

Exploring the Gene Page

Note: this exercise uses TriTrypDB (<https://TriTrypdb.org>) as an example database, but the same functionality is available on all VEuPathDB resources.

Learning objectives

Gene pages:

- Become familiar with the information in gene pages
- Navigate to and from the gene pages

1. Navigation to the Gene pages

For this exercise visit the gene page for Tb927.10.13780 (Glycogen synthase kinase 3). How did you get to this gene? (hint: copy and paste the ID in the site search, then click on the gene ID in the results).

The screenshot shows the TriTrypDB website interface. At the top, there is a search bar with the text "Tb927.10.13780" entered. Below the search bar, there are navigation links: "My Strategies", "Searches", "Tools", "My Workspace", "Data", "About", "Help", and "Contact Us". On the right side, there are social media icons for Twitter, Facebook, and YouTube, along with a "Guest" user profile icon. Below the navigation bar, the text "Genes matching Tb927.10.13780" is displayed. To the right of this text is a button labeled "Export as a Search Strategy to download or mine your results". Below the search results, there is a list of genes. The first gene is "Gene - Tb927.10.13780 Glycogen synthase kinase 3 short". A red arrow points to this gene. Below the gene name, there is a box containing the following information: "Gene name or symbol: GSK3s", "Organism: Trypanosoma brucei brucei TREU927", and "Fields matched: Cellular localization; External links; Gene ID; GO terms; Transcripts". To the left of the search results, there is a sidebar with filter options. Under "Filter results", there is a "Genome" filter with "Genes" selected. Under "Filter Gene fields", there are checkboxes for "Cellular localization", "External links", "Gene ID", "GO terms", and "Transcripts". Under "Filter organisms", there is a search bar for "Type a taxonomic name" and a list of organisms including "Trypanosomatidae" and "Trypanosoma".

2. Explore the top section of the gene page

What information is in this section? Can you easily find which chromosome this gene is located on? Does this gene have any user comments?

Tb927.10.13780 Glycogen synthase kinase 3 short

Name: GSK3s
Type: protein coding
Chromosome: 10
Location: Tb927.10.v5.1:3,361,774..3,366,257()

Species: Trypanosoma brucei
Strain: brucei TREU927
Status: Curated Reference Strain

[View this gene at GeneDB](#)
[View 3 user comments, or add a comment](#)

This genome is actively curated at GeneDB. User comments added to this gene will be reviewed and incorporated into the official annotation if appropriate.

Shortcuts

Synteny BLAT Alignments Phenotype SNPs Transcriptomics Protein Features Proteomics

Also see Tb927.10.13780 in the [Genome Browser](#) or [Protein Browser](#)

3. Explore the gene model section.

Scroll down to the gene model section of the gene page. What direction is the transcript relative to the chromosome? Does the gene have UTRs?

1 Gene models

Exons in Gene 1
Transcripts 1

▼ Gene Models

[View in JBrowse genome browser](#)

3,360,000 3,362,500 3,375,000 3,387,500

Annotated Transcripts (UTRs in White when available)

Tb927.10.13730-mRNA
Tb927.10.13730
Tb927.10.13740-mRNA
Tb927.10.13740
Tb927.10.13750-mRNA
Tb927.10.13750
Tb927.10.13770-mRNA
Tb927.10.13770
Tb927.10.13780-mRNA
Tb927.10.13780
Tb927.10.13790-mRNA
Tb927.10.13790
Tb927.10.13800-mRNA
Tb927.10.13800
Tb927.10.13820-mRNA
Tb927.10.13820
Tb927.10.13830-mRNA
Tb927.10.13830
Tb927.10.13840-mRNA
Tb927.10.13840
Tb927.10.13850-mRNA
Tb927.10.13850
Tb927.10.13860-mRNA
Tb927.10.13860
Tb927.10.13870-mRNA
Tb927.10.13870
Tb927.10.13880-mRNA
Tb927.10.13880
Tb927.10.13890-mRNA
Tb927.10.13890
Tb927.10.13710-mRNA
Tb927.10.13710

[View in JBrowse genome browser](#)

Transcripts Download Data sets

How long is the transcript? You can determine transcript length by expanding the Transcripts section.

[View in JBrowse genome browser](#)

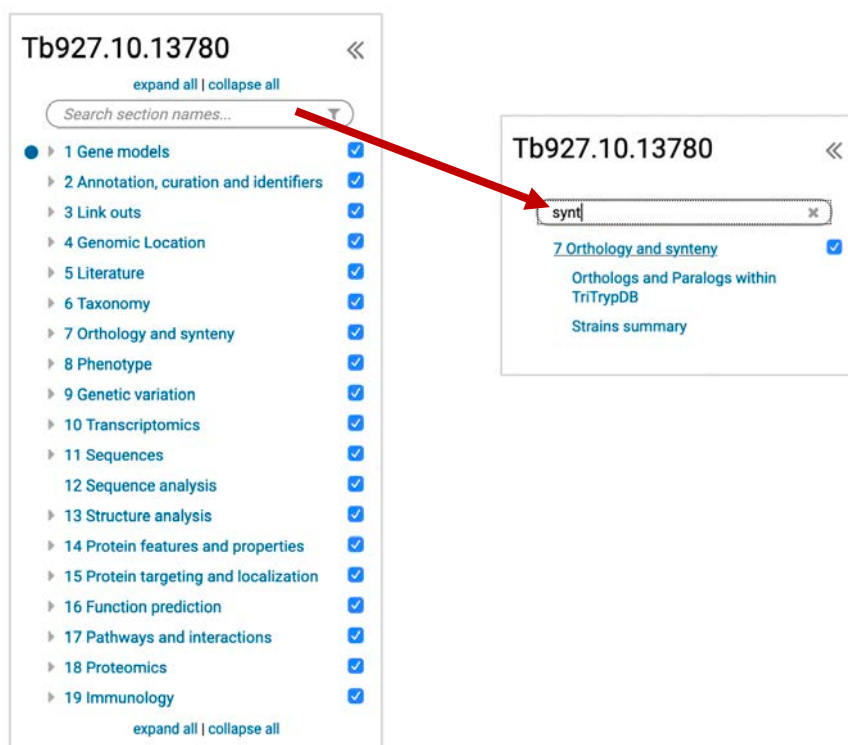
▼ Transcripts Download Data sets

Transcript	# exons	Transcript length	Protein length
Tb927.10.13780:mRNA	1	4484	352

4. Content navigation.

How do you find/navigate to the different sections of the page? Use the “Contents” menu on the left side, type a keyword and click on the menu, click on the work to

navigate to it on the page. In the example below the word “synteny” is used. You can also click on the images in the Shortcuts section in the top of the page.



5. Running an alignment of selected sequences

- Expand the “Orthologs and Paralogs in TriTrypDB” section.
- Select a few genes from the table using the checkbox.
- Scroll to the bottom of the table and click on the Run Clustal Omega button.

<input checked="" type="checkbox"/>	TcYC6_0115420	Trypanosoma cruzi Y C6	protein kinase
<input type="checkbox"/>	Tc_MARK_4866	Trypanosoma cruzi marinkellei strain B7	glycogen synt alpha, putative
<input type="checkbox"/>	TevSTIB805.10.14480	Trypanosoma evansi strain STIB 805	glycogen synt
<input type="checkbox"/>	DQ04_00191000	Trypanosoma grayi ANR4	putative glyco kinase-3 alpha
<input checked="" type="checkbox"/>	TM35_000033680	Trypanosoma theileri isolate Edinburgh	putative glyco kinase-3 alpha
<input type="checkbox"/>	TvY486_1013940	Trypanosoma vivax Y486	protein kinase

Check All Uncheck All

Select sequence type for Clustal Omega multiple sequence alignment:

Please note: selecting a large flanking region or a large number of sequences will take several minutes.

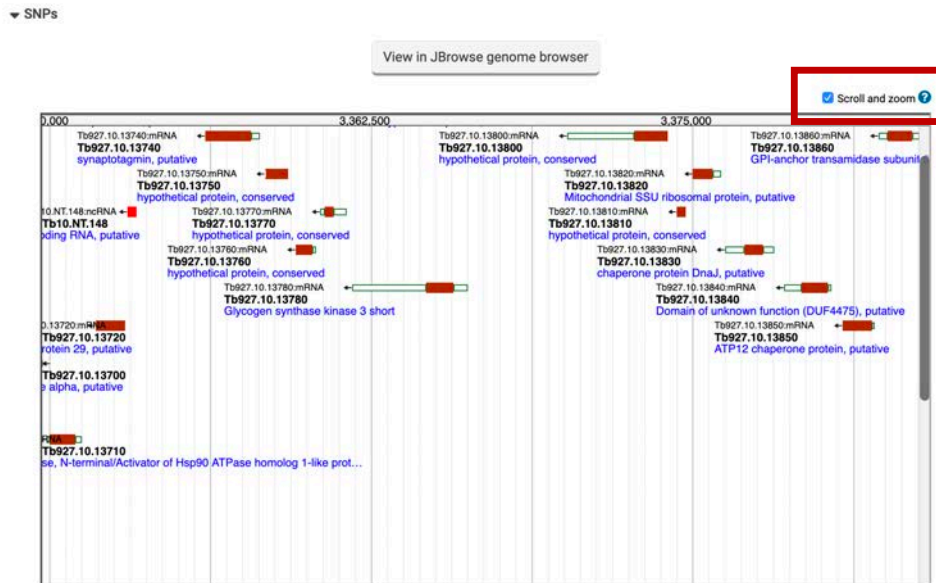
☒ Protein ☐ CDS (spliced) ☐ Genomic

Output format: Mismatches highlighted

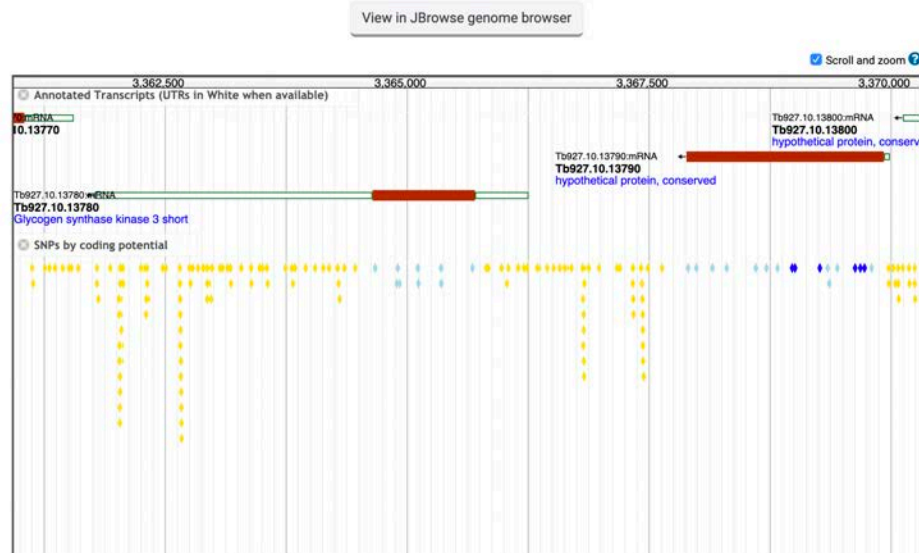
Run Clustal Omega for selected genes

6. Exploring the genetic variation section

Go to the Genetic variation section of the gene page and expand the SNP section. Notice that by default you cannot scroll within the embedded browser window. To enable scrolling, select the “Scroll and Zoom” check box in the upper right-hand side of the browser window. To scroll down within the browser window, you click and drag or use two-finger scrolling. You can also double click in an area to zoom in.



SNP color code: Dark blue (non-synonymous), light blue (synonymous), Yellow (non-coding), Red (nonsense). What kind of SNPs are in this gene? Can you see any non-synonymous SNPs? How does this compare to the neighboring genes?



7. Explore other sections of the gene page.

Feel free to scroll around the gene page and ask questions for clarification. Here are some questions you may want to ask about this gene:

- a. Is there evidence that this protein is phosphorylated? (hint: go to the proteomics section and expand the Post Translational Modification section).
- b. Where is the protein localized? (hint: go to the Protein Targeting and Localization section and expand the cellular localization section).
- c. Is there any phenotypic data available for this gene? (hint: go to the Phenotype section and expand its subsections).
- d. Is there any RNA-Seq data available for this gene? (hint: go to the Transcriptomics section and expand the subsections called RNA-Seq transcription summary and Transcript Expression).