

GEPHE SUMMARY

| | | | |
|--|----------------|------------|--------------|
| TAS1R1 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^TAS1R1^#gephebase-summary-title) | Gephebase Gene | GP00001307 | GepheID |
| Published | Entry Status | Arnoult | Main curator |

PHENOTYPIC CHANGE

| | | | |
|--|-----------------------------|--|-----------------------------|
| Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title) | Trait Category | | |
| Taste sensitivity (sugar) (https://www.gephebase.org/search-criteria?/and+Trait=^Taste+sensitivity+(sugar)^#gephebase-summary-title) | Trait | | |
| Gallus gallus | Trait State in Taxon A | | |
| Calypte anna | Trait State in Taxon B | | |
| Taxon A | Ancestral State | | |
| Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Interspecific^#gephebase-summary-title) | Taxonomic Status | | |
| | Taxon A | | Taxon B |
| Gallus gallus (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Gallus+gallus^#gephebase-summary-title) | Latin Name | Calypte anna (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Calypte+anna^#gephebase-summary-title) | Latin Name |
| chicken | Common Name | Anna's hummingbird | Common Name |
| Gallus gallus domesticus; chicken; bantam; chickens | Synonyms | Anna's hummingbird | Synonyms |
| species | Rank | species | Rank |
| cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria; Aves; Neognathae; Galloanserae; Galliformes; Phasianidae; Phasianinae; Gallus | Lineage | cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria; Aves; Neognathae; Apodiformes; Trochilidae; Calypte | Lineage |
| Gallus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9030) | Parent | Calypte () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9243) | Parent |
| 9031 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9031) | NCBI Taxonomy ID | 9244 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9244) | NCBI Taxonomy ID |
| No | is Taxon A an Intraspecies? | No | is Taxon B an Intraspecies? |

GENOTYPIC CHANGE

| | | | |
|---|-------------------------|--|-------------------------|
| T1R1 | Generic Gene Name | A0A088DBT6 (http://www.uniprot.org/uniprot/A0A088DBT6) | UniProtKB Calypte anna |
| - | Synonyms | KM091453 (https://www.ncbi.nlm.nih.gov/nucleotide/KM091453) | GenebankID or UniProtKB |
| - | String | | |
| Belongs to the G-protein coupled receptor 3 family. | Sequence Similarities | | |
| GO:0004930 : G protein-coupled receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004930) | GO - Molecular Function | | |
| - | GO - Biological Process | | |
| GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021) | GO - Cellular Component | | |
| GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886) | | | |

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

Presumptive Null

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

Molecular Type

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

Aberration Type

unknown

Molecular Details of the Mutation

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

Experimental Evidence

Sensory biology. Evolution of sweet taste perception in hummingbirds by transformation of the ancestral umami receptor. (2014) (<https://pubmed.ncbi.nlm.nih.gov/25146290>)

Main Reference

Baldwin MW; Toda Y; Nakagita T; O'Connell MJ; Klasing KC; Misaka T; Edwards SV; Liberles SD

Authors

Sensory systems define an animal's capacity for perception and can evolve to promote survival in new environmental niches. We have uncovered a noncanonical mechanism for sweet taste perception that evolved in hummingbirds since their divergence from insectivorous swifts, their closest relatives. We observed the widespread absence in birds of an essential subunit (T1R2) of the only known vertebrate sweet receptor, raising questions about how specialized nectar feeders such as hummingbirds sense sugars. Receptor expression studies revealed that the ancestral umami receptor (the T1R1-T1R3 heterodimer) was repurposed in hummingbirds to function as a carbohydrate receptor. Furthermore, the molecular recognition properties of T1R1-T1R3 guided taste behavior in captive and wild hummingbirds. We propose that changing taste receptor function enabled hummingbirds to perceive and use nectar, facilitating the massive radiation of hummingbird species.

Abstract

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Additional References

RELATED GEPHE

1 (TAS1R3) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=^9031^/and+Trait=Taste sensitivity/or+Taxon ID=^9244^/and+Trait=Taste sensitivity/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=^9031^/and+Trait=Taste+sensitivity/or+Taxon+ID=^9244^/and+Trait=Taste+sensitivity/and+groupHaplotypes=true#gephebase-summary-title))

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

Mutations in T1R3 also involved.