Enzyme Kinetics, Inihibition and Regulation

Chapter 12 Learning Objectives

By the end of this chapter (and some of chapter 11) you should be able to:

1) You should understand why enzymes are the most important catalyst in biological systems and the general means by which they are regulated.

2) Know why the rates of a reaction and not the equilibrium constant of a reaction are altered by enzymes.

3) Understand the formation of a transition state and the energy diagram for a simple mechanism, including the energy of activation. Know the role of the enzyme in this system

4) Understand the thermodynamics of an enzyme catalyzed reaction. Be able to relate the enthalpy, entropy and free energy to a biochemical system

5) Know the Michaelis-Menten equation, and use the double reciprocal (lineweaver burke) graph to the terms Km, Vmax, and the Kapp and Vapp

6) Know the mechanism of a bisubstrate reaction

7) If given the rates of an enzyme reaction with and without inhibitors, graph both the S vs. V and the lineweaver burk plot using the results and determine the
   - Km, Vmax and the kind of inhibition

8) Describe the different kinds of inhibitors and their actions on the enzyme.

9) Describe the effects of competitive and noncompetitive inhibitors on the kinetics of enzyme reactions. Understand how/where the inhibitor binds. Contrast reversible and irreversible inhibitors

10) Contrast the kinetics of allosteric enzymes with simple kinetics. Understand and interpret the graphs of S vs. V for both allosteric activators and inhibitors. Where are these enzymes doing their business.

11) Describe the properties of transition state analogs and substrates.

12) Know the effect of a suicide inhibitor and its means of acting on an enzyme

13) Understand the basic concepts behind regulation of enzymes