When the tap runs dry:

The physiological effects of acute experimental dehydration in the desert adapted mouse

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SCAN ME

Peromyscus eremicus

How are *Peromyscus eremicus* adapted to the desert?

- Behavior
- Physiology
- Genomic
  - Why traits vary?
    Evolutionary processes that drive variation in a trait
  - How traits vary?
    Underlying molecular mechanisms that produces a trait

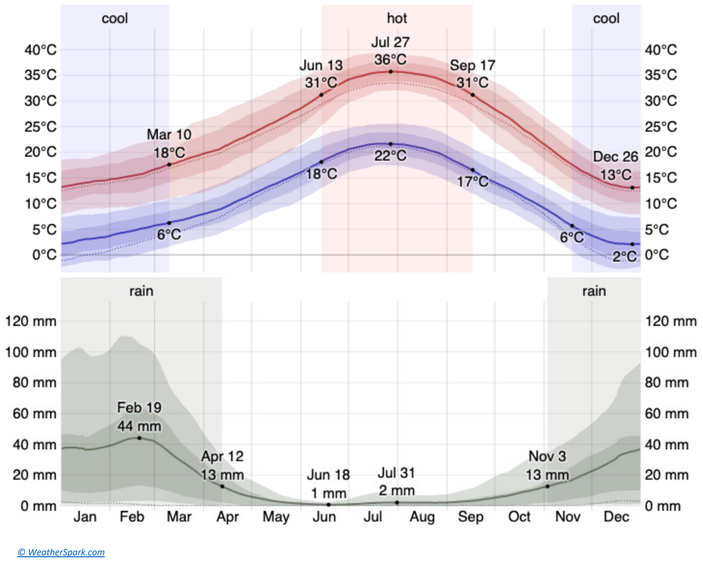

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Photo: Adam Stuckert

„acher, T., Timm, R. & Álvarez-Castañeda, S.T. 2019. *Peromyscus eremicus* (amended version of 2018 assessment). *The IUCN Red List of Threatened Species* 2019: e.T16659A143641683. https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T16659A143641683.en. Downloaded on 02 November 2021.

Methods

36 mice (18 males, 18 females)

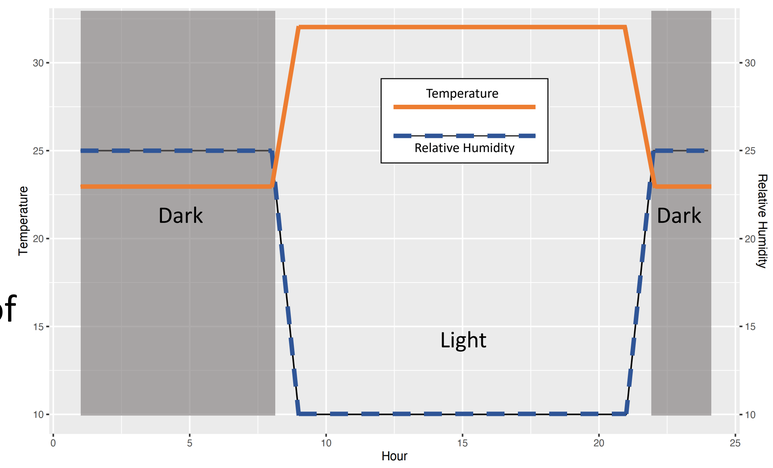
72 hours of data collection in temperature cycling room

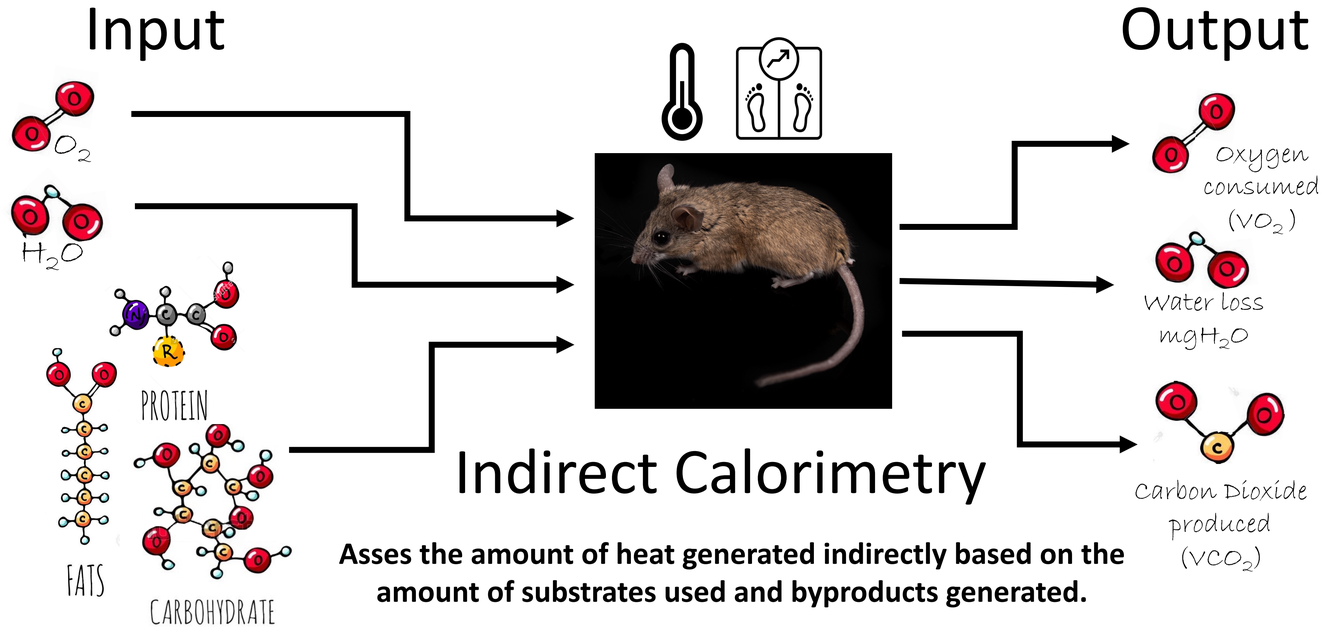
Weight every 24 hour

Body temperature every 12 hours

Real time metabolic rate and rate of water loss

Water *ad libitum*
No water

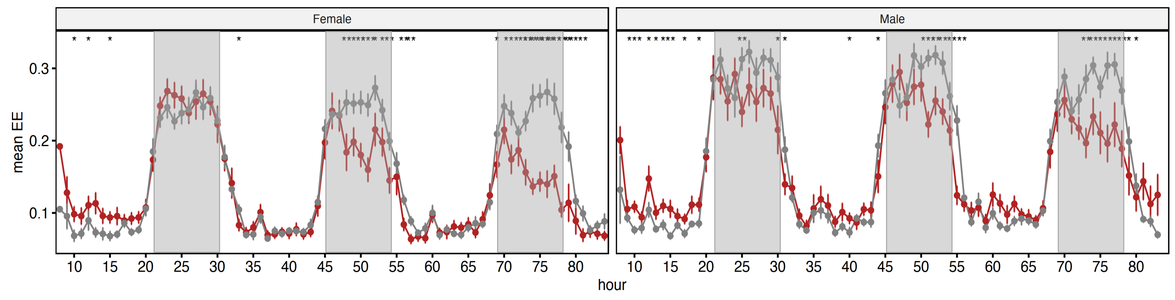




Asses the amount of heat generated indirectly based on the amount of substrates used and byproducts generated.

Results

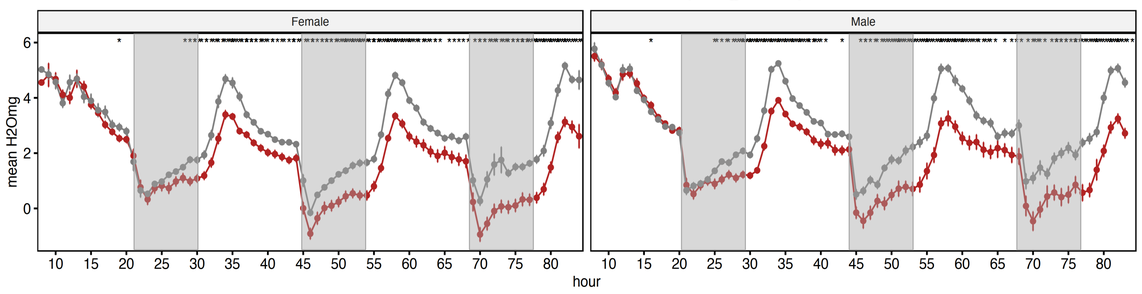
Metabolic rate (kcal hr^{-1})



Metabolic rate decreases over the course of three days for mice without water.

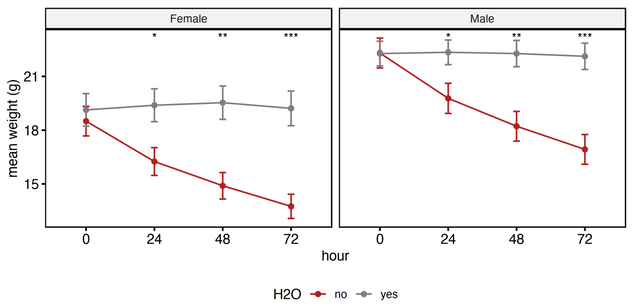
Dark phase
Light phase

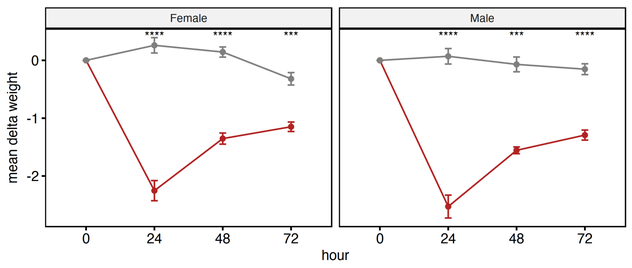
Rate of water loss (mg/hr)



Rate of water loss decreases over the course of three days for mice without water.

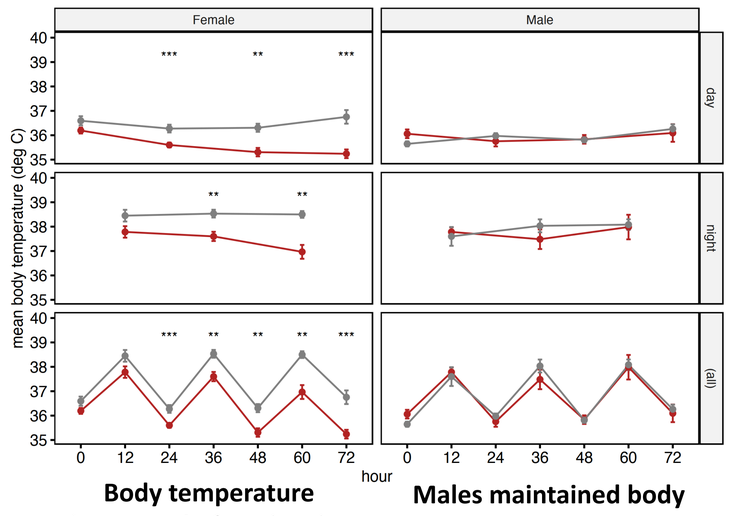
Weight (g)





Mice without access to water lose weight over the course of the experiment.

Body temperature (°C)



Body temperature decreases in females that don't have access to water.

Males maintained body temperature for both water treatments.

Water access
no yes

Discussion

Photo: Adam Stuckert

Metabolic rate

Metabolic rate decreased during the dark phases.
A lower metabolic rate without water leads to less heat production.

Rate of water loss

Rate of water loss decreases.
Water could be decreasing because there is no water to be lost.
Reduced metabolism would lead to reduced water lost through respiration.
Mice are not using evaporative water to dissipate heat.

Weight loss

Body weight decreases.
Mice are experiencing dehydration-related weight loss.

Body temperature

♀ : Daily torpor increases fitness as reproduction is primarily limited by access to resources.
♂ : Maintained body temperature increases fitness as reproduction is competition based.

Acknowledgments:

- Funded National Institute of Health National Institute of General Medical Sciences (R35 GM128843)
- Animal care provided by the Animal Resources Office and veterinary care staff at the University of New Hampshire
- Support from the MacManes and Rowe Lab
- Adam Stuckert for detailed *Peromyscus eremicus* pictures
- *P. eremicus* for having cool adaptations