GEPHE SUMMARY

Gephebase Gene

SOD1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^SOD1^#gephebase-summary-title)

GepheID

GP00001985

Entry Status

Published

Main curator

Courtier

PHENOTYPIC CHANGE

Trait Category

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait

Xenobiotic resistance (paraquat) (https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (paraquat)^#gephebase-summary-title)

Trait State in Taxon A

Drosophila melanogaster

Trait State in Taxon B

Drosophila melanogaster - hypersensitive to paraquat - CA1 allele

Ancestral State

Taxon A

Taxonomic Status

Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name

Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila melanogaster^#gephebase-summary-title)

Common Name

fruit fly

Synonyms

Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup

Parent

melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)

NCBI Taxonomy ID

7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Drosophila melanogaster^#gephebase-summary-title)

Common Name

fruit fly

Synonyms

Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Brachycera; Muscomorpha; Eremoneura; Cyclorrhapha; Schizophora; Acalyptratae; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup

Parent

melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 32351)

NCBI Taxonomy ID

7227 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7227)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

Sod1

Synonyms

Cu; 24492; CG11793; cSod; cSOD; Cu-Zn SOD; Cu/Zn sod; Cu/Zn SOD; Cu/Zn superoxide dismutase; Cu/ZnSOD; CuSOD; CuZn SOD; CuZn-SOD; CuZn-SOD1; CuZnSOD; Cu[2+]/Zn[2+]SOD; Dmel\CG11793; dsod; dSOD1; G; l(3)108; l(3)68Af'; l(3)G; Mn SOD; sod; Sod; SOD; Sod-1; SOD-1; sod1; SOD1; SODC_DROME; To; To-1; Zn Sod; Zn SOD; Zn-SOD; ZnSod

String

7227.FBpp0305736 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0305736)

Sequence Similarities

Belongs to the Cu-Zn superoxide dismutase family.

GO - Molecular Function

UniProtKB Drosophila melanogaster

P61851 (http://www.uniprot.org/uniprot/P61851)

GenebankID or UniProtKB

()

GO:0042803 : protein homodimerization activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0042803)
GO:0016209 : antioxidant activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016209)
GO:0005507 : copper ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005507)
GO:0004784 : superoxide dismutase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0004784)

GO - Biological Process

GO:0008340 : determination of adult lifespan
(https://www.ebi.ac.uk/QuickGO/term/GO:0008340)
GO:0007568 : aging (https://www.ebi.ac.uk/QuickGO/term/GO:0007568)
GO:0006979 : response to oxidative stress
(https://www.ebi.ac.uk/QuickGO/term/GO:0006979)
GO:0019430 : removal of superoxide radicals
(https://www.ebi.ac.uk/QuickGO/term/GO:0019430)
GO:0001306 : age-dependent response to oxidative stress
(https://www.ebi.ac.uk/QuickGO/term/GO:0001306)
GO:0048167 : regulation of synaptic plasticity
(https://www.ebi.ac.uk/QuickGO/term/GO:0048167)
GO:1903146 : regulation of autophagy of mitochondrion
(https://www.ebi.ac.uk/QuickGO/term/GO:1903146)
GO:2000331 : regulation of terminal button organization
(https://www.ebi.ac.uk/QuickGO/term/GO:2000331)

GO - Cellular Component

GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)
GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829)
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)
GO:0005777 : peroxisome (https://www.ebi.ac.uk/QuickGO/term/GO:0005777)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title)

Aberration Type

Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Insertion^#gephebase-summary-title)

Insertion Size

100-999 bp

Molecular Details of the Mutation

Insertion of a 0.68kb truncated P-element 47bp downstream of the transcription start site.

Experimental Evidence

Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title)

Main Reference

Low-activity allele of copper-zinc superoxide dismutase (CuZnSOD) in Drosophila increases paraquat genotoxicity but does not affect near UV radiation damage. (2001)
(https://pubmed.ncbi.nlm.nih.gov/11550893)

Authors

Vontas JG; Tsakas SC; Loukas M; Hemingway J

Abstract

Different types of mutations and DNA-damage profiles induced by near-UV radiation and the superoxide anion (O2-.) indicate separate lesions and (or) mechanisms of mutagenesis. Despite a wealth of data, it is still unclear whether variations in the activity levels of antioxidant enzymes naturally present in suboptimal concentrations are among the underlying causes of the increase of near UV radiation genotoxicity. We incorporated a low-activity allele of copper-zinc superoxide dismutase (CuZnSOD), recovered from natural populations of Drosophila melanogaster, into standard marked strains and employed a somatic mutation and recombination test (SMART) to compare paraquat and near UV radiation genotoxicity in these strains. Our results show that, although the low-activity CuZnSOD allele of D. melanogaster confers hypersensitivity to paraquat, the near UV radiation damage was not affected.

Additional References

RELATED GEPHE

Related Genes

19 (Acetylcholinesterase (Ace-2), alcohol dehydrogenase (Adh), Aldehyde dehydrogenase (Aldh), CG11699, Cyp12d1, Cyp28d1, Cyp28d1-Cyp28d2, cyp6d2, cyp6g1, glutamate-gated chloride channel (GluCl), GSS (glutathione synthetase), GSTE1-E10 cluster, kin of irre (kire), para (kdr), PHGPx, resistance to dieldrin, RnrS, Ugt86Dd, CHKov1)
(https://www.gephebase.org/search-criteria?/or+Taxon ID=^7227^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@TE - http://flybase.org/reports/FBal0282693