BIOL 101 – Foundations of Biology
Dr. Hardy

Exam 1 Overview

Topic 01 – Basic Biological Chemistry

I. Atoms
   A. Defined
   B. Elements vs. Atoms
   C. Bulk Elements vs. Trace Elements
   D. Atomic Structure
      1. Nucleus
      2. Electron Cloud
      3. Atomic Mass
   E. Chemical Bonds and Forces
      1. Covalent Bonds
      2. Ionic Bonds
      3. Hydrogen Bonds
      4. Ion-dipole Bonds
      5. Hydrophobic Forces
II. Important Molecules
   A. Water
   B. Organic Molecules
      1. Hydrocarbons
      2. Functional Groups
   C. 4 Main Classes of Biological Organic Molecules
      1. Carbohydrates
      2. Lipids
      3. Proteins
      4. Nucleic Acids
   D. Monomers & Polymers of Biological Molecule Classes
III. Dehydration and Hydrolysis Reactions
   A. Dehydration
   B. Hydrolysis

Topic 02 – Cells

I. Basics
   A. Cell Theory
   B. Diversity of Cell Sizes
II. Prokaryotes vs. Eukaryotes
   A. Prokaryotes
      1. Archaea
      2. Bacteria
   B. Eukaryotes
      1. Major Groups
         a. Protists
         b. Plants

           c. Fungi
           d. Animals
      2. Components Common to all
      3. Additional Components found in Fungal and/or Plant Cells

III. Cell-Cell Connections
    A. Animals
      1. Gap Junctions
      2. Extracellular Matrix
      3. Tight Junctions
      4. Anchoring Junctions
    B. Plants
      1. Plasmodesmata
      2. Middle Lamella
    C. Fungi
      1. Septal pores

Topic 03 – Membranes

I. Fluid Mosaic Model
    A. Phospholipids
    B. Proteins
    C. Other Organics

II. Permeability & Transport
    A. Passive Transport
      1. Diffusion
      2. Facilitated Diffusion
      3. Osmosis
    B. Active Transport
      1. Primary active transport (e.g., ATP directly involved)
      2. Secondary active transport (e.g., ATP not directly involved)

Topic 04 – Enzymes

I. Proteins
      A. Defined
      B. Structure
         1. Primary
         2. Secondary
         3. Tertiary
         4. Quaternary

II. Enzymes
      A. Defined
      B. Function
      C. Affecters of the rate of biochemical reactions
         1. Those that affect reaction kinetics
         2. Those that affect enzyme function