

GEPHE SUMMARY

Gephebase Gene		GepheID
spineless (ss) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^spineless(ss)^#gephebase-summary-title)	GP00001987	Main curator
Published	Entry Status	Courtier

PHENOTYPIC CHANGE

Trait Category		Trait	
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title)		Color vision (eye; photoreceptor composition) (https://www.gephebase.org/search-criteria?/and+Trait=^Color+vision+(eye;+photoreceptor+composition)^#gephebase-summary-title)	
Trait State in Taxon A		Trait State in Taxon B	
Drosophila melanogaster		Drosophila melanogaster -	
Taxon A		Ancestral State	
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Latin Name		Latin Name	
Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+melanogaster^#gephebase-summary-title)		Drosophila melanogaster (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Drosophila+melanogaster^#gephebase-summary-title)	
Common Name		Common Name	
fruit fly		fruit fly	
Synonyms		Synonyms	
Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster		Sophophora melanogaster; fruit fly; Drosophila melanogaster Meigen, 1830; Sophophora melanogaster (Meigen, 1830); Drosophila melangaster	
Rank		Rank	
species		species	
Lineage		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; Acalyptera; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup		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; Acalyptera; Ephydroidea; Drosophilidae; Drosophilinae; Drosophilini; Drosophila; Sophophora; melanogaster group; melanogaster subgroup	
Parent		Parent	
melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)		melanogaster subgroup () - (Rank: species subgroup) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=32351)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
7227		7227	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7227)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Drosophila melanogaster
ss	E1JIM6 (http://www.uniprot.org/uniprot/E1JIM6)	GenebankID or UniProtKB
Synonyms		
SS; AhR; AHR; CG6993; Dmel\CG6993; Ss; ssa; Dmel_CG6993		
String		
7227.FBpp0297168		
(http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0297168)		
Sequence Similarities		
-		
GO - Molecular Function		
GO:0046982 : protein heterodimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0046982)		
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)		

GO - Biological Process

- GO:0045944 : positive regulation of transcription by RNA polymerase II
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045944>)
- GO:0000122 : negative regulation of transcription by RNA polymerase II
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000122>)
- GO:0048814 : regulation of dendrite morphogenesis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048814>)
- GO:0006805 : xenobiotic metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006805>)
- GO:0048800 : antennal morphogenesis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048800>)
- GO:0036011 : imaginal disc-derived leg segmentation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0036011>)
- GO:0007469 : antennal development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007469>)
- GO:0010092 : specification of animal organ identity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010092>)
- GO:0008049 : male courtship behavior
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008049>)
- GO:0007613 : memory (<https://www.ebi.ac.uk/QuickGO/term/GO:0007613>)
- GO:0009410 : response to xenobiotic stimulus
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009410>)
- GO:0045466 : R7 cell differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0045466>)
- GO:0045676 : regulation of R7 cell differentiation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045676>)
- GO:0007468 : regulation of rhodopsin gene expression
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007468>)

GO - Cellular Component

- GO:0005829 : cytosol (<https://www.ebi.ac.uk/QuickGO/term/GO:0005829>)
- GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

	Presumptive Null
No (#gpepbase-summary-title)	
	Molecular Type
Cis-regulatory (#gpepbase-summary-title)	
	Aberration Type
Insertion (#gpepbase-summary-title)	
	Insertion Size
1-9 bp	
	Molecular Details of the Mutation
Single base insertion in the ss regulatory region upstream of the ss transcription start site. The insertion affects the stochastic on/off expression of the ss protein seen in the R7 photoreceptors: the presence of the insertion results in a significant decrease in the ratio of ss expressing to non-expressing R7 cells.	
	Experimental Evidence
Candidate Gene (#gpepbase-summary-title)	
	Main Reference
Natural variation in stochastic photoreceptor specification and color preference in Drosophila. (2017) (https://pubmed.ncbi.nlm.nih.gov/29251595)	
	Authors
Anderson C; Reiss I; Zhou C; Cho A; Siddiqi H; Mormann B; Avelis CM; Deford P; Bergland A; Roberts E; Taylor J; Vasiliauskas D; Johnston RJ	
	Abstract
Each individual perceives the world in a unique way, but little is known about the genetic basis of variation in sensory perception. In the fly eye, the random mosaic of color-detecting R7 photoreceptor subtypes is determined by stochastic on/off expression of the transcription factor Spineless (Ss). In a genome-wide association study, we identified a naturally occurring insertion in a regulatory DNA element in ss that lowers the ratio of Ss to Ss cells. This change in photoreceptor fates shifts the innate color preference of flies from green to blue. The genetic variant increases the binding affinity for Klumpfuss (Klu), a zinc finger transcriptional repressor that regulates ss expression. Klu is expressed at intermediate levels to determine the normal ratio of Ss to Ss cells. Thus, binding site affinity and transcription factor levels are finely tuned to regulate stochastic expression, setting the ratio of alternative fates and ultimately determining color preference.	
	Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

<http://flybase.org/reports/FBal0337841>

