

Lab 12, Pathways Part G

Name:

Instructions: A copy of this worksheet will be randomly selected at the end of Week 12's lab. Make sure you have submitted a folder containing all requested images and datafiles, each with the appropriate name. Answer questions completely and clearly, fully indicating your reasoning/thoughts (often writing in complete sentences is helpful). I expect the responses to have no typos and minimal grammatical error. You are allowed/encouraged to discuss questions with your labmates.

G1. Generate the following figures for each unique isoform (with filenames similar to the provided example). If a unique isoform was NOT available, write on the back of p. 3 a short paragraph explaining why you think that unique isoform does not exist.

- a. Take a screenshot to save the data entry section and checklist results (e.g. Rheb-PA_dyak_GeneModelChecker.png)
- b. Right click to save image of dotplot (e.g. Rheb-PA_dyak_DotPlot.png)
- c. Use 'Download alignment image' to save the protein alignment (e.g. Rheb-PA_dyak_ProtAlign.png)
- d. Use our method of saving Genome Browser images to save the custom gene model with required tracks (e.g. Rheb-PA_dyak_GenomeBrowserCustom.png)

G2. Make sure you have merged GFF/PEP/FASTA files containing all UNIQUE isoforms, with filenames in the correct format. (e.g. dyak_Rheb.gff, dyak_Rheb.pep, dyak_Rheb.fasta)

G3. In a short paragraph, describe your findings from the dot plots (try to make this as close as you can to how you would talk about this in a Results section). Note any anomalies on the dot plots and protein alignments (e.g., large gaps, regions with no sequence similarity) for each isoform, if present, and propose why you think the anomalies might be valid. If there are additional visuals from Parts E-F that illustrate the logic of your explanation, you can include related screenshots as well. You should describe these findings for all unique isoforms, but note that you can mention in a sentence if it is the same finding for more than one unique isoform. If there are no anomalies for one or more isoforms, indicate as such.

G4. Develop figure legends on the back of p. 3 of the worksheet for G1b-G1d for **ONE unique isoform**. This can be three separate figure legends, or one figure legend where the three figures are each subplots. The figure legend(s) should reference all isoforms matching the unique isoform, so a reader knows the set of isoforms represented. Note that a well-done version of this problem can be typed up to use if you are extending your Pathways Paper (Paper5 Assignment). Use underlining to indicate bolding or italics (double underline if simultaneously bolded and italicized). Request more blank paper as needed.

G5. Use the Google Drive folder linked on BB to add/edit all requested images and files. For those from Pathways A-C, note any remaining feedback from me on whether your image was appropriate. Note the filename formatting - make sure every file/image in this folder follows the requested format.

- A4: *GeneSymbol_Dmel_GenomicNeighborhood.png*
- B3: *GeneSymbol_TargetSpecies_tblastn.png*
- C2: *GeneSymbol_TargetSpecies_GenomicNeighborhood.png*
- G1a: *Uniquelsoform_TargetSpecies_GeneModelChecker.png*
- G1b: *Uniquelsoform_TargetSpecies_DotPlot.png*
- G1c: *Uniquelsoform_TargetSpecies_ProtAlign.png*
- G1d: *Uniquelsoform_TargetSpecies_GenomeBrowserCustom.png*
- G2: *TargetSpecies_GeneSymbol.gff*
- G2: *TargetSpecies_GeneSymbol.pep*
- G2: *TargetSpecies_GeneSymbol.fasta*

G6. After noting the other team's target species for the same target gene, note that species here, and indicate whether that species is more closely related or less closely related to *D. melanogaster* than your target species. Add some notes on how different the relationships seem to be for your two species with respect to *D. melanogaster*.

G7. Compare the dot plots and protein alignments for each isoform and compare them for each target species. Take some notes in the space below on features that are similar versus features that are different in their dot plot compared to the one for your target species. If an isoform is not found, indicate no isoform information available for one or both species.

Isoform 1 (_____):

Isoform 2 (_____):

G8. Make an inference about how the mutational patterns visualized in the dot plot relate to the phylogenetic relationships each species shares with *D. melanogaster*. Explain your reasoning.