

## GEPHE SUMMARY

<p>sterol C5 desaturase (<a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> Gephebase=<sup>^</sup>sterol C5 desaturase<sup>^</sup>#gephebase-summary-title)</p>	<p>Gephebase Gene</p>	<p>GP00001954</p>	<p>GepheID</p>
<p>Published</p>	<p>Entry Status</p>	<p>Courtier</p>	<p>Main curator</p>

## PHENOTYPIC CHANGE

<p>Physiology (<a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> Category=<sup>^</sup>Physiology<sup>^</sup>#gephebase-summary-title)</p>	<p>Trait Category</p>	<p>Cholesterol metabolism (cholesterol biosynthesis) (<a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> =<sup>^</sup>Cholesterol metabolism (cholesterol biosynthesis)<sup>^</sup>#gephebase-summary-title)</p>	<p>Trait</p>
<p>able to synthesise cholesterol de novo</p>	<p>Trait State in Taxon A</p>	<p>unable to synthesise cholesterol de novo</p>	<p>Trait State in Taxon B</p>
<p>Taxon A</p>	<p>Ancestral State</p>	<p>Intergeneric or Higher (<a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> Status=<sup>^</sup>Intergeneric or Higher<sup>^</sup>#gephebase-summary-title)</p>	<p>Taxonomic Status</p>
<p>Taxon A</p>	<p>Latin Name</p>	<p>Taxon B</p>	<p>Latin Name</p>
<p>Homo sapiens (<a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms</a> =<sup>^</sup>Homo sapiens<sup>^</sup>#gephebase-summary-title)</p>	<p>Caenorhabditis elegans (<a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms</a> =<sup>^</sup>Caenorhabditis elegans<sup>^</sup>#gephebase-summary-title)</p>	<p>human</p>	<p>-</p>
<p>human; man; Homo sapiens Linnaeus, 1758; Home sapiens; Homo sapiens; Homo sapeins; Homo sapien; Homo sapiens; Homo sapience; Homo sapiense; Homo sapients; Homo sapines; Homo spaiens; Homo spiens; Humo sapiens</p>	<p>roundworm; Rhabditis elegans; Caenorhabditis elegans (Maupas, 1900); Rhabditis elegans Maupas, 1900</p>	<p>species</p>	<p>Rank</p>
<p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes; Catarrhini; Hominoidea; Hominidae; Homininae; Homo</p>	<p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Rhabditida; Rhabditina; Rhabditomorpha; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis</p>	<p>species</p>	<p>Rank</p>
<p>Homo () - (Rank: genus) (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605</a>)</p>	<p>Caenorhabditis () - (Rank: genus) (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6237">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6237</a>)</p>	<p>9606 (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606</a>)</p>	<p>NCBI Taxonomy ID</p>
<p>No</p>	<p>6239 (<a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6239">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6239</a>)</p>	<p>No</p>	<p>NCBI Taxonomy ID</p>
<p>is Taxon A an Infrasppecies?</p>	<p>is Taxon B an Infrasppecies?</p>	<p>is Taxon A an Infrasppecies?</p>	<p>is Taxon B an Infrasppecies?</p>

## GENOTYPIC CHANGE

<p>ERG3</p>	<p>Generic Gene Name</p>	<p>UniProtKB Saccharomyces cerevisiae (strain ATCC 204508 / S288c) P32353 (<a href="http://www.uniprot.org/uniprot/P32353">http://www.uniprot.org/uniprot/P32353</a>)</p>	<p>GenebankID or UniProtKB</p>
<p>PSO6; SYR1; YLR056W; L2150</p>	<p>Synonyms</p>	<p>0</p>	<p>GenebankID or UniProtKB</p>
<p>4932.YLR056W (<a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=4932.YLR056W">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=4932.YLR056W</a>)</p>	<p>String</p>	<p>0</p>	<p>GenebankID or UniProtKB</p>
<p>Belongs to the sterol desaturase family.</p>	<p>Sequence Similarities</p>	<p>0</p>	<p>GenebankID or UniProtKB</p>
<p>GO:0005506 : iron ion binding (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005506">https://www.ebi.ac.uk/QuickGO/term/GO:0005506</a>)</p>	<p>GO - Molecular Function</p>	<p>0</p>	<p>GenebankID or UniProtKB</p>
<p>GO:0000248 : C-5 sterol desaturase activity (<a href="https://www.ebi.ac.uk/QuickGO/term/GO:0000248">https://www.ebi.ac.uk/QuickGO/term/GO:0000248</a>)</p>	<p>GO - Biological Process</p>	<p>0</p>	<p>GenebankID or UniProtKB</p>

GO:0006696 : ergosterol biosynthetic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006696>)  
GO:0016126 : sterol biosynthetic process  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016126>)

GO - Cellular Component

GO:0016021 : integral component of membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)  
GO:0005788 : endoplasmic reticulum lumen  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005788>)  
GO:0005789 : endoplasmic reticulum membrane  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005789>)

Presumptive Null  
Yes ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes))  
Molecular Type  
Gene Loss ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular Type=~Gene Loss))  
Aberration Type  
Deletion ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration Type=~Deletion))  
Deletion Size  
unknown  
Molecular Details of the Mutation  
gene absent in the genome  
Experimental Evidence  
Candidate Gene ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene))  
Main Reference  
Preservation of genes involved in sterol metabolism in cholesterol auxotrophs: facts and hypotheses. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18682733>)  
Authors  
Vinci G; Xia X; Veitia RA

Abstract  
It is known that primary sequences of enzymes involved in sterol biosynthesis are well conserved in organisms that produce sterols de novo. However, we provide evidence for a preservation of the corresponding genes in two animals unable to synthesize cholesterol (auxotrophs): *Drosophila melanogaster* and *Caenorhabditis elegans*.

We have been able to detect bona fide orthologs of several ERG genes in both organisms using a series of complementary approaches. We have detected strong sequence divergence between the orthologs of the nematode and of the fruitfly; they are also very divergent with respect to the orthologs in organisms able to synthesize sterols de novo (prototrophs). Interestingly, the orthologs in both the nematode and the fruitfly are still under selective pressure. It is possible that these genes, which are not involved in cholesterol synthesis anymore, have been recruited to perform different new functions. We propose a more parsimonious way to explain their accelerated evolution and subsequent stabilization. The products of ERG genes in prototrophs might be involved in several biological roles, in addition to sterol synthesis. In the case of the nematode and the fruitfly, the relevant genes would have lost their ancestral function in cholesterologenesis but would have retained the other function(s), which keep them under pressure.

By exploiting microarray data we have noticed a strong expressional correlation between the orthologs of ERG24 and ERG25 in *D. melanogaster* and genes encoding factors involved in intracellular protein trafficking and folding and with Start1 involved in ecdysteroid synthesis. These potential functional connections are worth being explored not only in *Drosophila*, but also in *Caenorhabditis* as well as in sterol prototrophs.

Additional References

## RELATED GEPHE

Related Genes  
3 (lanosterol c14 demethylase, lanosterol synthase, squalene synthase) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~9606~/and+Trait=Cholesterol metabolism/or+Taxon ID=~6239~/and+Trait=Cholesterol metabolism/and+groupHaplotypes=true#gephebase-summary-title>)  
Related Haplotypes  
1 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~sterol C5 desaturase~/and+Taxon ID=~9606~/or+Gene Gephebase=~sterol C5 desaturase~/and+Taxon ID=~6239~/and+groupHaplotypes=true#gephebase-summary-title>)

## EXTERNAL LINKS

## COMMENTS

@ParallelEvolution in insects