3. Temperature

Marguerite Butler

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Pre-class materials

> **Read ahead**
>
> **Before class, you can prepare by reading the following materials:**
>
> 1. Withers chapter 5. Look over the homework, handout, and discussion questions and skim the chapter, reading anything that you need to know.
> 2. [Discussion Questions]
> 3. [Slide Deck] - for your reference as we go through the material

Announcements/Reminders

- We are back in the lab this week. Read [Lab 3]. Watch the podcast on peripheral circulation. Read Do prelab quiz and the prelab, focusing on the hypotheses that you will design.
- We will finish Metabolism and begin Temperature.
- HW1 due Tuesday in class, hand-written (you may submit as a group - week 2 if you wish).
- HW2 due next Tuesday in class (individual).

Week 3 Discussion Groups

Group	Partner 1	Partner 2	Partner 3
1	Abby	James	Johsua
2	Veronica	Ilan	Kylee
3	Vivian	Hao	Mohamad

Group	Partner 1	Partner 2	Partner 3
4	Adam	Christian	Sean
5	Ashton	Tamako	

Thought for the day

> Physiology is the story of evolution's struggle to maintain an appropriate SA/D ratio in relation to the volume of an animal – *Haldane*

3. Temperature

Modes of Heat Transfer

- **Conduction**
- **Convection**
- **Evaporative**
- **Radiative**

Animals also generate heat through **Metabolism**.

https://youtu.be/BHchDrboqEo

Flux = C * ∇ (Mass or Energy)

Q = C * M ∇ T

Where: - Flux is the transfer of mass or energy - ∇ is the gradient symbol - Q is heat - C is a material property (resistance or insulation value) - T is temperature

Heat Balance

Metbolic heat production is balanced by all mechanisms for heat exchange:

$\Delta H_s = H_m \pm H_c \pm H_r \pm H_e$

Where:
ΔH_s = heat of storage
H_m = heat of metabolism
H_c = heat of conduction and convection
H_r = heat of radiation
H_e = heat of evaporation

If an animal is in heat balance, Tb (body temperature) is stable.

If ΔH_s is positive, (Gains > Losses), then Tb increases.

If ΔH_s is negative, (Gains < Losses), then Tb decreases.

Body Temperature

Q10

https://youtu.be/T5O9UvSZ_-g

Iterative Method

https://youtu.be/pEzcZCTYPyE

For Next Time

> Reminders and materials