Functional annotation in Apollo

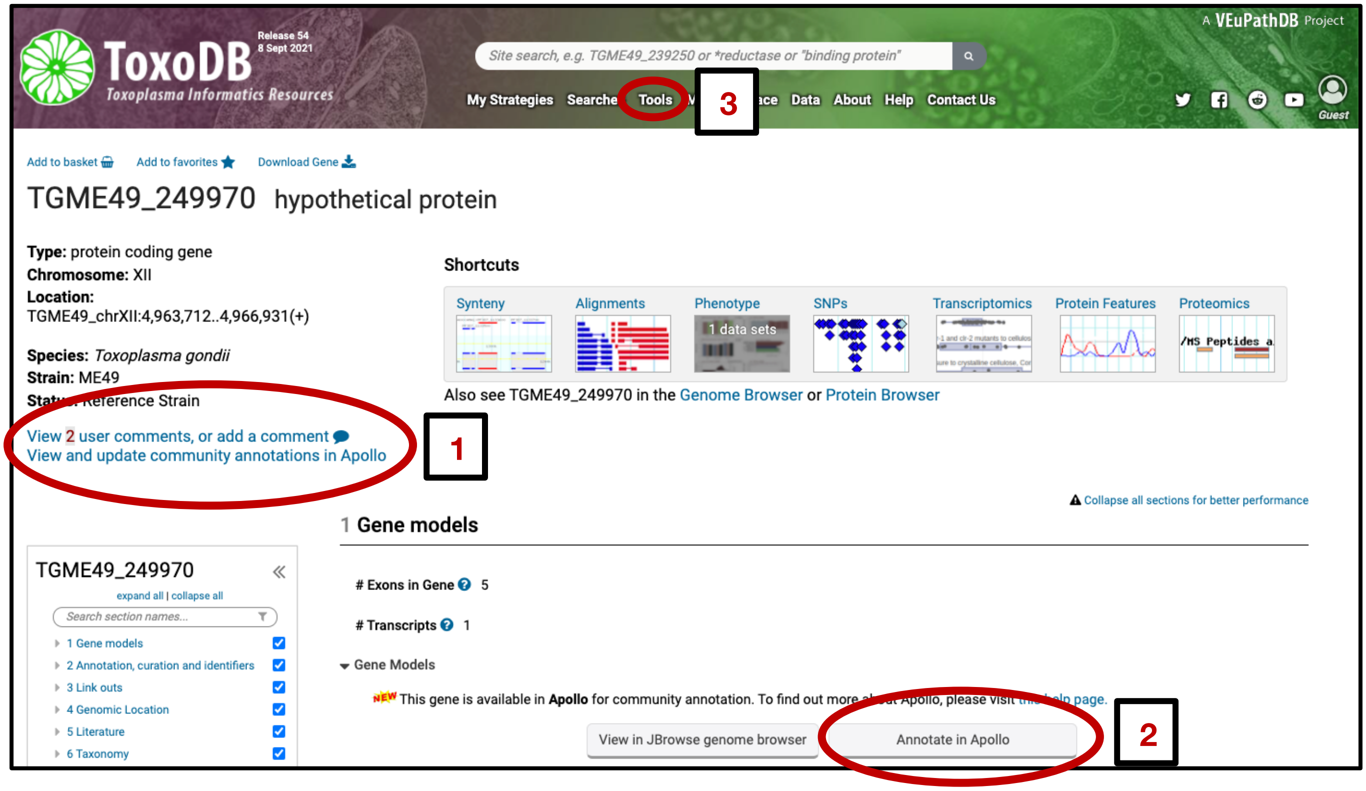
There are two options to add function annotation in VEuPathDB:
1) Adding a user comment on the gene record page
2) Using the community annotation tool Apollo

Functional annotation can involve:
- Adding or changing the description of a gene or product
- Assigning or changing a gene name/symbol
- Adding Gene Ontology (GO) terms
- Adding a publication
- Adding an EC number

In this manual we are showing you step by step how to add a gene name, product description and GO term to a gene in Apollo.

1) Accessing Apollo

To access Apollo go to the gene record page of your gene of interest and click on the link **View and update community annotations in Apollo** (**1**). You can also access Apollo from the gene models section by clicking on the button **Annotate in Apollo** (**2**). Alternatively, go to the **Tools** menu and choose Apollo from the drop-down list (**3**).



TGME49_249970 hypothetical protein

Type: protein coding gene
Chromosome: XII
Location: TGME49_chrXII:4,963,712..4,966,931(+)

Species: *Toxoplasma gondii*
Strain: ME49
Status: Reference Strain

View 2 user comments, or add a comment
View and update community annotations in Apollo

Also see TGME49_249970 in the Genome Browser or Protein Browser

1 Gene models

 # Exons in Gene 5

 # Transcripts 1

Gene Models

NEW This gene is available in **Apollo** for community annotation. To find out more about Apollo, please visit this help page.

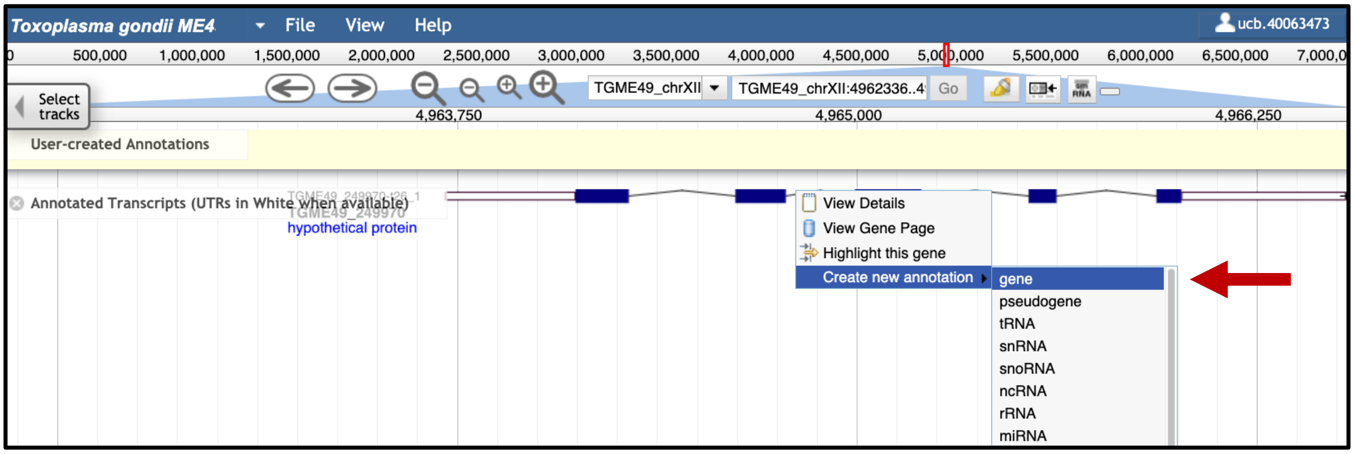
TGME49_249970

- 1 Gene models ☑
- 2 Annotation, curation and identifiers ☑
- 3 Link outs ☑
- 4 Genomic Location ☑
- 5 Literature ☑
- 6 Taxonomy ☑

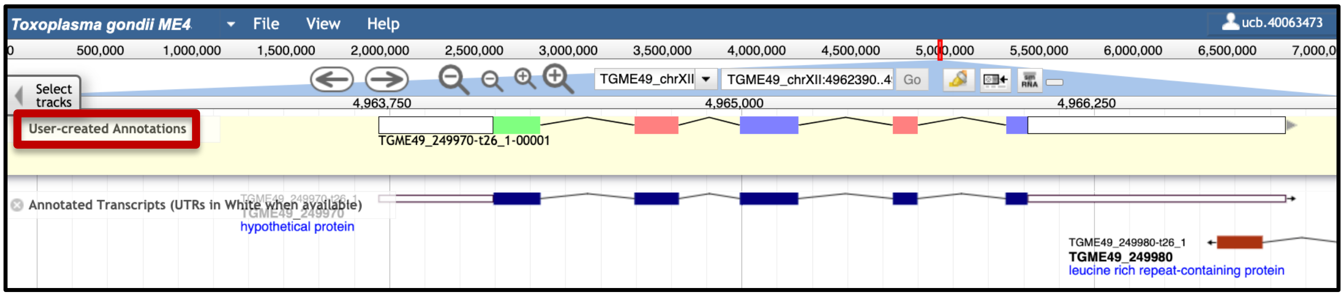
To use Apollo you need to be logged into VEuPathDB. If you have not done so yet log now into Apollo with your VEuPathDB user ID and password.

2) Dragging and dropping the annotation

Right click on the gene in the Annotated Transcripts track, select from the drop-down menu **Create new annotation** > **gene**.

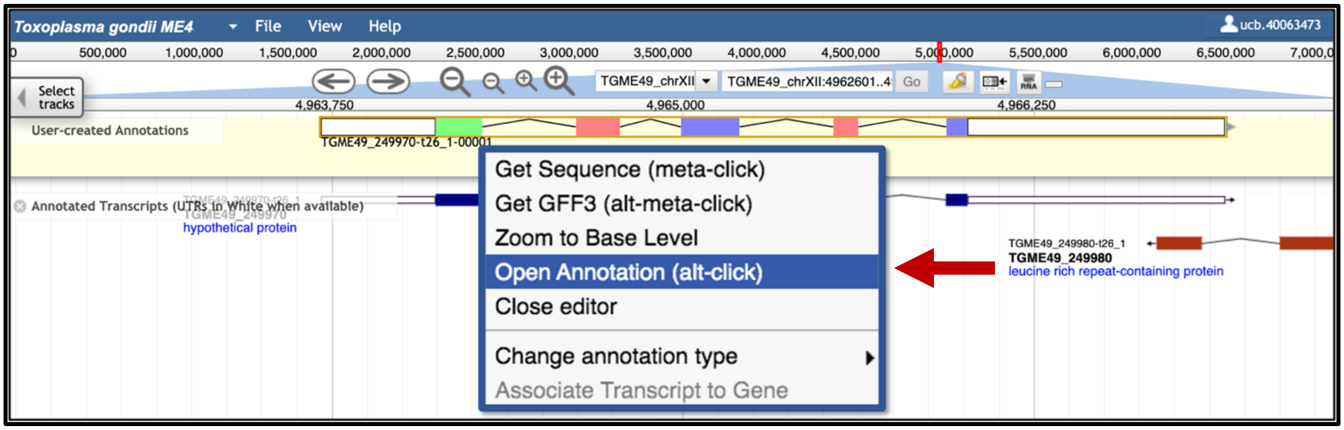


You can now see your gene of interest in the User-created Annotations track.

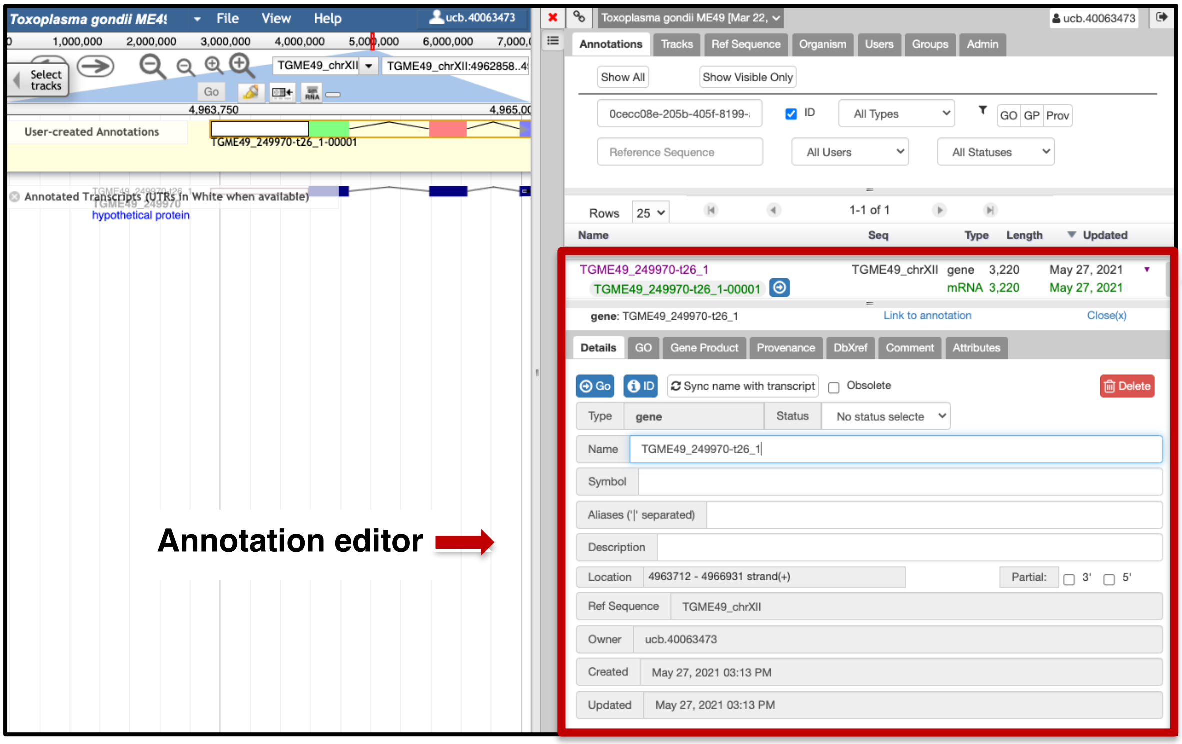


3) Opening of the Annotation editor window

Select the gene in the User-created Annotations track and with a right-click open the drop-down menu and choose **Open Annotation**. Alternatively, you can use the short-cut **alt-click**.



The annotation editor window is now shown on the right-hand side.



Name	Seq	Type	Length	Updated
TGME49_249970-t26_1	TGME49_chrXII	gene	3,220	May 27, 2021
TGME49_249970-t26_1-00001		mRNA	3,220	May 27, 2021

gene: TGME49_249970-t26_1

Type: gene
Status: No status selecte
Name: TGME49_249970-t26_1
Symbol:
Aliases ('|' separated):
Description:
Location: 4963712 - 4966931 strand(+)
Partial: ☐ 3' ☐ 5'
Ref Sequence: TGME49_chrXII
Owner: ucb.40063473
Created: May 27, 2021 03:13 PM
Updated: May 27, 2021 03:13 PM

You can either select the gene or the mRNA.

Please note functional annotation should be added to the gene. For genes with alternative transcripts add the information to the mRNA.

4) Adding Functional annotation

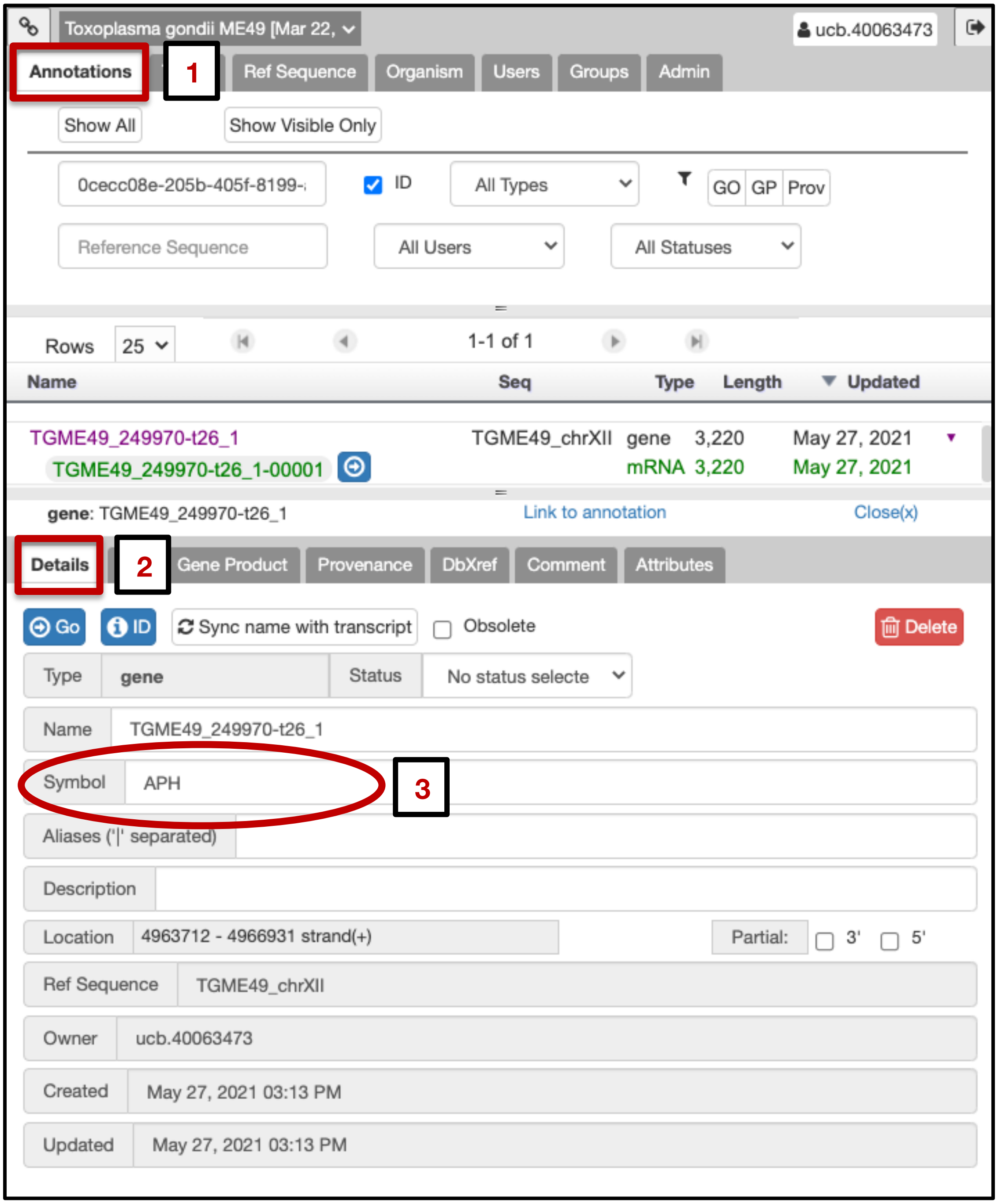
In this example we are showing you how to improve the functional annotation of TGME49_249970. This gene is currently annotated as hypothetical protein. It has been experimentally characterised in the following publication:

https://pubmed.ncbi.nlm.nih.gov/26962945/

Gene name/symbol: APH
Gene product: Acylated pleckstrin-homology domain-containing protein
GO term: microneme
PMID: 26962945

Adding a gene name/symbol

Once the annotations panel (**1**) is open click on the details tab (**2**) and add the gene name in the field Symbol (**3**). In our example the new gene name/symbol is APH.



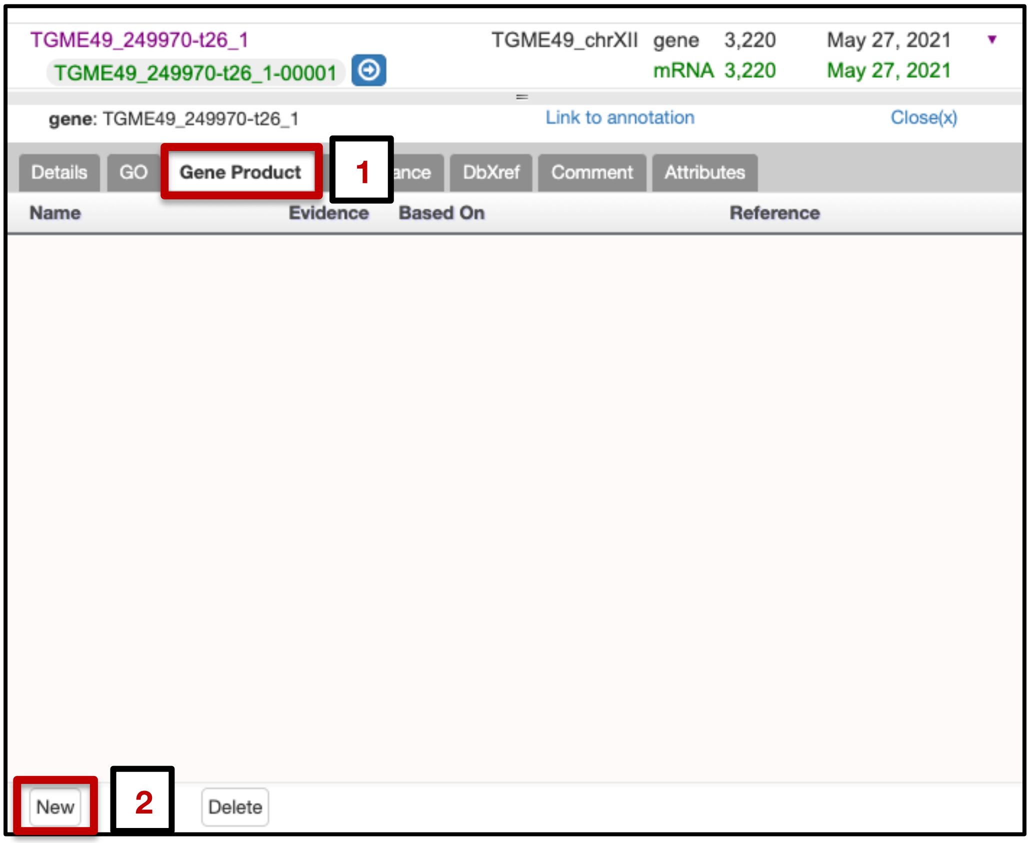
Name	Seq	Type	Length	Updated
TGME49_249970-t26_1	TGME49_chrXII	gene	3,220	May 27, 2021
TGME49_249970-t26_1-00001		mRNA	3,220	May 27, 2021

gene: TGME49_249970-t26_1 Link to annotation Close(x)

Type: gene
Status: No status selecte
Name: TGME49_249970-t26_1
Symbol: APH
Aliases ('|' separated):
Description:
Location: 4963712 - 4966931 strand(+)
Partial: ☐ 3' ☐ 5'
Ref Sequence: TGME49_chrXII
Owner: ucb.40063473
Created: May 27, 2021 03:13 PM
Updated: May 27, 2021 03:13 PM

Adding a product description

To add a product description with metadata choose the tab Gene Product (**1**) and click on **New** at the bottom of the editor window (**2**).

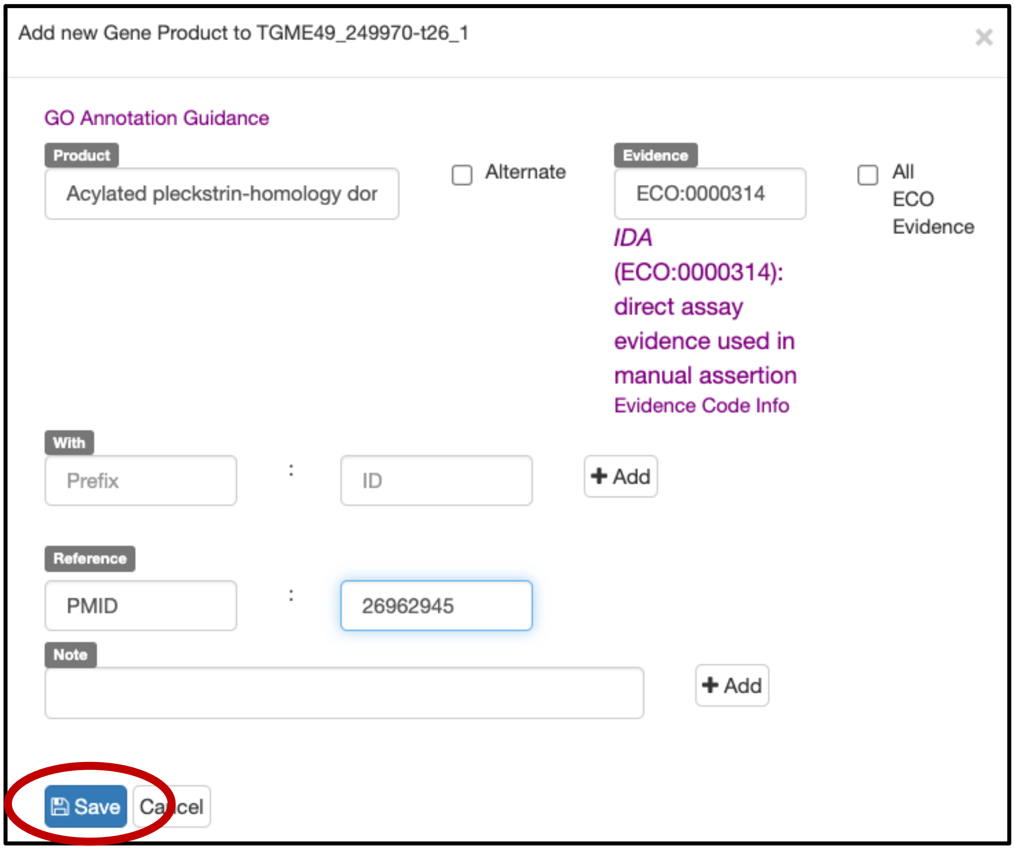


TGME49_249970-t26_1 TGME49_chrXII gene 3,220 May 27, 2021

TGME49_249970-t26_1-00001 mRNA 3,220 May 27, 2021

gene: TGME49_249970-t26_1

Fill in the fields product, evidence and PMID. Click on Save. More information about evidence codes can be found here: http://geneontology.org/docs/guide-go-evidence-codes



Add new Gene Product to TGME49_249970-t26_1

Product: Acylated pleckstrin-homology dor

☐ Alternate

Evidence: ECO:0000314

IDA (ECO:0000314): direct assay evidence used in manual assertion

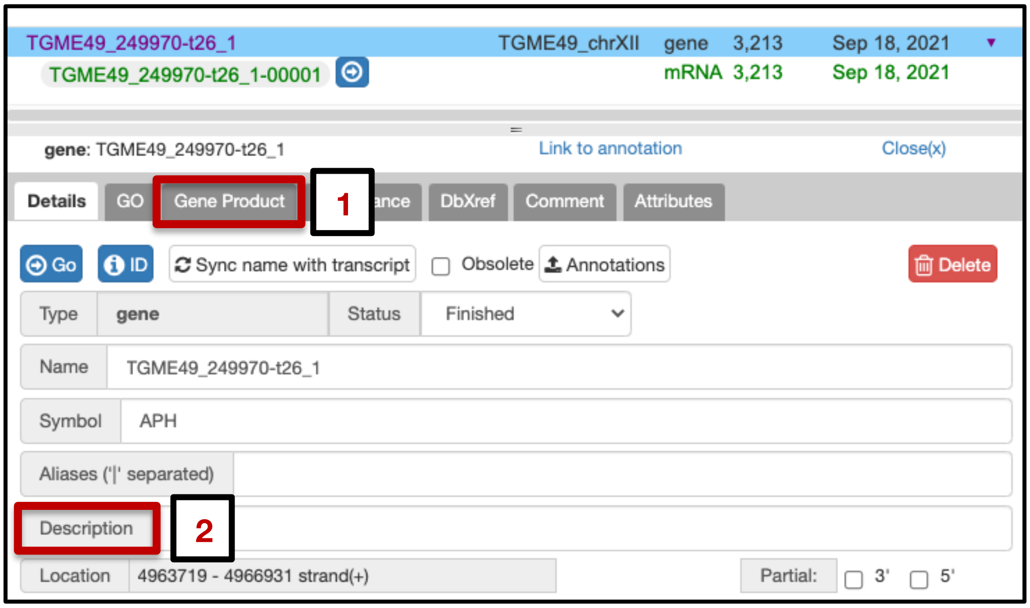
☐ All ECO Evidence

With: Prefix : ID

Reference: PMID : 26962945

Note:

Please note, if possible always add a product description with metadata to the Gene Product tab (**1**). If you don't have any metadata, for example a publication you can add the product description in the field Description (**2**) in the Details tab. Don't add the product to both, the Gene Product tab and the Details tab.



TGME49_249970-t26_1 TGME49_chrXII gene 3,213 Sep 18, 2021

TGME49_249970-t26_1-00001 mRNA 3,213 Sep 18, 2021

gene: TGME49_249970-t26_1

Type: gene

Status: Finished

Name: TGME49_249970-t26_1

Symbol: APH

Aliases ('|' separated):

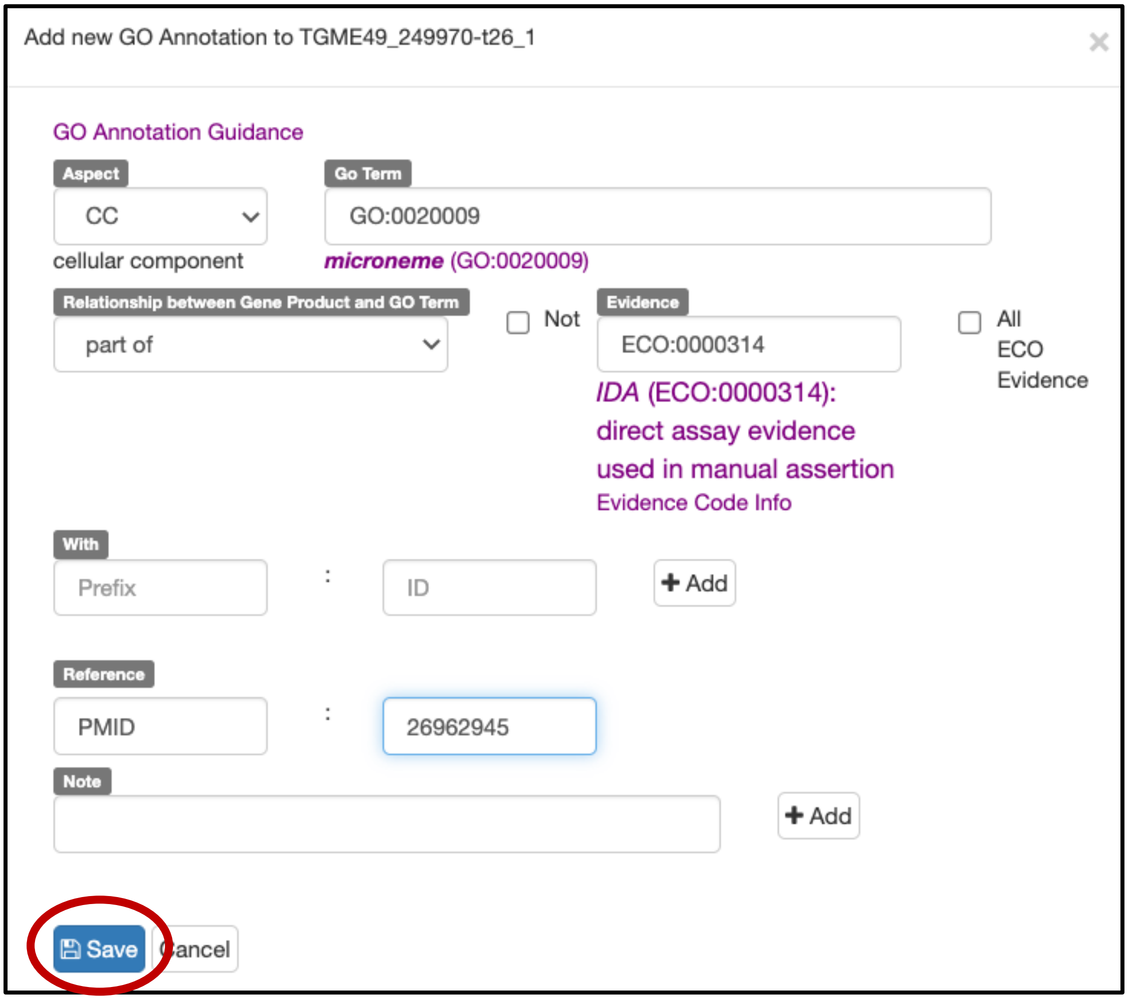
Description:

Location: 4963719 - 4966931 strand(+)

Partial: ☐ 3' ☐ 5'

Adding GO terms

Choose the tab GO in the editor window, fill in the required fields and click on Save.



Add new GO Annotation to TGME49_249970-t26_1

GO Annotation Guidance

Aspect: CC

cellular component

Go Term: GO:0020009

microneme (GO:0020009)

Relationship between Gene Product and GO Term: part of

☐ Not

Evidence: ECO:0000314

IDA (ECO:0000314): direct assay evidence used in manual assertion

Evidence Code Info

☐ All ECO Evidence

With: Prefix : ID

Reference: PMID : 26962945

Note:

Adding a PubMed ID

Choose the Tab DbXref in the annotation editor window, add the PMID as shown in the screenshot. Click on the **+** sign.

gene: TGME49_249970-t26_1

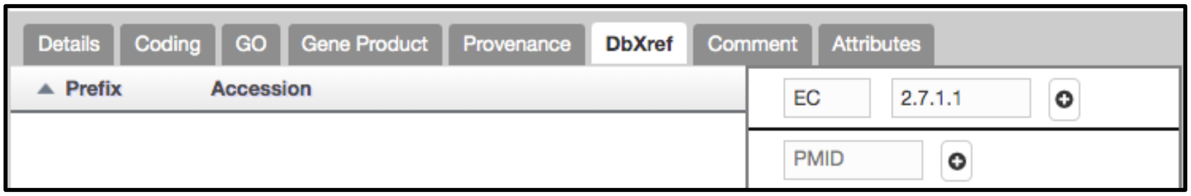
PMID

26962945

A small window will come up showing the title of the Pubmed Article. Click OK.

Add article Phosphatidic Acid-Mediated Signaling Regulates Microneme Secretion in Toxoplasma.

You can also add additional database identifiers (DbXref), i.e. EC numbers.

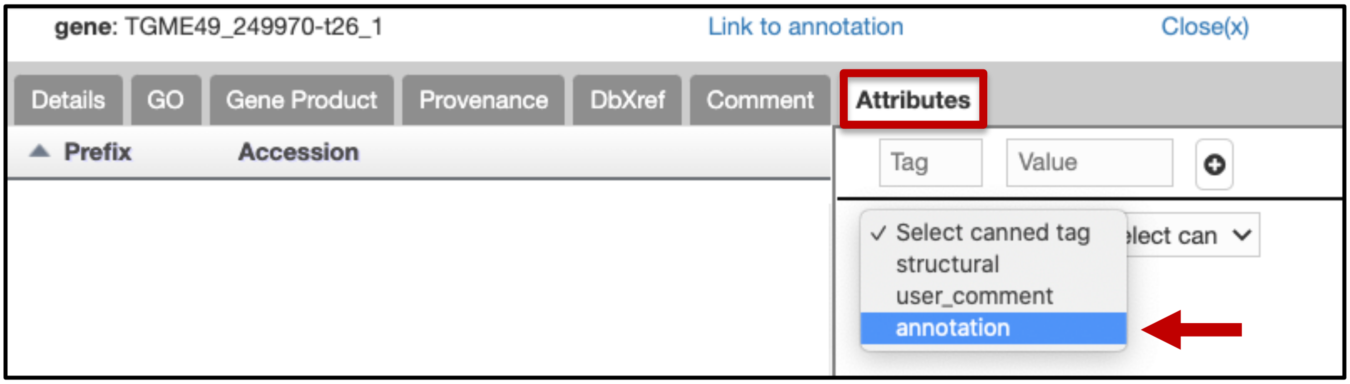


EC

2.7.1.1

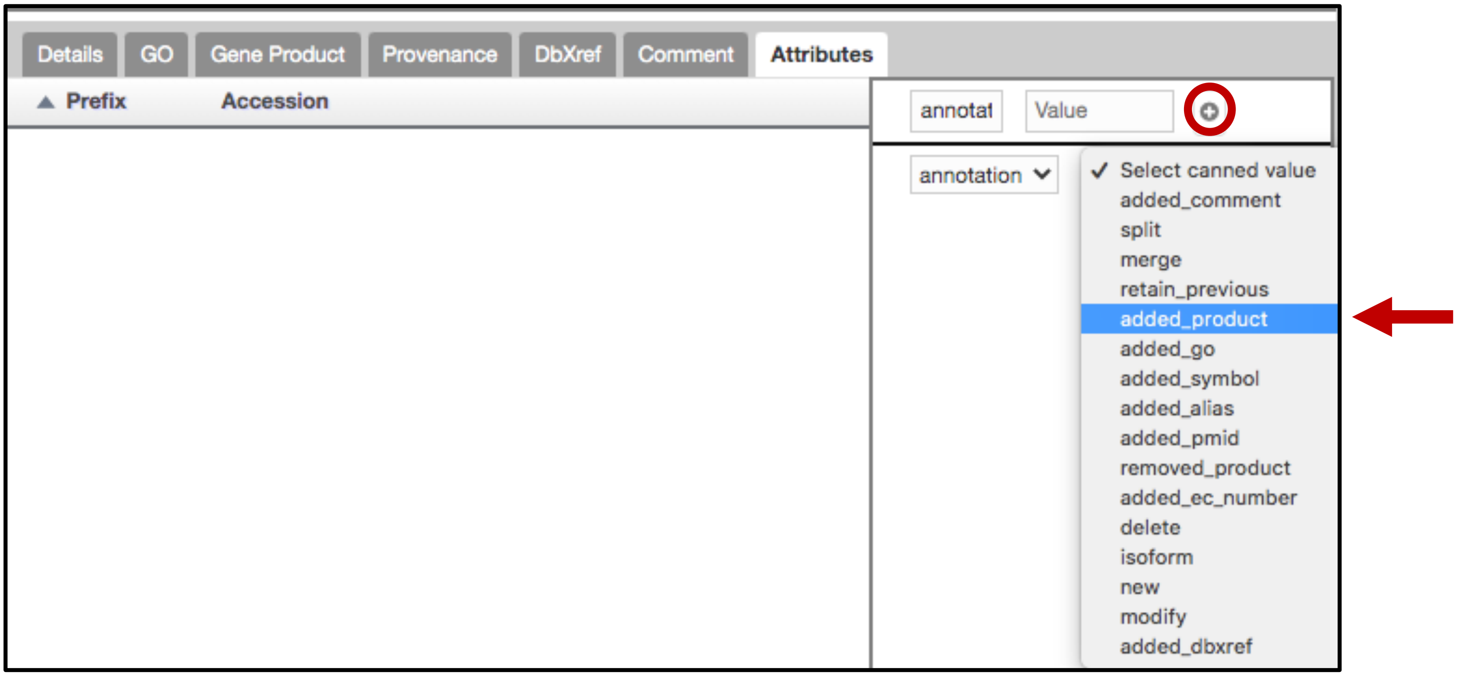
5) Finalising the functional annotation

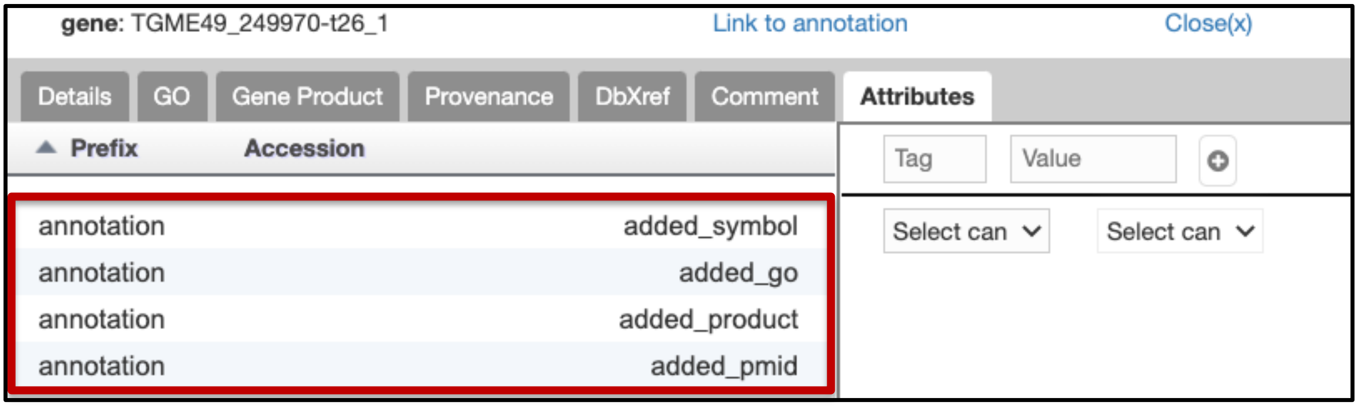
Go to the **Attributes** tab in the gene section, choose from the “Select canned tag” drop-down menu **annotation**.



gene: TGME49_249970-t26_1

From the “Select canned value” drop-down menu choose **added_product**. Repeat this and choose **added_symbol, added_go** and **added_pmid**. Finally click on the **+** sign.

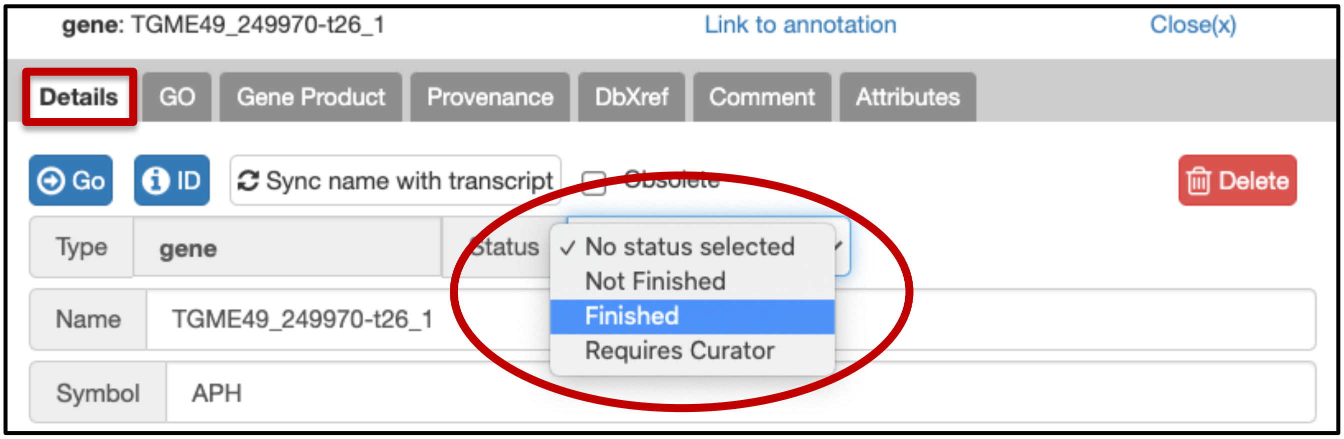




gene: TGME49_249970-t26_1

Prefix	Accession
annotation	added_symbol
annotation	added_go
annotation	added_product
annotation	added_pmid

In the last step, go back to the Details tab and add to the gene and mRNA the status **Finished**.



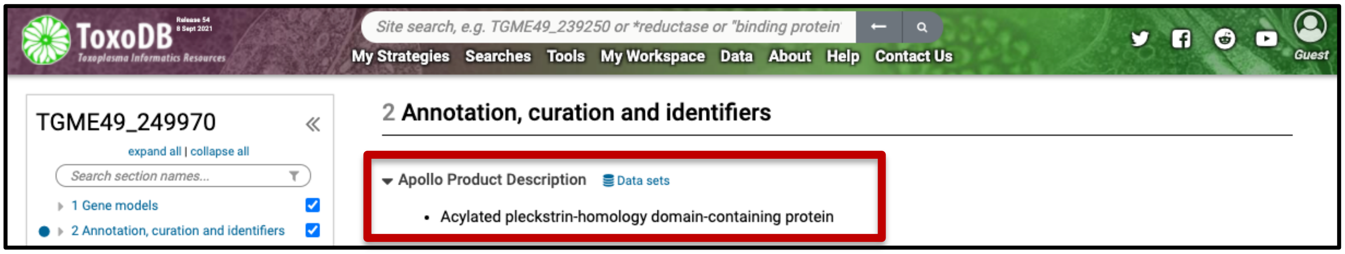
gene: TGME49_249970-t26_1

Type: gene

Name: TGME49_249970-t26_1

Symbol: APH

The new Apollo product description can be viewed the following day on the gene record page in the Annotation, curation and identifiers section.



- Acylated pleckstrin-homology domain-containing protein

Done! For additional questions, please get in touch with the VEuPathDB help desk.

Additional note

On rare occasions when dragging and dropping a gene model in the User-created Annotations track, the gene model automatically changes and ends up without a correct start. To correct this right-click on the gene model in the User-created Annotations track and select from the menu **Set Optimal ORF**. This will correct the start.