Chapter 21 – Amino acids, porphyrins, and neurotransmitters

- Understand the processes used to catabolize amino acids
- Know how nonessential amino acids are synthesized in eukaryotic cells
- Know how polyamines are synthesized from ornithine
- Know the reaction catalyzed by phenylalanine hydroxylase, the structure of the cofactor tetrahydrobiopterin, and the clinical importance of the reaction
- Know the processes of heme biosynthesis and degradation
- Know the neurotransmitters synthesized from amino acids and how they are made

Chapter 22 – Nucleotide metabolism

- Know how nucleotide salvage takes place and the important enzyme in nucleotide salvage pathways
- Know the enzymatic pathway for purine biosynthesis and its regulation
- Know the pathways for purine degradation and clinical disorders associated with problems in purine degradation
- Know the pathways for pyrimidine nucleotide synthesis and their regulation
- Know how deoxyribonucleotides are synthesized from ribonucleotides
- Know how anticancer and anti-HIV drugs work by disrupting nucleotide metabolism

Chapter 23 – Metabolic Control

- Know the preferred energy sources for different organs and which pathways are enabled or disabled in the organs
- Understand how hormonal influence (insulin, glucagon, and epinephrine) affects energy metabolism in different organs
- Know the general responses to diabetes and starvation
- Know how G-protein coupled receptors mediate signal transduction
- Know how tyrosine kinase receptors mediate signal transduction
- Know the role of G proteins in vision reception in rod cells
• Know how calcium ions and diacylglycerol function as hormonal second messengers