

# Are the proteins from the Uniprot activity related?

- These proteins are not related to one another because they each produce a different structure/effect.
- These proteins are related as they all have the same catalytic domain (biopterin).
- These proteins are most likely related to each other since they share a majority of features, such as being found in the same organism, having similar subcellular locations and sharing a majority of pfam domains.

Database	For the last hit			Taxonomic range of hits	Number of hits in human?	BLAST RID – last character	Number of sequences in database
	%QC	e-value	% ID				
Nr	100	0.0	92	Placentals	20	6	340795435
Refseq_proteins	100	0.0	91.37	Placentals	2	6	185399577
Modelorganism (landmark)	11	0.006	44	Eukaryotes	9	6	438637
Uniprot	15	4e-04	40	Eukaryotes	4	6	475372

Many very similar hits, many from human

Many very similar hits, but few from human

Many hits from human, even some bad hits. This is good!

Fewish hits from human, even some bad hits. Is this good or bad?

nr

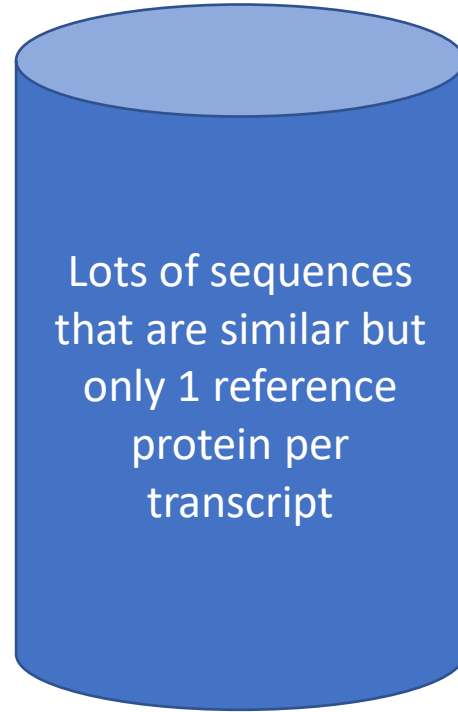
Refseq\_protein

Landmark

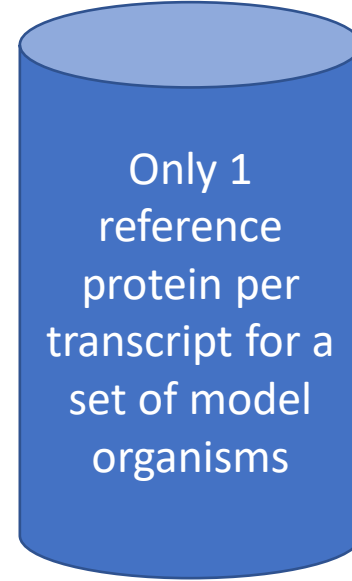
Uniprot



Search with default setting yields very similar sequences.



Search with default setting yields similar sequences.



Search with default setting yields more diverse sequences.



It depends! But mostly diverse. The least inconclusive of a species has a homolog or not...

Name	Length	Protein accession	GeneID
PAH	452 aa	NP_000268.1	5053
PAH	452 aa	NP_001341233.1	5053
PAH isoform X1	240 aa	XP_016874859.1	5053
TPH2	490 aa	NP_775489.2	121278
TPH1	444 aa	NP_004170.1	7166
TH isoform b	497 aa	NP_000351.2	7054
TH isoform X1	501 aa	XP_011518637.1	7054
TH isoform a	528 aa	NP_954986.2	7054
TH isoform c	524 aa	NP_954987.2	7054

### Many proteins, but only 4 genes:

Alternative splicing -> protein isoforms

Isoforms may be very similar, may just differ by one or two amino acids in length, but can also be very different in length.

### Are there paralogs in this table?

Yes, different gene ids in the same species

### Are there orthologs?

No, all are from the same species. Why can there not be orthologs from the same species?

# In class today:

- Complete the computer set up
- Complete Day 4 activity
  - remember to submit to Canvas by Wed 1 PM
- Documents including sequence dataset for Day 4 activity are on the class website.
- The quiz from last week is open until 11:59 tonight...