

GEPHE SUMMARY

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|--|----------------|------------|--------------|
| CYP6D1 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=CYP6D1#gephebase-summary-title) | Gephebase Gene | GP00002118 | GepheID |
| Published | Entry Status | Courtier | Main curator |

PHENOTYPIC CHANGE

| | | | |
|---|-----------------------------|---|-----------------------------|
| Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=Physiology#gephebase-summary-title) | Trait Category | | |
| Xenobiotic resistance (insecticide) (https://www.gephebase.org/search-criteria?/and+Trait=Xenobiotic+resistance+(insecticide)#gephebase-summary-title) | Trait | | |
| Musca domestica - sensitive | Trait State in Taxon A | | |
| Musca domestica- resistant | Trait State in Taxon B | | |
| Taxon A | Ancestral State | | |
| Intraspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=Intraspecific#gephebase-summary-title) | Taxonomic Status | | |
| | Taxon A | | Taxon B |
| Musca domestica (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Musca+domestica#gephebase-summary-title) | Latin Name | Musca domestica (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=Musca+domestica#gephebase-summary-title) | Latin Name |
| house fly | Common Name | house fly | Common Name |
| house fly; Musca domestica Linnaeus, 1758 | Synonyms | house fly; Musca domestica Linnaeus, 1758 | Synonyms |
| species | Rank | species | Rank |
| 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; Calypratae; Muscoidea; Muscidae; Muscinae; Muscini; Musca; Musca | 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; Calypratae; Muscoidea; Muscidae; Muscinae; Muscini; Musca; Musca | Lineage |
| Musca () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=44052) | Parent | Musca () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=44052) | Parent |
| 7370 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7370) | NCBI Taxonomy ID | 7370 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7370) | NCBI Taxonomy ID |
| No | is Taxon A an Intraspecies? | No | is Taxon B an Intraspecies? |

GENOTYPIC CHANGE

| | | | |
|--|-------------------------|--|---------------------------|
| CYP6D1 | Generic Gene Name | Q27698 (http://www.uniprot.org/uniprot/Q27698) | UniProtKB Musca domestica |
| - | Synonyms | Q | GenebankID or UniProtKB |
| - | String | | |
| Belongs to the cytochrome P450 family. | Sequence Similarities | | |
| GO:0020037 : heme binding (https://www.ebi.ac.uk/QuickGO/term/GO:0020037) | GO - Molecular Function | | |
| GO:0005506 : iron ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005506) | | | |
| GO:0004497 : monooxygenase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004497) | | | |
| GO:0016705 : oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen (https://www.ebi.ac.uk/QuickGO/term/GO:0016705) | | | |
| - | GO - Biological Process | | |

GO:0005789 : endoplasmic reticulum membrane
 (https://www.ebi.ac.uk/QuickGO/term/GO:0005789)

| | |
|---|-----------------------------------|
| No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title) | Presumptive Null |
| Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Cis-regulatory^#gephebase-summary-title) | Molecular Type |
| Insertion (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Insertion^#gephebase-summary-title) | Aberration Type |
| 10-99 bp | Insertion Size |
| 15 bp insertion which disrupts a putative mdGfi-1 binding site in the CYP6D1v1 promoter. mdGfi-1 is a negative regulator of transcription so this leads to increased expression of CYP6D1 | Molecular Details of the Mutation |
| Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title) | Experimental Evidence |
| Role of the transcriptional repressor mdGfi-1 in CYP6D1v1-mediated insecticide resistance in the house fly, <i>Musca domestica</i> . (2006) (https://pubmed.ncbi.nlm.nih.gov/16651185) | Main Reference |
| Gao J; Scott JG | Authors |
| Gfi-1 is a C(2)H(2)-type zinc finger protein that is a transcriptional repressor in vertebrates and has been implicated in control of CYP6D1 expression in house flies (<i>Musca domestica</i>). A 15 bp insert, which disrupts a putative mdGfi-1 binding site in the CYP6D1v1 promoter has been implicated as a cause of increased expression of CYP6D1, and thus insecticide resistance. Using electrophoretic mobility shift assays we demonstrate that the CYP6D1 promoter from susceptible strains binds mdGfi-1. The 15 bp insert that interrupts the mdGfi-1-binding site in insecticide-resistant strains reduces the amount of mdGfi-1 binding by 9- to 20-fold, consistent with the role of mdGfi-1 in resistance. Partial sequences of mdGfi-1 (spanning the first intron) from individual houseflies from 11 different strains revealed the presence of 23 alleles. There was no consistent difference in the mdGfi-1 alleles between susceptible and CYP6D1-mediated insecticide-resistant strains, indicating that mdGfi-1 alleles were not likely involved in resistance. Polymorphisms were used to map mdGfi-1 to autosome 1. Quantitative real time PCR (qRT-PCR) revealed Gfi-1 expression was higher in the thorax compared to the head and abdomen, and varied between life stages and between strains. However, similar levels of mdGfi-1 were detected in susceptible and resistant adults suggesting that altered levels of mdGfi-1 were not likely a cause of insecticide resistance. The significance of these results to understanding insecticide resistance is discussed. | Abstract |
| | Additional References |

RELATED GEPHE

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|---|--------------------|
| 5 (Acetylcholinesterase (Ace-2), Acetylcholinesterase (Ace), esterase isozyme E7 = E3, para (kdr), resistance to dieldrin) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^7370^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title) | Related Genes |
| No matches found. | Related Haplotypes |

EXTERNAL LINKS

COMMENTS