Lecture 5

Plasma Membrane:

Components

- Proteins (figure
    - **Integral**: Serve as channels, receptors, anchors
        - Amphipathic → so they can orient themselves in the bilayer
        - Not removable → hard to pull out of membrane because they have polar and non polar regions
            - Many of them are transmembrane
                - Goes completely across the membrane
    - **Peripheral**: impact shape and motility
        - Polar → because they lie on the polar heads
        - Found in the inside of the cell in the intracellular fluid; on the cytosolic side; NOT the outside
        - Cytosolic surface (in)
- **Glycocalyx**: allows for Identification and Interactions
    - Our immune system can recognize it
        - It is a protein on the outside of the cell
            - Allows for identification and interaction between cells
                - "Are you a healthy cell or a foreign, malicious cell?"
            - It is a sugar chain anchored in a protein
        - Everyone has a unique glycocalyx
        - Pathogens are recognized because they do not have the same glycocalyx as us
    - Short, branched carbohydrates (AKA sugars)
    - 3D → reason it looks fuzzy under a microscope
        - Give "fuzzy" surface
        - If we have a cross section of a cell we can tell which side is the outside/ inside of the cell by looking for the fuzzy

Junctions: for interactions (figure 3-9)

- These help form tissues!
- 1) **Gap Junctions**:
    - Channels linking two cytosols
    - Direct channels between adjacent cells
    - Signals can move through gap junctions
        - The signal is limited to the size of the channel
    - Small, so we have limited exchange
    - Allows interstitial fluid flow!
        - There is intracellular fluid flow too
- 2) **Desmosome**:
    - protein linkage between cells
    - Kind of like sowing cells together

    - There are still some small spaces in between (where they aren't being held)
    - Things cannot move from one cell to another through this. All is does is hold cells together
    - Spot welds
    - Allows interstitial fluid flow!
        - BUT there is not intracellular fluid flow
- 3) **Tight Junctions**:
    - joining of plasma membranes
    - Kind of like desmosome but the connection is ALL the way around our cells
        - 3D
    - Forms a band around the cell
        - Plasma membranes are fully connected all the way around
        - They block interstitial fluid flow!!! There is obviously no intracellular fluid flow either
            - Useful in the digestive tract, skin ← epithelial cells
            - Creates barrier between outside and inside of you

Cellular Metabolic Pathways

- Energy source = ATP (adenosine triphosphate)
    - Phosphate bonds are high energy
        - Energy is released when we break a phosphate bond
            - Refer to equation #1
- Making ATP
    - 1) **Substrate Level Phosphorylation**
        - Substrate interaction
        - P bound to a substrate is transferred to ADP
            - ATP + X ←→ ADP + XP
        - Ex. glycolysis and krebs cycle and [creatine in muscles]
            - Know all three examples!
    - 2) **Oxidative Phosphorylation**
        - Uses the **electron transport chain**/ system
        - For THIS class we can say they are synonymous
        - Energy input allows unbound P to bind to ADP