | **Xanthine Oxidase** | **NO Synthase** | **Cytochrome P450** | **Hydroxyacid oxidase 1** | **SDH (Succinate Dehydrogenase)** |  |
| **Function** | Oxidative Enzyme | Oxidative Enzyme | Oxidative Enzyme | Oxidative Enzyme | Oxidative Enzyme |  |
| **Human** | XDH | NOS 1,2,3 | CYP (Multiple) | HAO1 | SDHA, SDHB, SDHC, SDHD |  |
| **Murine** | Xdh | Nos 1,2,3 | Cyp (multiple) | Hao1 | Sdha, Sdhb, Sdhc, Sdhd |  |
| ***C. elegans*** | xdh-1 | Unknown | cyp-(23-37) | Unknown | sdha-1, sdhb-1, sdhd-1 |  |
| **Location human vs**  ***C. elegans*** | Peroxisome and Extracellular region vs Cytosol |  | ER vs Unknown |  | Mitochondria VS Mitochondria |  |
| **Enzymatic activity** | Rat: 4.4 ccm oxy uptake/unit time/unit weight of intestine | Human: .5-2.5 pmol/min/mg (brain) Mouse: Normalized to 1 | Multiple | --- | 1.45 ferricyanide reduced/min.mg wetwt. (Euthyroid) |  |
| **Disruption**  **phenotype in**  ***C. elegans*** | Unavailable |  | Unavailable |  | Unavailable |  |
| **Homology** | 46.54% |  | 28.97% |  | 69.12% |  |
| **Refs** | ([112](#_ENREF_112)) |  | ([113-116](#_ENREF_113)) |  | ([117](#_ENREF_117)) |  |