**Honors Human Physiology: Topics You Should Know from Biology and Chemistry:**

Each student comes to Honors Human Anatomy and Physiology with an individual level of knowledge about basic chemistry and cell biology/physiology topics. Because there is not time to review all these topics in this fast-paced class, you are required to have a working knowledge of the following topics. You must know the structure and function of the cell organelles at a level more than just “mitochondria are the powerhouse of the cell.”

Suggestions to help in your review: Read chapters 2-3 in the textbook, Bozeman Biology video series (links on Mr. B’s websites), reliable websites.

**Basic Chemistry Topics (mostly found in chapter 2)**
- Basic atomic structure and stability of atoms (valence electrons, orbitals, octet rule or rule of eights, atomic #, atomic mass, isotopes)
- Energy (basic definition, difference between potential, kinetic, chemical, electrical, mechanical, radiant)
- Solutions (solvent, solute, concentration, molarity)
- Ions (cations, anions)
- Polar vs nonpolar molecules (electropositive, electronegativity, dipole)
- Chemistry of water (polarity, high heat capacity, role as a solvent)
- Bonds (ionic, covalent, hydrogen)
- Chemical Reactions
  - Reactants and Products
  - Synthesis (anabolic)
  - Decomposition (catabolic)
  - Exchange/replacement
  - Oxidation-reduction (redox reactions)
  - Exergonic vs endergonic reactions
  - Endothermic vs exothermic reactions
  - Reaction involving water (dehydration synthesis/condensation and hydrolysis)
  - Salts (ionic compounds, electrolytes)
  - Acids
  - Bases
  - Buffers
- Major organic compound groups located in organisms
  - Carbohydrates (monosaccharides, disaccharides, polysaccharides)
  - Lipids (phospholipids, steroids, neutral fats (triglycerides))
  - Proteins (amino acids, peptide bonds, denaturation)
    - Enzymes -Role of catalysts (proteins) in a chemical reaction
  - Nucleic Acids (structure and role of DNA, mRNA, tRNA, rRNA, ATP)
Cell Organelles/Processes (chapter 3)

- Extracellular fluid vs. interstitial fluid
- Extracellular Fluid Concentrations (hypertonic, isotonic, hypotonic)
- Cytoplasm: cytosol, inclusions, organelles
- Cell membrane (roles of phospholipids, glycolipids, glycoproteins, cholesterol, transport proteins)
- Transport through a cell membrane
- Nucleus, Nuclear membrane, nucleoplasm, nuclear pore, nucleolus
- Rough Endoplasmic Reticulum, Smooth ER
- Golgi Apparatus, Vacuole
- Ribosome
- Lysosome, Peroxisome
- Chromatin, Histone proteins, Chromosome
- Cytoskeleton (microfilaments, intermediate filaments, microtubules)
- Centriole
- Cellular extensions: Cilia, Flagella, microvilli,
- *Mitochondria (structure)
- DNA Replication
- Protein Synthesis (transcription and translation)
- Cell Reproduction (mitosis, cytokinesis, cell cycle)
- Gamete Production (meiosis and cytokinesis)

*Mr. B will cover these topics in more detail as they are vital to your understanding of human physiology.

- Mitochondria, Aerobic Respiration and Anaerobic Lactic Acid Fermentation
- Plasma (cell) Membrane, methods of transport, solute pumps