

Week 2 – Cell Organization

Part I

Learning Goal: Appreciate the broad similarities and differences among different cell types.

After the pre-class assignments you should be able to:

- Compare and contrast the organization of prokaryotic/eukaryotic cells and plant/animal cells
- Define the terms organelle, cytoplasm, and cytosol
- Describe the function of common eukaryotic organelles: mitochondrion, chloroplast, nucleus, endoplasmic reticulum, Golgi apparatus, lysosome, and vacuole

By the time you take the first midterm you should also be able to:

- Predict the primary function of a cell based on the molecules and organelles it contains
- Predict the relative abundance of organelles in different cells based on their functions
- Discuss how visual representations (models) of biological systems can be both useful and misleading

Part II

Learning Goal: Understand the relationship between the structure and function of cell membranes.

After the pre-class assignments you should be able to:

- Identify the structures of different lipids: triglycerides, fatty acids, phospholipids, and cholesterol
- Differentiate between saturated and unsaturated fatty acids
- Describe the structure of the plasma membrane and the different ways that proteins can be associated with the lipid bilayer

By the time you take the first midterm you should also be able to:

- Predict the structure of a phospholipid membrane in hydrophilic vs. hydrophobic environments
- Evaluate how changing temperature, phospholipid chain length, and phospholipid saturation affects membrane fluidity

Part III

Learning Goal: Understand the relationship between the structure and function of cell membranes.

After the pre-class assignments you should be able to:

- Define and term diffusion
- Explain how the chemical properties of a phospholipid bilayer allow it to act as a semipermeable membrane
- Define and relate the terms tonicity, osmosis, hypertonic, hypotonic, and isotonic
- Compare and contrast the different passive (simple diffusion, facilitated diffusion) and active (primary, secondary) transport mechanisms

By the time you take the first midterm you should also be able to:

- Predict the permeability of a molecule based on its chemical properties
- Predict the net movement of water based on the relative tonicity of two solutions
- Predict the rate and direction of net movement of molecules based on their concentration gradients and the absence or presence of specific membrane transport proteins