Zool 255- Lecture 2-  
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Homeostasis and Cell Membrane  

Homeostasis  
- Central concept in physiology  
- Definition: maintenance of internal environmental (within narrow limits)  

Levels of organization- Fig 1.1  
- What is the cell's environment?  
- How is cell's environment regulated?  

Intracellular/ extracellular  
- Fluid compartments  
  - Total body water  
- Intracellular fluid  
- Extracellular fluids  
  - Interstitial fluid  
  - Plasma  
  - Cerebral spinal fluid  

Homeostasis  
- What aspects of internal environment are regulated?  

Negative feedback system components  
- Variable  
- Sensory receptor (information input)  
  - (afferent pathway)  
- Control center  
- Effector system  
  - (efferent pathway)
Negative feedback loops

• Blood pressure regulation (Fig 1.3)
• What are some other negative feedback systems?
  - Red blood cell (RBC) number
  - Glucose concentration
  - Acid/base balance

Positive feedback systems- Fig 1.4

• Rare in biological systems (except in pathological situations—vicious cycles)
• Change not resisted, but amplified
• Used where large magnitude response is needed
• What “stops” the response?

Read Chapter 2

• Review of basic chemical principles important in biology

Cell membrane (Fig 3.2)

• Membrane Structure and Function
• How does structure affect what crosses membrane or is transported across it?

Lipid Bilayer Membrane

• Fluid mosaic model
• Amphipathic nature
• Water-soluble vs. lipid soluble molecules (polar vs. non-polar, carry charges vs. don’t)

Membrane Protein Component

• Integral proteins
  - Amphipathic
  - Many roles
• Peripheral proteins
  - Water-soluble
  - Often enzymatic
• Glycoproteins
Integral Proteins

- **Ion channels**
  - Usually a selective filter
  - Size and charge of ion
- **Gated channels**
  - Voltage regulated
  - Chemical regulated
  - Stretch regulated

**Carrier proteins = transporters**
- Specificity
- Conformational (shape) change
- Saturable
- Passive or active (energy)

**Membrane receptors**
- Specificity for a ligand
- Saturable
- Competition

**Limited mobility of components**
**Dynamic change**
- size and shape of cell
- # & kind of proteins, lipids

**Transmembrane flux**
- Vocabulary: A membrane is permeable or impermeable to something, whereas a molecule is permeant (permeating) or non-permeant in the membrane.

**Fluid mosaic membrane**

**Next time**
Membrane Transport