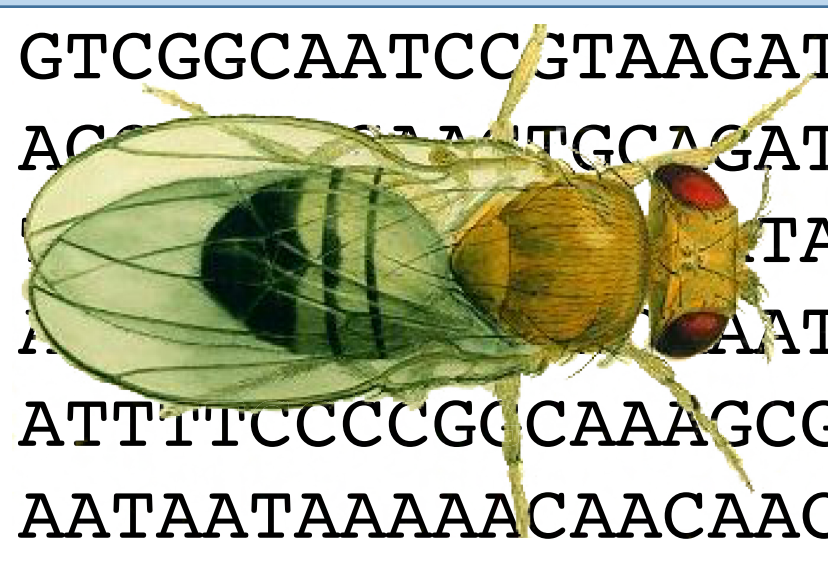


GTCGGCAATCCGTAAGATAGCCAAATATTATTATTGTTTCAGATACTCAC
 ACCGATGTCAGATCCGTTGAGATGTTTGAATCAGTGAATTT
 TAACTTCCATCCAAATTTTTCAGTCCGTTTC
 AATCATCCAAATGAAAGGAAATTTTCCTTTC
 ATTTTCCCCGCAAGCGGACTTTTTCGGAAATGAAATAAAAA
 AATAATAAAAAACAACACAGTGAACAACAGCCGGGCATCTTCATAGA



FlyBase

Enhanced Orthology Data in FlyBase

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FlyBase has recently incorporated orthology data from the DRSC Integrative Ortholog Prediction Tool (DIOPT). This dataset integrates ortholog predictions between 9 species (*D. melanogaster*, *H. sapiens* and 7 other model organisms) from 13 individual tools (Compara, HGNC, Homologene, Inparanoid, Isobase, OMA, OrthoDB, orthoMCL, Panther, Phylome, RoundUp, TreeFam and ZFIN). The DIOPT approach thus provides a comparison of orthology predictions originating from different algorithms based on sequence homology, phylogenetic trees or functional similarity. FlyBase also includes an OrthoDB-derived orthology set comprising ~40 species, biased towards those closely related to *D. melanogaster*. Both the DIOPT and OrthoDB datasets are now searchable through the new 'Orthologs' tab of the QuickSearch tool on the FlyBase homepage, and are shown explicitly within the revised 'Orthologs' section of our Gene Reports.

Search for orthologs using QuickSearch

1. Select input species
2. Enter one or more gene symbols/IDs
3. Select one or more output species
4. Click 'Search'

QuickSearch

Human Disease Expression GO Phenotype References

Simple **Orthologs** NEW Protein Domains Gene Groups Data Class

Enter gene symbol(s) or ID(s), separated by spaces

Search

Input: Species: *D. melanogaster* Gene(s): dpp

Output: MODEL ORGANISMS (via DIOPT) [instead search OrthoDB orthology groups]

- H. sapiens* (Human)
- M. musculus* (House mouse)
- X. tropicalis* (Western clawed frog)
- D. rerio* (Zebrafish)
- D. melanogaster* (Fruit fly)
- C. elegans* (Nematode, roundworm)
- S. cerevisiae* (Brewer's yeast)
- S. pombe* (Fission yeast)

un/check all:

- H. sapiens*
- M. musculus*
- X. tropicalis*
- D. rerio*
- D. melanogaster*
- C. elegans*
- S. cerevisiae*
- S. pombe*

When the input species is '*D. melanogaster*', there is the alternative option to search for orthologs in the OrthoDB set, which includes other *Drosophila* species and arthropods:

QuickSearch

Human Disease Expression GO Phenotype References

Simple **Orthologs** NEW Protein Domains Gene Groups Data Class

Enter gene symbol(s) or ID(s), separated by spaces

Search

Input: Species: *D. melanogaster* Gene(s): e.g. Cdk1, CG5363, FBgn1

Output: ORTHOLOGY GROUPS (via OrthoDB) [instead search DIOPT model organisms]

- Drosophila species
- non-Drosophila Diptera
- non-Dipteran Insects
- non-Insect Arthropods
- non-Arthropod Metazoa

un/check all:

Export table to a TSV file

Score is the number of pipelines supporting the given call.
Best Score indicates if this is the highest score.
Best Reverse Score indicates if the query gene has the highest score in a reverse search – clicking '+' will perform that search.

Links to Gene Reports at other relevant databases

Save results as tsv file Help

Search Term: **dpp** Species: **Drosophila melanogaster (Fruit fly)** Gene: **dpp** Reports: **NCBI FlyBase**

Ortholog Gene	Ortholog Gene Reports	Score	Best Score	Best Rev Score	Source	Align	Transgene in Fly
Homo sapiens (Human)							
BMP2	NCBI Ensembl HGNC OMIM	7	Yes	Yes (+)	Compara, Homologene, Inparanoid, Isobase, OrthoDB, Phylome, RoundUp	(+)	
BMP4	NCBI Ensembl HGNC OMIM	6	No	Yes (+)	Compara, Inparanoid, OrthoDB, orthoMCL, Phylome, RoundUp	(+)	Yes
GDF1	NCBI HGNC OMIM	1	No	Yes (+)	TreeFam	(+)	
GDF3	NCBI HGNC OMIM	1	No	Yes (+)	TreeFam	(+)	
Mus musculus (House mouse)							
Bmp2	NCBI MGI	7	Yes	Yes (+)	Compara, Homologene, Inparanoid, Isobase, OrthoDB, Phylome, RoundUp	(+)	
Bmp4	NCBI MGI	6	No	Yes (+)	Compara, Inparanoid, OrthoDB, orthoMCL, Phylome, RoundUp	(+)	
Gdf1	NCBI MGI	1	No	Yes (+)	TreeFam	(+)	
Gdf3	NCBI MGI	1	No	Yes (+)	TreeFam	(+)	
Xenopus tropicalis (Western clawed frog)							
bmp2	NCBI Xenbase	6	Yes	Yes (+)	Compara, Homologene, OMA, OrthoDB, Phylome, RoundUp	(+)	
bmp4	NCBI Xenbase	4	No	Yes (+)	Compara, OrthoDB, Phylome, RoundUp	(+)	
gdf1	NCBI Xenbase	1	No	Yes (+)	TreeFam	(+)	
gdf3	NCBI Xenbase	1	No	Yes (+)	TreeFam	(+)	
Danio rerio (Zebrafish)							
bmp2b	NCBI ZFIN	7	Yes	Yes (+)	Compara, Homologene, Inparanoid, OMA, OrthoDB, Phylome, RoundUp	(+)	
bmp2a	NCBI ZFIN	3	No	Yes (+)	Compara, Homologene, OrthoDB	(+)	
bmp4	NCBI ZFIN	3	No	Yes (+)	Compara, OrthoDB, orthoMCL	(+)	
bmp16	NCBI ZFIN	1	No	Yes (+)	Compara	(+)	
gdf3	NCBI ZFIN	1	No	Yes (+)	TreeFam	(+)	
Caenorhabditis elegans (Nematode, roundworm)							
dbl-1	NCBI WormBase	3	Yes	Yes (+)	Compara, Isobase, RoundUp	(+)	
tig-2	NCBI WormBase	1	No	No (+)	Inparanoid	(+)	
Saccharomyces cerevisiae (Brewer's yeast) - no orthologs found							
Schizosaccharomyces pombe (Fission yeast) - no orthologs found							

Link to FlyBase Gene Report where a non-*Drosophila* gene has been expressed transgenically in flies

Link to sequence alignment at the DIOPT website

List of individual pipelines supporting the given call

View orthologs in Gene Reports

Gene Report for **dpp** (Drosophila melanogaster)

General Information: Symbol: dpp, Species: D. melanogaster, Name: dpp, Feature type: protein_coding_gene, FlyBase ID: FBgn000490, Gene Model Status: Current, Block availability: 10 publicly available

Chromosomal Location: chr2L:2,438,372-2,438,823 (+)

Gene Group: Transforming growth factor-beta, N-terminal; Transforming growth factor-beta, C-terminal; Inhibin, alpha subunit; Transforming growth factor-beta-related; Transforming growth factor-beta, conserved site; Cysteine-knot cysteine

Orthologs: 47 total orthologs found across various species.

Human Orthologs (via DIOPT v5.1.1) (4)

Gene name	Score	OMIM ID	OMIM Phenotype	Transgene in Fly
BMP2; bone morphogenetic protein 2	7	112261	BRACHYDACTYLY, TYPE A2; BDA2; HEMOCHROMATOSIS, TYPE 1; HFE1	
BMP4; bone morphogenetic protein 4	6	112262	MICROPTHALMIA, SYNDROMIC 6; MCOP6	Yes
GDF3; growth differentiation factor 3	1	606522	KLIPPEL-FEIL SYNDROME 3; AUTOSOMAL DOMINANT; KFS3	
GDF1; growth differentiation factor 1	1	602880	MICROPTHALMIA, ISOLATED 7; MCOP7	

Orthologs in Drosophila Species (EOG7B94PP) (47)

Organism	Common Name	Gene	AAA Synthetic Ortholog	Multiple Dmel Genes in this Orthologous Group
Drosophila melanogaster	fruit fly	Dmelidpp		
Drosophila simulans		Dsimidpp	Y	
Drosophila sechellia		DseciGM18343	Y	
Drosophila erecta		Dereidpp	Y	
Drosophila yakuba		Dyakidpp	Y	
Drosophila ananassae		DanaidGF20585	Y	
Drosophila pseudoobscura		Dpseidpp	Y	
Drosophila persimilis		Dperidpp	Y	
Drosophila willistoni		Dwilidpp	Y	
Drosophila virilis		Dviridpp	Y	
Drosophila mojavensis		Dmojidpp	Y	
Drosophila grimshawi		Dgridpp	Y	

Model Organism Orthologs (via DIOPT v5.1.1) (19)

Gene Symbol	NCBI Gene	Score	Best score	Best reverse score	Source	Align	Transgene in Fly
HsapBMP2	650	7	Yes	Yes	Compara, Homologene, Inparanoid, Isobase, OrthoDB, Phylome, RoundUp	(+)	
HsapBMP4	652	6	No	Yes	Compara, Inparanoid, OrthoDB, orthoMCL, Phylome, RoundUp	(+)	Yes
HsapGDF3	9573	1	No	Yes	TreeFam	(+)	
HsapGDF1	2657	1	No	Yes	TreeFam	(+)	
Mus musculus (House mouse)							
MmusBmp2	12156	7	Yes	Yes	Compara, Homologene, Inparanoid, Isobase, OrthoDB, Phylome, RoundUp	(+)	
MmusBmp4	12159	6	No	Yes	Compara, Inparanoid, OrthoDB, orthoMCL, Phylome, RoundUp	(+)	
MmusGdf3	14562	1	No	Yes	TreeFam	(+)	
MmusGdf1	14559	1	No	Yes	TreeFam	(+)	
Xenopus tropicalis (Western clawed frog)							
XtropicalisBmp2	548717	6	Yes	Yes	Compara, Homologene, OMA, OrthoDB, Phylome, RoundUp	(+)	
XtropicalisBmp4	549788	4	No	Yes	Compara, OrthoDB, Phylome, RoundUp	(+)	
XtropicalisGdf3	493288	1	No	Yes	TreeFam	(+)	
XtropicalisGdf1	549573	1	No	Yes	TreeFam	(+)	
Danio rerio (Zebrafish)							
Dreidpp2b	30632	7	Yes	Yes	Compara, Homologene, Inparanoid, OMA, OrthoDB, Phylome, RoundUp	(+)	
Dreidpp2a	30612	3	No	Yes	Compara, Homologene, OrthoDB	(+)	
Dreidpp2a	30631	3	No	Yes	Compara, OrthoDB, orthoMCL	(+)	
Dreidpp3	30125	1	No	Yes	Compara	(+)	
Dreidpp16	10329171	1	No	Yes	TreeFam	(+)	
Caenorhabditis elegans (Nematode, roundworm)							
Celeidpp1	179068	3	Yes	Yes	Compara, Isobase, RoundUp	(+)	
Celeidpp2	178864	1	No	No	Inparanoid	(+)	
Saccharomyces cerevisiae (Brewer's yeast)							
No orthologs found.							
Schizosaccharomyces pombe (Fission yeast)							
No orthologs found.							

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