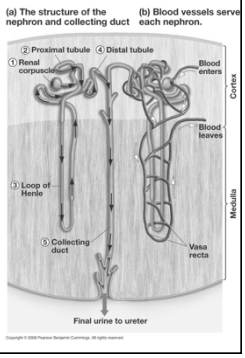
Wednesday 2/21/12

- Turn in your writing assignment!
- Anything due tomorrow?

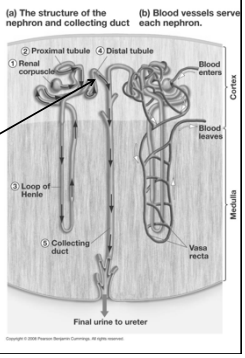
Review

1. Renal Corpuscle
   - Filtration
2. Proximal Tubule
   - Reabsorption
3. Loop of Henle
   - Establishing an osmotic gradient



Review

- What solutes are left?
  - Urea, other wastes
- Fluid entering the distal tubule is slightly hypotonic to blood.
- Fluid osmolarity is always consistent



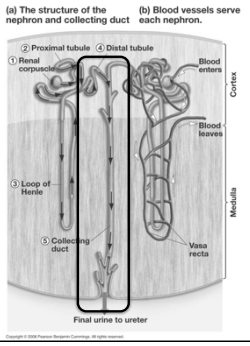
The Distal Tubule and Collecting Duct

4. Distal tubule

5. Collecting duct

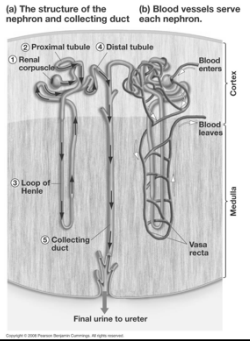
Activity changes in response to osmotic stress

Both respond to hormones



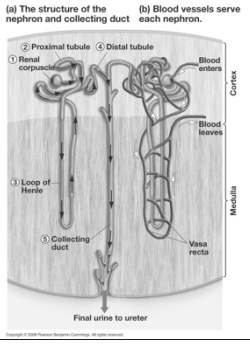
The Distal Tubule and Collecting Duct

- Normal functions
- Distal Tubule:
  - Reabsorb Na^+, Cl^-, H_20
- Collecting Duct
  - Normally impermeable



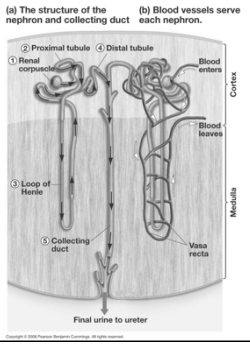
The Distal Tubule and Collecting Duct

- Regulated by hormones when…
- Low blood Na^+
  - Too much water
- Dehydration
  - Too little water



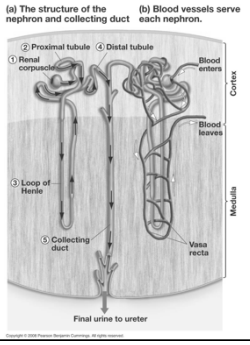
The Distal Tubule and Collecting Duct

- Low blood Na^+
  - Too much water
  - **aldosterone**
  - More Na^+ pumps activated, more Na^+ reabsorbed



The Distal Tubule and Collecting Duct

- Dehydration
  - Too little water
  - **ADH** (antidiuretic hormone)
  - Aquaporins inserted in plasma membrane
  - Membrane more permeable to urea (?)



The collecting duct and ADH

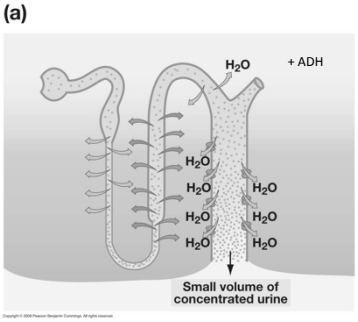


Fig. 42.18 pg. 953

Questions

- What is the major difference between the first 3 segments of the nephron and the last 2 segments?
- Which segment of the nephron is inactive under normal conditions?

Write this down.

- Describe what will happen in the nephron in response to a person drinking too much alcohol. Keep in mind that alcohol is a diuretic.

- Describe what will happen in the nephron in response to someone who was just given ecstasy and a case of bottled water.

http://www.alcoholbars.com/wp-content/uploads/2011/03/Why-do-People-Drink-Alcohol-1.jpg

http://www.meaningandhappiness.com/pictures/blog/happy-fool.jpg

Photosynthesis

- Properties of light and pigments
- Photosystem II
- Photosystem I
- Calvin Cycle
- Adaptive variations

$$CO_2 + H_2O \xrightarrow{light} O_2 + CH_2O$$

Light Spectrum

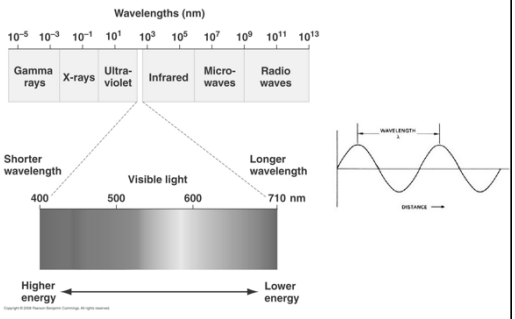


Fig 10.4 pg 202

http://www.daviddarling.info/encyclopedia/W/wavelength.html

Pigments involved in photosynthesis

Pigments	Wavelengths
Chlorophyll a	Absorbs blue and red
Chlorophyll b	Absorbs blue and red
Carotenoids (e.g. β-carotene)	Absorbs UV, stabilizes unpaired electrons and free radicals (Sunscreen)
	Absorbs blue and green

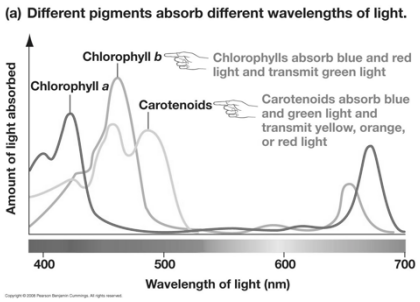


Fig 10.6 pg. 203

How exciting!

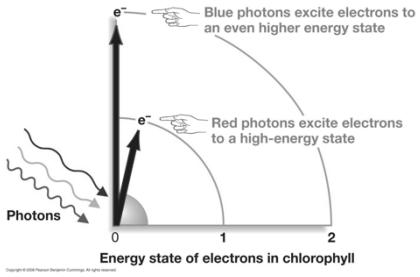


Fig 10.9 pg. 205

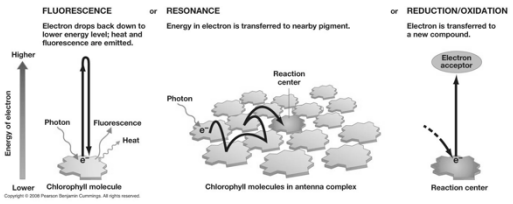
Exciting Consequences!

- When an electron in a chlorophyll molecule is excited, it can cause:
- Fluorescence
- Resonance
- Redox Reaction
- Depends on location of chlorophyll molecule

Exciting Consequences!

- Solitary chlorophyll molecule
  - Fluorescence (release of light and heat)
- Antenna Complex
  - Resonance (vibration)
    - Transfer of energy (not the electron) until it reaches…
  - Redox reaction
    - Reaction center

Exciting Consequences!



Energy Lost | Energy Transferred | Energy Captured

Fig. 10.11 pg. 206

Photosystem II

Pheophytin captures electron, donates it to intermediates (redox) in an electron transport chain

ETC creates a proton gradient

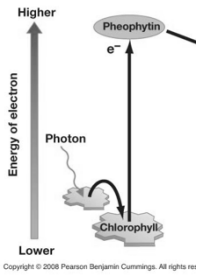
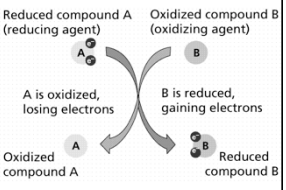


Fig. 10.13 pg. 208

Redox Reactions

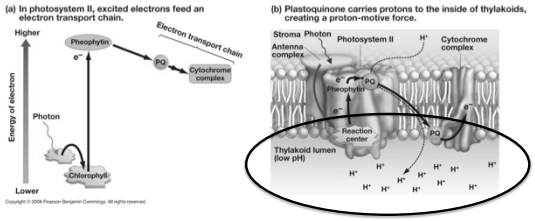
- Oxidation - Reduction
- A class of reactions that cause the loss or gain of an electron.
- An electron donor must always be paired with an electron acceptor



NAD + e- acceptor Oxidized
NADH e- donor Reduced

http://www.emc.maricopa.edu/faculty/farabee/BIOBK/biobookenzym.html

Proton Motive Force!



Pheophytin serves the same role in photosynthesis as NADH and $FADH_2$ do in respiration:

Donating electrons to create a proton gradient

Fig. 10.13 pg 208