Notes on salamander:

* *neotony* is a type of paedomorphosis
* *Heterochrony* is any genetically controlled difference in the timing, rate, or duration of a developmental process in an organism compared to its ancestors or other organisms.
* TH regulates paedomorphosis and metamorphosis. More TH, metamorphosis. Less TH, paedomorphosis.
* *Biphasic* - undergoes metamorphosis, associated with unstable, seasonal aquatic habitats.
* Paedomorphs - associated with stable aquatic habitats
* Facultative - both biphasic and paedomorphic are observed in the same population

Questions:

* Do salamanders which paedomorphosis speciate more frequently than those who do not?
* Is there a difference in fitness in salamanders that have paedomorphosis and those who do not?
* Correlations between thyroid size and lifestyle? Pituitary gland size and lifestyle?

Maybe Hypothesis:

* Paedomorphism/neotony in salamanders speeds up sexual maturity while retaining juvenile features. Since paedomorphic salamanders reach sexual maturity faster than those who metamorphose, selection will favor species that can paedomorphosis.
* Salamanders in \_\_\_\_\_\_\_\_ microhabitats are more likely to be paedomorphic.
* Padeomorphic salamanders will have smaller morphological features

[Discussion of fitness benfits paedo vs meta](https://www.jstor.org/stable/3037717?seq=14)

[Salamanders and TH Level](https://www.sciencedirect.com/science/article/pii/B9780123859792000083?casa_token=awkzDM-1LWIAAAAA:woh0jAGSf_MjiWK1SV-yz3oh3FbMhp8eF_kjQK6HL1eZ-0tm6HD50SOyM3ssRVZCxNeWG1PyMIM#s0005)

[Neoteny—a slowdown in the growth rate with a delay in maturation—has occurred in human evolution.](https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/neoteny)

[Repeated ecological and life cycle transitions make salamanders an ideal model for evolution and development](https://anatomypubs.onlinelibrary.wiley.com/doi/full/10.1002/dvdy.373)

<https://datadryad.org/stash/dataset/doi:10.5061/dryad.6djh9w13b> maybe important

<https://www.journals.uchicago.edu/doi/full/10.1086/711019>

<https://datadryad.org/stash/dataset/doi:10.5061/dryad.4cs45>

<https://datadryad.org/stash/dataset/doi:10.5061/dryad.ht76hdrcg> maybe important

[Body Size And Temperature](https://www.nature.com/scitable/knowledge/library/body-size-and-temperature-why-they-matter-15157011/)

[Macroevolution of Arboeal Salamander](https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.5267)

* Microhabitat categories: arboreal (A), cave (C), fossorial (F), saxicolous (S), terrestrial (T), and aquatic (W).
* These six classification schemes represent two different approaches (majority-rule and lenient; abbreviated as M and L, respectively) for each of three different biological considerations: our classification (6-M and 6-L), our classifications considering an independent semiaquatic microhabitat (7-M and 7-L), and McEntire's (2016) arboreal classifications (6-McM and 6-McL). All classification schemes are described in more detail below and are summarized in Table 1.
* To quantify body shape for each specimen, we measured snout-vent length (SVL), tail length (TL), head length (HL), body width (BW), snout-eye distance (SE), forelimb length (FLL), and hind limb length (HLL) as these measures are considered to capture the major variation in general body shape (Adams, Berns, Kozak, & Wiens, 2009; Bonett & Blair, 2017, see Blankers et al., 2012 for measurement details)

R Help:

[Reading and Writing CSV Files – Programming with R](https://swcarpentry.github.io/r-novice-inflammation/11-supp-read-write-csv/)