Discussion WeekIIb

Animal Physiology
Discussion Questions and Reading Assignments

Reading assignment: Withers skim pp. 841-845 (pick up the four main steps of Tubular Excretion),read 855- 874 (Vertebrate Kidneys) and pp. 874-886 (Nitrogen Metabolism) or HWA pp.754-776, 782-785.

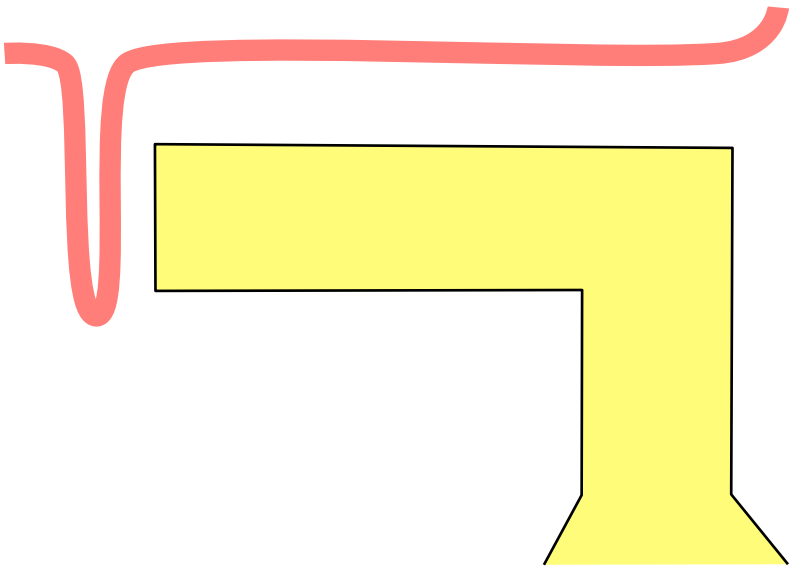
Monday - Excretion! Nephrons! Kidneys Oh MY!

Know:

- ☐ TMAO stands for TriMethlyAmine Oxide :)

Discuss:

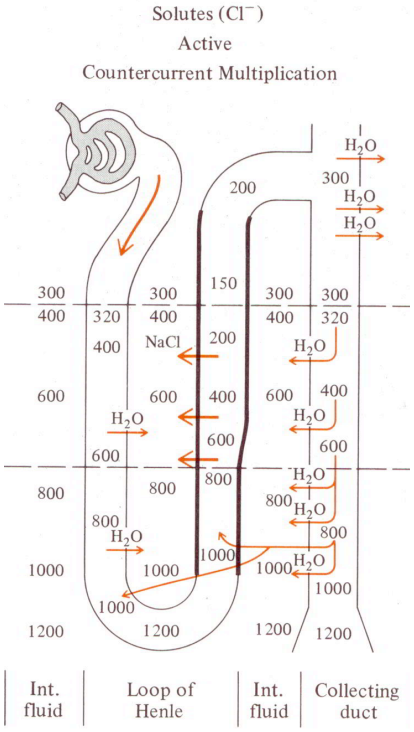
1. What are the four main physiological processes of tubular excretion: filtration, reabsorption, secretion,and osmotic concentration (what is excreted or absorbed)? What are the structures involved? Think about how the following processes are regulated: ion concentration, nitrogen excretion, and volume regulation.



2. What are the structural and functional differences between fish, amphibian and reptile kidneys on the one hand, and mammal kidneys? How do bird kidneys compare?

3. The mammalian kidney is truly a masterpiece of functional design. The long medullary nephrons of mammals (and some avians) can produce a concentrated (hyperosmotic) urine. How?
   a. What is the role of active transport of Cl- ions and passive diffusion of Na+ ions out of the tick ascending limb of the loop of Henle? What is countercurrent multiplication and how is it different from passive countercurrent exchange

b. What contributes to the top to bottom osmotic gradient formed in the loop of Henle?
c. What is the role of the interstitial fluid?



d. What is the role of the Vasa Recta (blood supply adjacent to the loop of Henle? Active or passive?
e. What is the role of urea, and what how is the movement of urea regulated differently than other solutes? What is the effect of ADH on the collecting duct and how does it regulate water flux?