

This is the first of two review sheets for the second exam. This review covers Chapters 9 through 11.

Catalytic strategies

What are the different types of catalysis?

What are proteases?

What is the structure of chymotrypsin? What is its mechanism? How does the kinetics look like? How does DIPF inhibit it?

What are serine proteases? How similar are they? How many groups of them are there? What does this suggest?

What other types of proteases are there? What are their important features?

What reaction does Carbonic anhydrase catalyze? What are the important features of the active site?

How do we know that an important group has a pK of ~ 7? What is its mechanism of catalysis? What is the evidence for that catalysis? What are the three families of Carbonic anhydrases and how do they differ?

Regulatory strategies

What is allosteric control?

What are isozymes? Why are they useful?

How is Aspartate Transcarbamoylase (ATCase) regulated? How does the subunit structure of the enzyme relate to their function? How does PALA affect ATCase? What are the R and T states and how does ATP and CTP affect the enzyme? What are the concerted and sequential models of allosteric control?

What types of reversible covalent modification occur? Why is reversible modification desirable?

Why is phosphorylation used as a regulatory molecule? What are the important aspects of how Protein Kinase A phosphorylates other proteins? How is it turned on and off?

What are zymogens? Why are they needed? What are the relationships among the digestive zymogens and how are they activated? How do Trypsin Inhibitor and α -Antitrypsin inhibit? How does smoking cause emphysema? How are zymogens involved in the process of blood clotting? How does Vitamin K fit into this process? How are clots dissolved?

Carbohydrates

What is the structure of the following D-sugars: glyceraldehyde, dihydroxyacetone, erythrose, ribose, ribulose, arabinose, xylose, glucose, mannose, galactose, and fructose?

What are anomeric carbons, aldoses, ketoses, and epimers? What are trioses, tetroses, etc.?

What is the difference between the chair and boat form of hexoses and why is β -D-glucose the most stable 6-carbon sugar?

What are the structures of the disaccharides cellobiose, sucrose, lactose, and maltose? What enzymes break down these disaccharides?

What are the structures of glycogen, starch, chitin, and cellulose? What are their 3D structures? Why does the 3D structure matter?

What is the general structure of other common polysaccharides (peptidoglycans, glycosaminoglycans), and where are they found?