11. Respiration-Osmoreguation

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Pre-class materials

> **!** Important Homework announcements
>
> Due at the beginning of class, written by hand (paper and pencil or pen).

> **i** Read ahead
>
> **Before class, you can prepare by reading the following materials:**
>
> 1. Monday and Wednesday we will finish respiration and Friday begin osmoregulation.
> 2. The Symmorphosis paper is a very interesting and important paper. It will be useful for design3 respiration.
> 3. In Lab this week you will measure your own brain waves using EEG. Have fun! [manual]!

Announcements/Reminders

- Due Monday at the start of class– Homework 5 [schedule]
- Due Friday at midnight - Design 3 draft
- Please do your peer review for design 3 over the weekend
- Do discussion TEAMMATES eval, released each Friday, due by Monday.

Week 13 Discussion Groups

Group	Partner 1	Partner 2	Partner 3
1	Alvin	Sasha	Anna
2	Adry	Morgan Maisie	Kylie
3	Garrett	Christina	Krystal
4	Maisie	Kirsten	Logan M
5	Logan B	Matthew	Richard
6	Justin	Mayuka	

Monday - Finish aerial respiration questions 2, 3, 5

- **Reading assignment:** Withers pp. 609-631 OR HWA chapter 23 + Withers 626-632, skip invertebrates
- [discussion pg 4:2,3,5] [slide deck2]
- **Aerial Respiration Topics:**
  - Air flow patterns of vertebrates
  - Lung Volumes
    - Lung Volume (VL or VT)
    - tidal volume (Vt)
    - Dead space volume (VD)
    - Alveolar ventilation volume (VA or Va)
    - Alveolar Minute Volume (VAE)
  - Breath Rate (BR)
  - Oxygen Extraction and Pulmonary Diffusing Capacity

Respiration the Movie

https://youtu.be/clyu9h810n4

Wednesday - Symmorphosis

- **Reading assignment:** Symmorphosis: Weibel, Taylor, and Hoppeler (1991) The concept of symmorphosis: A testable hypothesis of structure-function relationship. PNAS 88:10357-61 Respiration Papers folder
- In class discussion

Friday - Begin Osmoregulation

- **Reading assignment:** Withers skim beginning Ch. 16 for definitions in list below, also read Water & Ion Budgets pp. 788-790, Vertebrates pp. 798-803, Terrestrial Environments pp. 806-812, Terr. Verts. 822-827. Withers is actually very readable on this topic, and some of it will be familiar to you already:).
- [discussion] [slide deck] [slide deck 2]
- definitions:
  - solutes,
  - osmosis,
  - osmolarity/osmolality,
  - ionoregulation,
  - osmoregulation/osmoconforming,
  - compatible solutes,
  - perturbing solutes,
  - counteracting solutes,
  - osmotic permeability (&formulae)
- The components of **Water Budgets** (input/output) as well as **Ion Budgets**
- The water and ion challenges of **freshwater**, **marine**, and **terrestrial** environments

Osmoregulation Podcast

https://youtu.be/1vQxLFoPCmM

For Next Time

> Reminders and materials