**Enzyme Kinetics and Inhibition**

**7.1: Explain why an enzyme’s activity varies with the substrate concentration.**

* Describe how an enzyme’s activity is measured.

measurement of reaction velocity

velocity vs. [enzyme]

velocity vs. [substrate]

* Depict enzyme saturation in graphical form.

**7.2: Use the Michaelis-Menten equation to describe enzyme behavior.**

* Distinguish first order and second order reactions. (calc. 7.1)

first order velocity

second order velocity

* Describe the changes in the concentrations of S, P, ET, and ES during the course of an enzyme-catalyzed reaction. (calc. 7.2)



steady state equilibrium

d[ES]/dt = 0

dissociation/association



* Define *K*M and *k*cat.

expression of rate constants

estimation of affinity

catalytic constant

catalytic efficiency

* Derive the values of *K*M and *V*max from graphical data. (calc. 7.3)



multisubstrate reactions

multistep reactions

nonhyperbolic reactions

**7.3: Distinguish the effects of different types of enzyme inhibitors.**

* Compare the action of reversible and irreversible inhibitors.

suicide inhibitors

reversible inhibition

* Describe the effects of competitive, noncompetitive, mixed, and uncompetitive inhibitors on a reaction’s *K*M and *V*max.

competitive inhibition

noncompetitive inhibition

mixed inhibition

uncompetitive inhibition

LB inhibitor plots

* Express inhibitor strength in terms of a *K*I value. (calc. 7.4)

⍺ = degree of inhibition

*K*I = inhibition constant

⍺ = 1 + [I]/ *K*I

transition state analogs

allosteric enzymes

regulation of enzyme activity