GEPHE SUMMARY

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

GepheID
GP00002460

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

Trait State in Taxon A
Anopheles funestus - sensitive

Trait State in Taxon B
Anopheles funestus - resistant

Ancestral State
Data not curated

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

Taxon A

Latin Name
Anopheles funestus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Anopheles funestus^#gephebase-summary-title)

Common Name
African malaria mosquito

Synonyms
African malaria mosquito; Anopheles funestus Giles, 1900

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Anophelinae; Anopheles; Cellia; Myzomyia; funestus group; funestus subgroup

Parent
funestus subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62323)

NCBI Taxonomy ID
62324 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62324)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Anopheles funestus (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Anopheles funestus^#gephebase-summary-title)

Common Name
African malaria mosquito

Synonyms
African malaria mosquito; Anopheles funestus Giles, 1900

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Anophelinae; Anopheles; Cellia; Myzomyia; funestus group; funestus subgroup

Parent
funestus subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62323)

NCBI Taxonomy ID
62324 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 62324)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
GstE2

Synonyms
CG17523; Dmel\CG17523; DmGSTE2; gste2; GSTE2; Dmel_CG17523

String
7227.FBpp0085851 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0085851)

Sequence Similarities
-

GO - Molecular Function
GO:0004364 : glutathione transferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004364)

GO - Biological Process
GO:0006749 : glutathione metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0006749)

GO - Cellular Component

UniProtKB Drosophila melanogaster
Q7JYZ9 (http://www.uniprot.org/uniprot/Q7JYZ9)

GenebankID or UniProtKB
()

GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

L119F. The resistant allele is more efficient at metabolizing DDT than the susceptible one.

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Leu	Phe	119

Main Reference

Resistance in the Genus Spodoptera: Key Insect Detoxification Genes. (2021) (https://pubmed.ncbi.nlm.nih.gov/34208014)

Authors

Hilliou F; Chertemps T; MaÃ¯bÃ¨che M; Le Goff G

Abstract

The genus Spodoptera (Lepidoptera: Noctuidae) includes species that are among the most important crop pests in the world. These polyphagous species are able to feed on many plants, including corn, rice and cotton. In addition to their ability to adapt to toxic compounds produced by plants, they have developed resistance to the chemical insecticides used for their control. One of the main mechanisms developed by insects to become resistant involves detoxification enzymes. In this review, we illustrate some examples of the role of major families of detoxification enzymes such as cytochromes P450, carboxyl/cholinesterases, glutathione S-transferases (GST) and transporters such as ATP-binding cassette (ABC) transporters in insecticide resistance. We compare available data for four species, Spodoptera exigua, S. frugiperda, S. littoralis and S. litura. Molecular mechanisms underlying the involvement of these genes in resistance will be described, including the duplication of the CYP9A cluster, over-expression of GST epsilon or point mutations in acetylcholinesterase and ABCC2. This review is not intended to be exhaustive but to highlight the key roles of certain genes.

Additional References

A single mutation in the GSTe2 gene allows tracking of metabolically based insecticide resistance in a major malaria vector. (2014) (https://pubmed.ncbi.nlm.nih.gov/24565444)

RELATED GEPHE

Related Genes

3 (CYP6P9 cluster (CYP6P9a and CYP6P9b), CYP6P9; CYP6P4 cluster, resistance to dieldrin) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^62324^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^GSTe^/and+Taxon ID=^62324^/or+Gene Gephebase=^GSTe^/and+Taxon ID=^62324^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS