

### Control for HCS Signal (Cont.)

- Chemical messengers
  - Most travel through extracellular (EC) fluid
    - Endocrine, paracrine, neurotransmitter
    - Special cases
      - **Autocrine**: pathway = IF (interstitial fluid)
        - Does not communicate from cell A to cell B
        - Its communicates from cell A to cell A
        - The receiving cell (the effector) is also the resreaser
      - **Cytokine**: pathway = IF/ plasma/ lymph; immune signal
        - The messengers of our immune system
        - Special because it can travel through a bunch of different mediums
        - Generally associated with the immune system
    - Figure 1-9
  - Some not based on EC fluid
    - **Gap junctions**: direct channels between adjacent cells
      - Figure 3-9
    - **Juxtacrines**: bound to cell membrane (i.e. not released)
      - Cells come in contact with each other
      - Nothing is actually released into the EC
      - Figure 18-12

### Body Organization

- **Cell**: each has the same DNA/ genetic information
  - New cells via mitosis (figure 1-1)
  - Unspecialized (undifferentiated) → specialized (differentiation)
  - Major categories:
    - Muscles:
      - generate mechanical force
    - Nerve/neurons:
      - works with electrical signals
    - Epithelial cells
      - interacts with environment and acts as protection
      - Found on skin, lines the lungs
      - Lines the organs that come in contact with air
    - Connective
      - connect, anchor and support
      - not just physical support but also metabolic
- **Tissues**: groupings of similar specialized cells
  - Same 4 major categories

- **Organs:** combinations of tissues
  - Almost all organs have muscle, nerve, and connective tissues
  - Vary in proportion and pattern
  - **Functional units**
    - Smallest yet still works
    - Smallest unit that can still perform the full function of the organ
    - Why do we have functional units?
      - Redundancy: continue even if lose some
        - the quality of having more than one functional unit
      - Expansion: add more without stopping
        - You can add another functional unit to that existing functional unit
- **Organ Systems:** organs with common function
  - Ex. circulatory system = heart, blood vessels, blood
  - Specials: OSs (Organ systems) can contain other OSs
    - Ex. immune = WBCs, spleen, thymus, circulatory system
- **Extracellular**
  - Fluid
  - **Matrix:** collection of proteins and minerals
    - Functions
      - Provide structure
      - Regulate info transfer
    - Protein types
      - Fibers, main ones:
        - Collagen: rope like traits
          - Like a dogs leash, it can move things closer just fine but prevents things from moving to far away
        - Elastin: rubberband-like traits
          - Can move things further away but things can spring back together
      - Non fibrous: carbohydrate- associated dominant
        - Normal proteins (the globular shaped ones)
- **Fluid Compartments** (there are 3)
  - 1) Intracellular fluid (cytosol) = within cells
    - 67% of total water (~28L)
  - Extracellular fluid (EC) = outside cells
    - 2) Interstitial fluid (IF) = between cells (actual “external”)
      - 26% (~11L)

Friday, 1/16/15

3) Plasma= fluid on blood vessels

o - 7% (~3L)

Don't need to know exact numbers. Just know which is biggest/ smallest