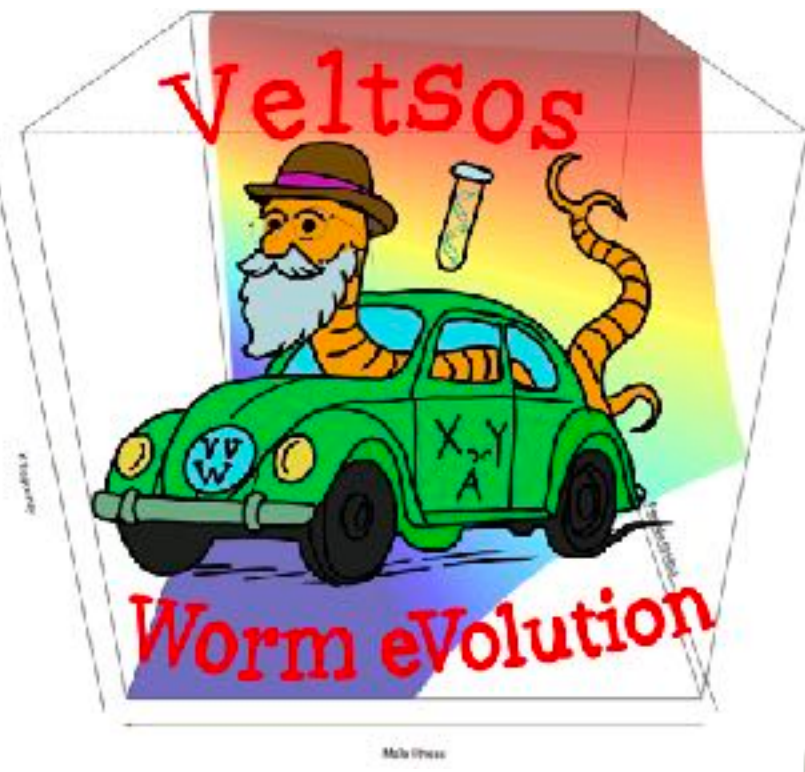




Veltsos Worm eVolution

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Research interests

I am interested in the interplay between sexual selection, environmental adaptation and sex chromosome evolution.

Possible projects **in yellow**.

I am also happy to discuss other ideas.

Worms are great

Easy lab and genetic studies

- Grow fast
- Easy to cross
- Easy to keep

Extensive resources

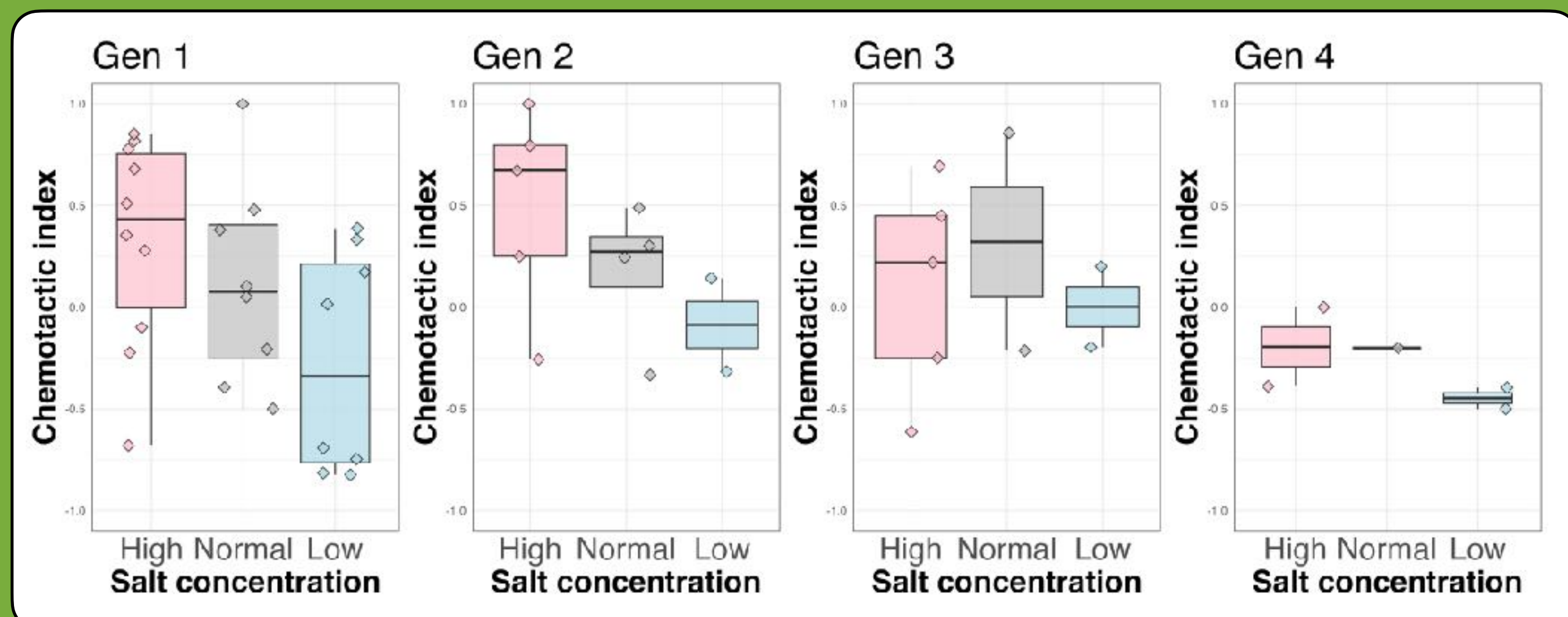
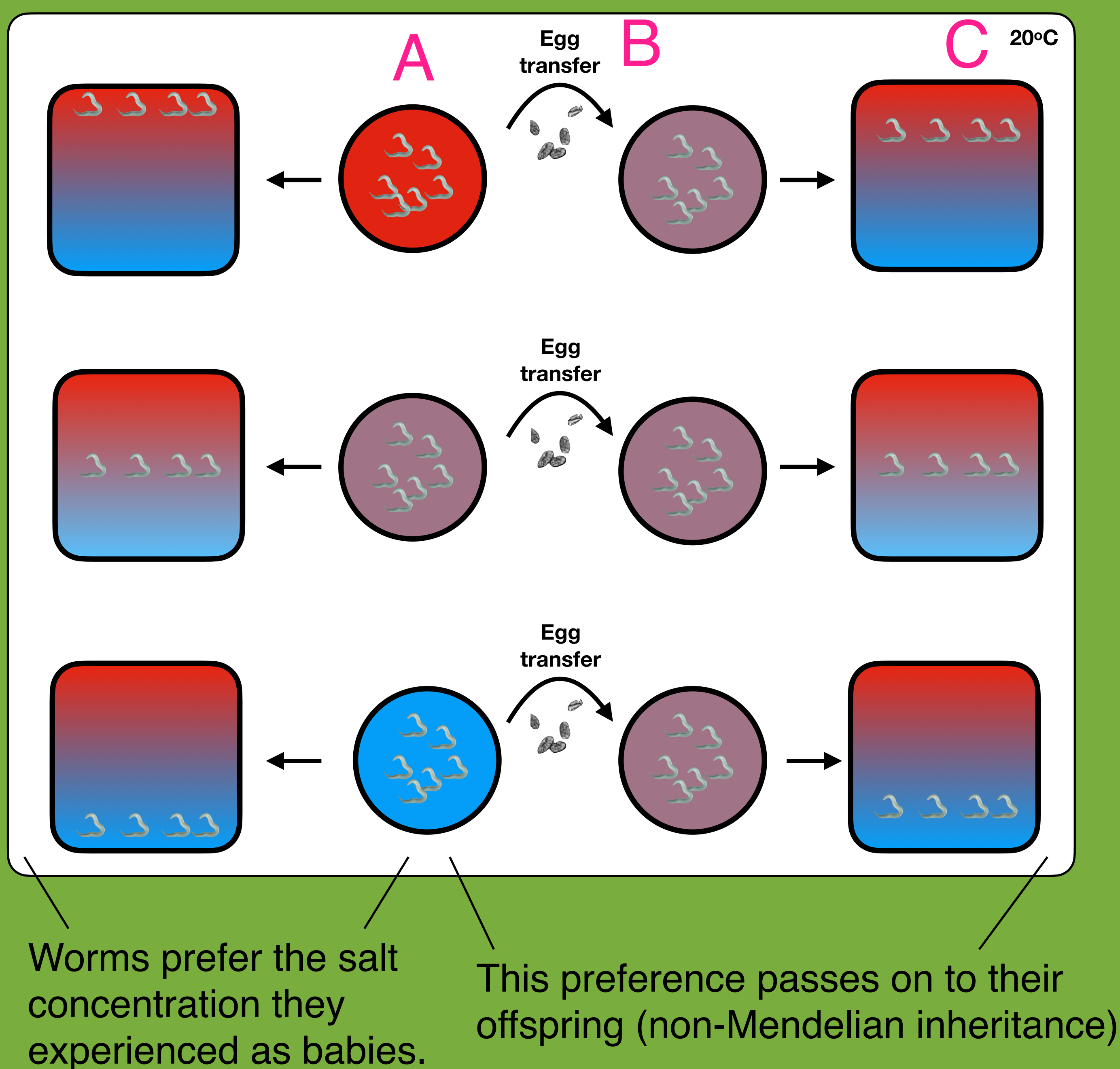
- wormbase.org
- wormbook.org
- Worldwide collections
- Available genomes and transcriptomes

You will gain experience in

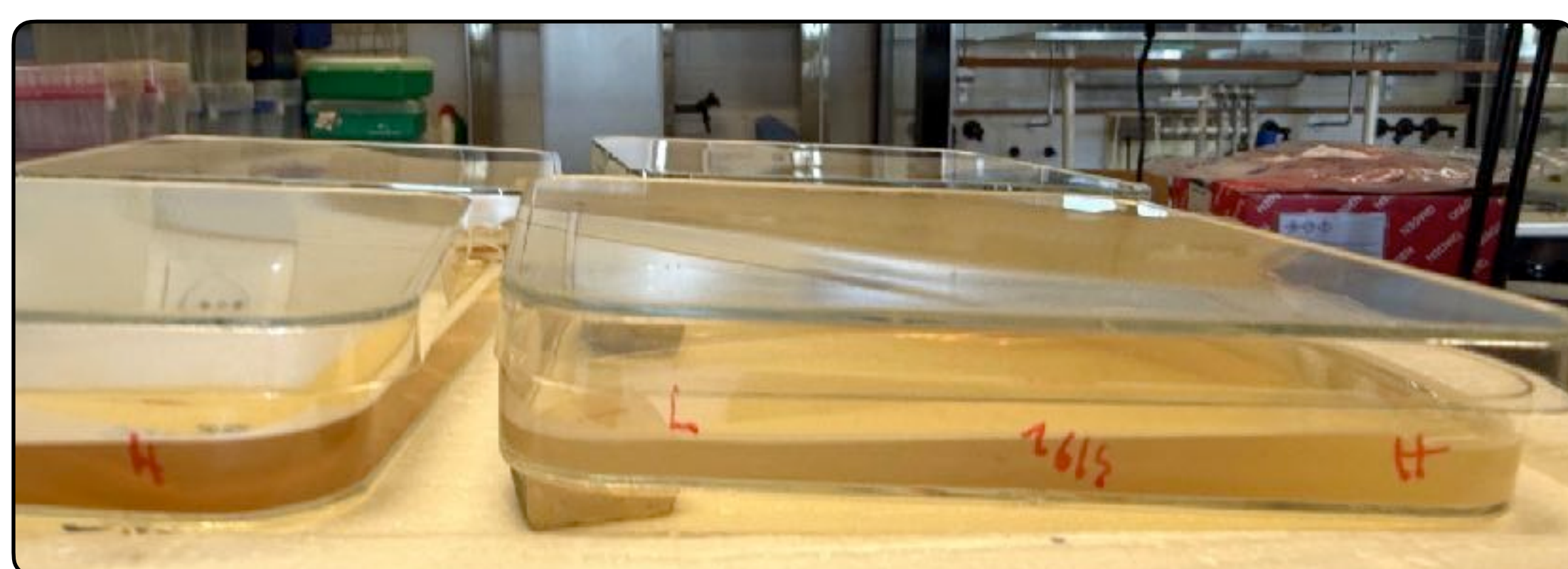
- Experimental design
- Lab maintenance
- Aseptic technique
- Patience, perseverance
- Self organization
- Statistical analysis
- Work with others
- Maintaining a lab book
- Writing skills
- Presentation skills

Epigenetic memory for salt preference

We raise worms in **high**, **normal** and **low** salt concentrations, and then ask them what salt concentration they prefer by observing on which side of a salt **gradient** plate they move.



The epigenetic memory weakens every generation (data from last years' BSc project).



Salt gradient plates: 2 layers of agar of different salt concentration establish a gradient. The movement of worms after they are placed in the middle allows to evaluate their preference (chemotaxis index).

A Which salt concentration is optimal?

Pohl *et al.* (2025) showed that the "normal" salt is mildly toxic to *C. elegans*.

We can repeat this result in other species, and explore whether the different sexes are affected differently by salt.

Work

1. Compare lifespan, development rate, progeny production between worms raised in **normal salt** and **no salt**.
2. Look at sex differences and multigenerational salt acclimation.

The results can help decide the optimal parameters for future gradient analyses.

Pohl, F. *et al.* (2025) Environmental NaCl affects *Caenorhabditis elegans* development and aging. *Genetics*, 231, iyaf139.

B Does the egg transfer protocol affect behavior?

Eggs are usually transferred through a bleach solution, which kills adults and stresses the eggs. This is a highly biologically unrealistic, but efficient way to obtain lots of eggs for experiments.

Work

1. Compare **high salt** preference due to high salt conditioning between different worm synchronization protocols (bleach or egg laying-windows).
2. Compare **high salt** avoidance due to starvation at high salt between synchronization protocols (bleach and developmental arrest vs egg laying-windows)

The results have implications for the behavioral assays used in the field.

C Does temperature stress affect behavior?

Mendenhall *et al.* (2017) showed that moderate heat stress reduces variability in lifespan. However it is unclear whether it affects salt preference (strength/variability).

Work

1. Compare **high salt** preference and variability between worms raised at normal and high temperatures.
2. Investigate multigenerational effects of temperature acclimation.

The results can help decide the optimal parameters for future behavior experiments.

Mendenhall, A. *et al.* (2017) Environmental canalization of life span and gene expression in *Caenorhabditis elegans*. *J Gerontol A Biol Sci Med Sci*, 72, 1033-1037.

Next steps



1. Check poster again, see previous students' output at www.parisveltsos.com/research/students
2. Email me paris.veltsos@vub.be with follow up questions or if you want to see the lab.
3. Ideas on **other*** projects are welcome, for example whether salt adaptation leads to reproductive isolation.