

Amphibian Mitochondria- Who's Related to Whom?



Ellen Wilson
BIOL792 Final Project
May 4, 2021



Siberian wood frog
(*Rana amurensis*)



Wood frog (*Lithobates sylvaticus*)



California red-legged frog
(*Rana draytonii*)



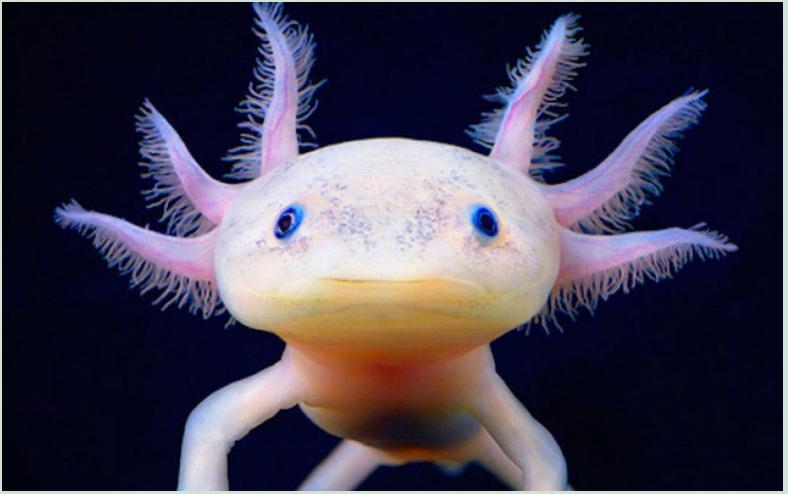
Dybowski's frog
(*Rana dybowskii*)



European common frog
(*Rana temporaria*)



Gray treefrog
(*Dryophytes versicolor*)



Axolotl (*Ambystoma mexicanum*)



African clawed frog
(*Xenopus laevis*)



Tiger salamander
(*Ambystoma tigrinum*)



Asiatic Toad
(*Bufo gargarizans*)



Human (*Homo sapiens*)

Hypotheses:

1. All frog and toad species mtDNA will be closely related to each other.
2. The salamander species mtDNA will be related to each other, but farther distanced from the other species.
3. Human mtDNA will be far-removed from all other species.



Search NCBI

Bufo gargarizans mitochondria

x Search

Results found in 4 databases

ORGANELLE

Was this helpful?  

Asiatic toad mitochondrial reference genome

Bufo gargarizans

RefSeq: NC_008410.1 Length: 17,277 bp circular

Gene (13) RefSeq protein (13) PopSet (26) PubMed (1)

Sequence Viewer

Primer-BLAST

Download

See all archival Bufo gargarizans complete genomes

Literature

Bookshelf

Download FASTA sequences x

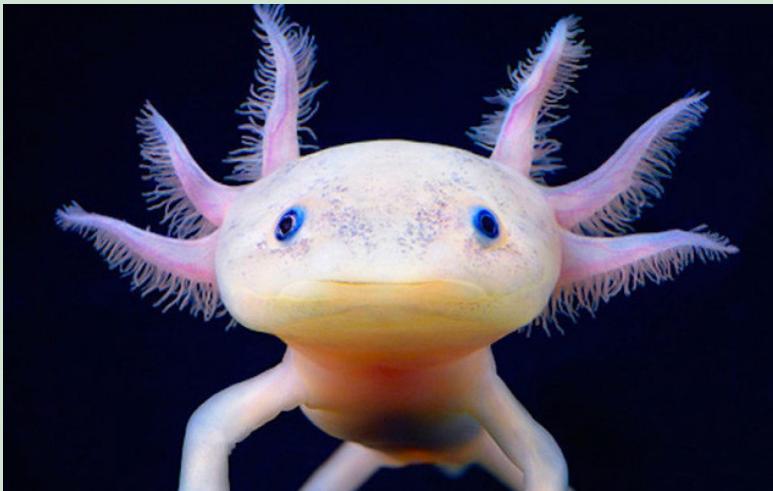
RefSeq complete genome (1)

RefSeq proteins (13)

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/Users/ellenwilson/Desktop/Homework/Practice/HomeworkBIOL792/Amphibian_Project
[Ellens-MacBook-Pro:Amphibian_Project ellenwilson$ ls *.fasta
Ambystoma_mexicanum.fasta          Rana_draytonii.fasta
Ambystoma_tigrinum.fasta           Rana_dybowskii.fasta
Bufo_gargarizans.fasta            Rana_kunyuensis.fasta
Dryophytes_versicolor.fasta       Rana_temporaria.fasta
Lithobates_sylvaticus.fasta        Xenopus_laevis.fasta
Rana_amurensis.fasta              homo_sapiens.fasta
[Ellens-MacBook-Pro:Amphibian_Project ellenwilson$ ls *.txt
Ambystoma_mexicanum.txt          Rana_draytonii.txt
Ambystoma_tigrinum.txt           Rana_dybowskii.txt
Bufo_gargarizans.txt             Rana_kunyuensis.txt
Dryophytes_versicolor.txt        Rana_temporaria.txt
Lithobates_sylvaticus.txt         Ranadraytonii.txt
Rana_amurensis.txt                Xenopus_laevis.txt
Rana_amurensis.txt                  homo_sapiens.txt
Ellens-MacBook-Pro:Amphibian_Project ellenwilson$ ]
```



European common
frog (*Rana temporaria*)



Axolotl (*Ambystoma
mexicanum*)



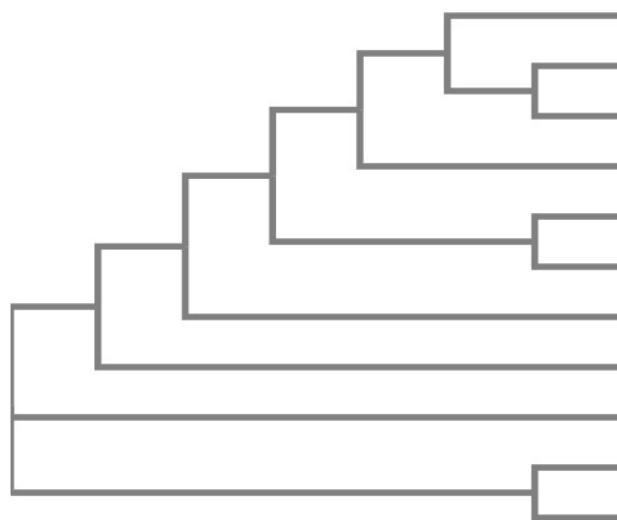
Asiatic Toad
(*Bufo gargarizans*)

1	taxa	genus	species	nucleotides	matching_Bufo_gargarizans	matching_Ambystoma_mexicanum	matching_Rana_temporaria	location	concern
2	Bufo_gargarizans	Bufo	gargarizans	17,277	17,277	10,658		10,835	Asia LC
3	Rana_amurensis	Rana	amurensis	18,470	9,645	9,006		11,773	Asia LC
4	Lithobates_sylvaticus	Lithobates	sylvaticus	17,343	11,479	10,509		12,786	NAmerica LC
5	Rana_draytonii	Rana	draytonii	17,805	11,400	10,499		13,033	NAmerica V
6	Rana_dybowskii	Rana	dybowskii	18,864	10,668	9,865		13,361	Asia LC
7	Rana_temporaria	Rana	temporaria	16,061	10,835	10,044		16,061	Europe LC
8	Ambystoma_tigrinum	Ambystoma	tigrinum	16,375	10,603	15,624		10,704	NAmerica LC
9	Dryophytes_versicolor	Dryophytes	versicolor	18,800	13,024	10,866		10,970	NAmerica LC
10	Ambystoma_mexicanum	Ambystoma	mexicanum	16,369	10,658	16,369		10,044	NAmerica CE
11	Homo_sapiens	Homo	sapiens	16,569	10,055	9,963		9,855	ALL LC
12	Xenopus_laevis	Xenopus	laevis	17,553	10,594	10,879		10,309	Africa LC

Phylogenetic Tree

This is a Neighbour-joining tree without distance corrections.

Branch length: Cladogram Real

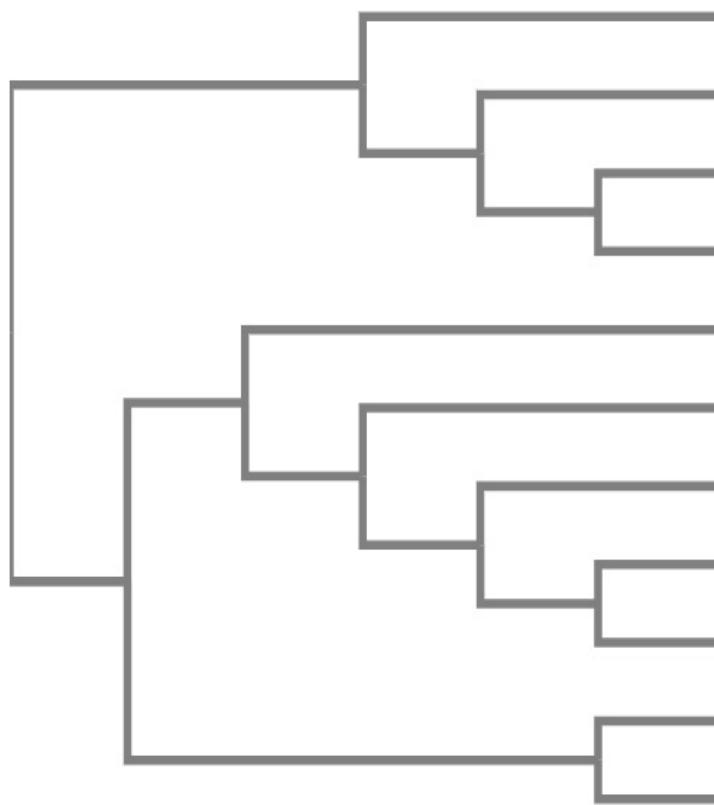


Xenopus_laevis	0.1396
Ambystoma_tigrinum	0.02254
Ambystoma_mexicanum	0.02279
Homo_sapiens	0.19706
Bufo_gargarizans	0.12179
Dryophytes_versicolor	0.11959
Lithobates_sylvaticus	0.09499
Rana_draytonii	0.08386
Rana_amurensis	0.0789
Rana_temporaria	0.06832
Rana_dybowskii	0.08288

```
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clustalo-I20210502-224308-0211-36744052-p2m.sequence --threads 8 --MAC-RAM 8000 --  
verbose --guidetree-out clustalo-I20210502-224308-0211-36744052-p2m.dnd --outfmt  
clustal --resno --outfile clustalo-I20210502-224308-0211-36744052-p2m.clustal_num --  
output-order tree-order --seqtype dna
```

Phylogram

Branch length: Cladogram Real



- Xenopus_laevis 0.288727
- Homo_sapiens 0.27718
- Ambystoma_tigrinum 0.0245281
- Ambystoma_mexicanum 0.0245281
- Rana_draytonii 0.186371
- Lithobates_sylvaticus 0.206152
- Rana_amurensis 0.173939
- Rana_temporaria 0.126736
- Rana_dybowskii 0.126736
- Bufo_gargarizans 0.169908
- Dryophytes_versicolor 0.169908

Questions?

