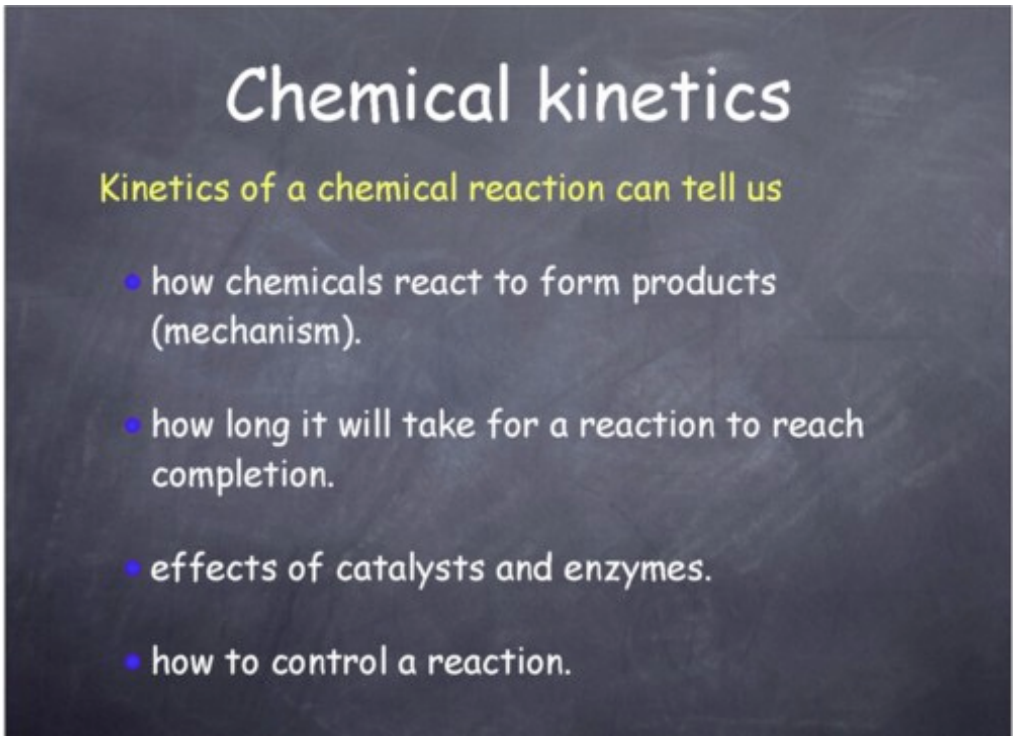
BME 225 – Oct 6, 2008
Protein Function in Biology and Bioinformatics
http://www.soe.ucsc.edu/classes/bme225/Fall08/

Enzymes, the Very Basics

(prep/recap for Guest Lecture by Ted Holman on Oct 8)

• Accompanying reading:
Lesk "Protein Science - Architecture, Function & Genomics": pp 188-191
Petsko & Ringe "Protein Structure and Function": 2-6 - 2-16
+ WWW- lecture resource (most slides): http://ull.chemistry.uakron.edu/genobc/



Chemical kinetics

The study of reactions as a function of time.

ΔG

Only tells us if a reaction will occur but not how long it will take.

Kinetics

Measures the time required for areaction to occur.

Example - Diamonds

Less stable than graphite but very slow kinetics.

Factors that influence reaction rates

Can be affected by

- reactant structure
- concentration of reactants
- temperature
- physical state of reactants
- presence of a catalyst

Can be used to describe an **equilibrium**

- process that is established when the rate of the forward reaction is equal to the reverse reaction.

Effective collisions

For reactants to make products

- They must collide.
- The energy of collision must be greater than the bond energy between the atoms

Activation Energy

The minimum amount of energy required to produce a chemical reaction.

Catalysis

Catalyst

A substance that changes the rate of a reaction without being used in the reaction.

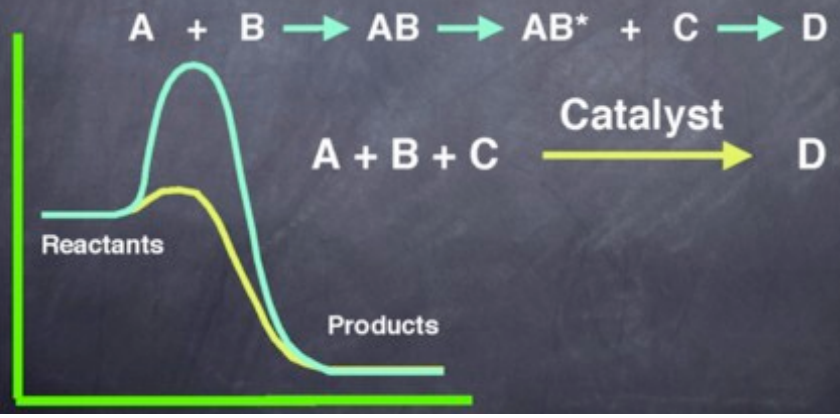
- Provides an easier way to react.
- Lower activation energy.
- Still make the same products.
- Enzymes are biological catalysts.

Inhibitor

A substance that decreases the rate of reaction.

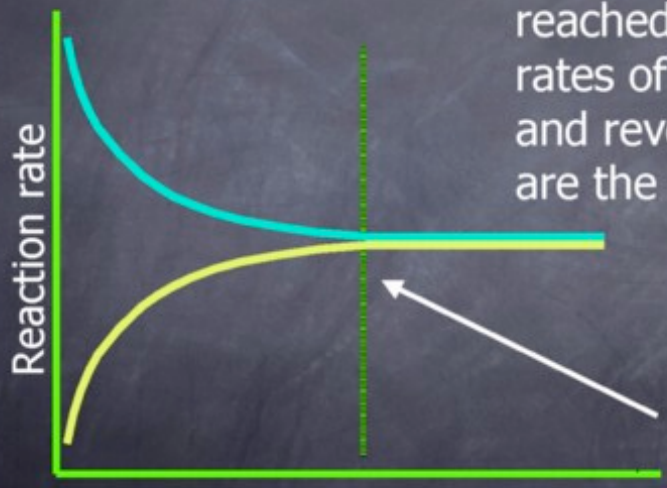
Catalysts

All that matters is that the reaction goes from the reactants to the products. It does not matter how you get there.

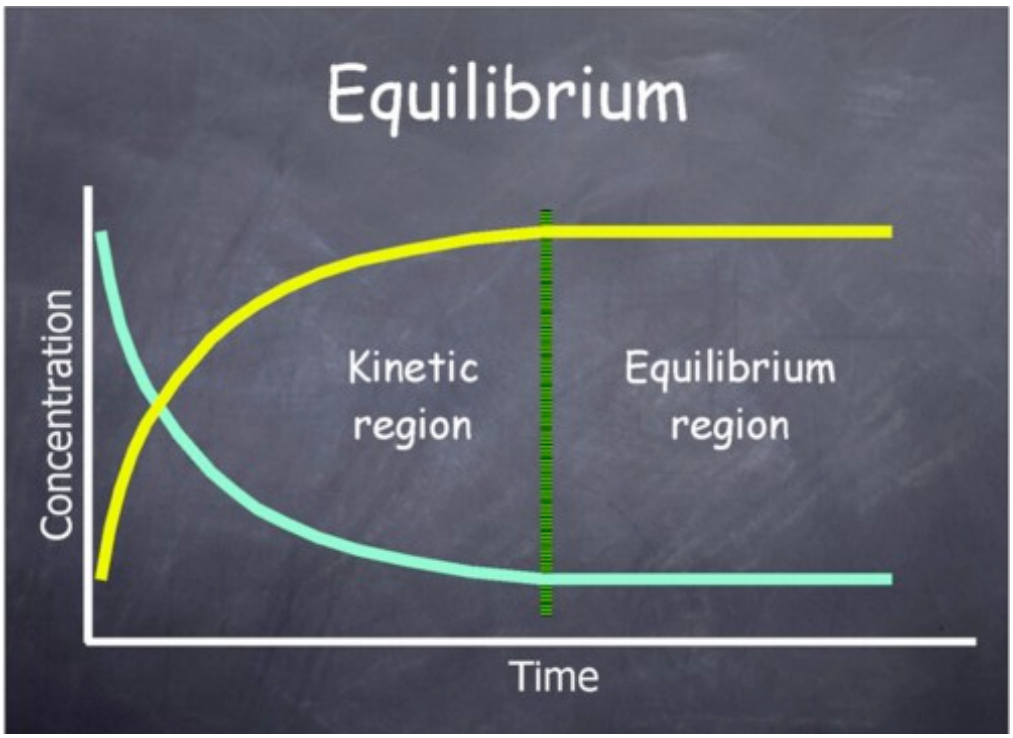


Equilibrium and reaction rates

A point is ultimately reached where the rates of the forward and reverse reactions are the same.



At this point, equilibrium is achieved.


Equilibrium
Concentration
Kinetic region
Equilibrium region
Time