GEPHE SUMMARY

Gephebase Gene
LOC105383139 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^LOC105383139^#gephebase-summary-title)

GepheID
GP00002412

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
basal courtship behavior

Trait State in Taxon B
enhanced courtship behavior, increased mating success

Ancestral State
Taxon A

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

Taxon A

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

Common Name
caddisflies

Synonyms
caddisflies

Rank
order

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera

Parent
Amphiesmenoptera () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 85604)

NCBI Taxonomy ID
30263 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 30263)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
butterflies and moths

Synonyms
butterflies and moths; moths

Rank
order

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera

Parent
Amphiesmenoptera () - (Rank: no rank) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 85604)

NCBI Taxonomy ID
7088 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 7088)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
-

Synonyms
-

String
-

Sequence Similarities
-

GO - Molecular Function
-

GO - Biological Process
-

GO - Cellular Component
-

UniProtKB
()

GenebankID or UniProtKB
()

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

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

Aberration Type

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

Insertion Size

10-100 kb

Molecular Details of the Mutation

Horizontal Gene Transfer from Listeria bacteria to Lepidoptera of an entire gene coding region. The gene contains an alcohol dehydrogenase domain and a zinc-binding dehydrogenase domain.

Experimental Evidence

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

Main Reference

HGT is widespread in insects and contributes to male courtship in lepidopterans. (2022) (https://pubmed.ncbi.nlm.nih.gov/35853453)

Authors

Li Y; Liu Z; Liu C; Shi Z; Pang L; Chen C; Chen Y; Pan R; Zhou W; Chen XX; Rokas A; Huang J; Shen XX

Abstract

Horizontal gene transfer (HGT) is an important evolutionary force shaping prokaryotic and eukaryotic genomes. HGT-acquired genes have been sporadically reported in insects, a lineage containing >50% of animals. We systematically examined HGT in 218 high-quality genomes of diverse insects and found that they acquired 1,410 genes exhibiting diverse functions, including many not previously reported, via 741 distinct transfers from non-metazoan donors. Lepidopterans had the highest average number of HGT-acquired genes. HGT-acquired genes containing introns exhibited substantially higher expression levels than genes lacking introns, suggesting that intron gains were likely involved in HGT adaptation. Lastly, we used the CRISPR-Cas9 system to edit the prevalent unreported gene LOC105383139, which was transferred into the last common ancestor of moths and butterflies. In diamondback moths, males lacking LOC105383139 courted females significantly less. We conclude that HGT has been a major contributor to insect adaptation.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@HGT