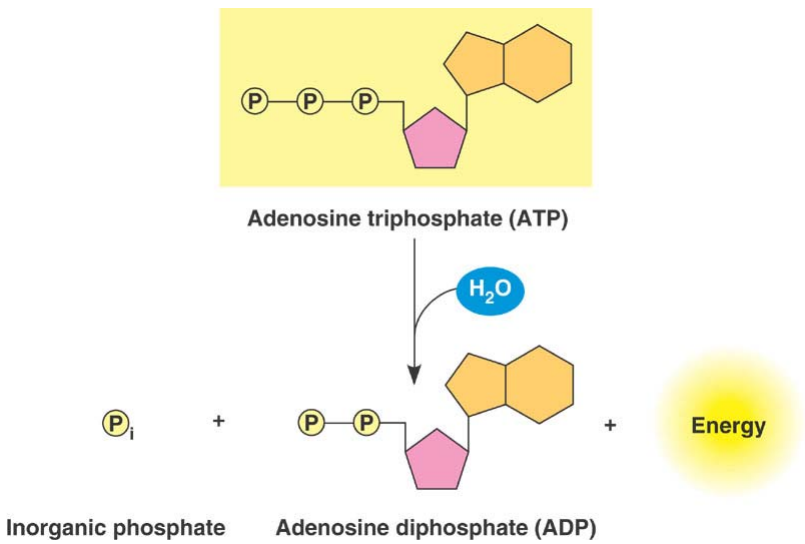
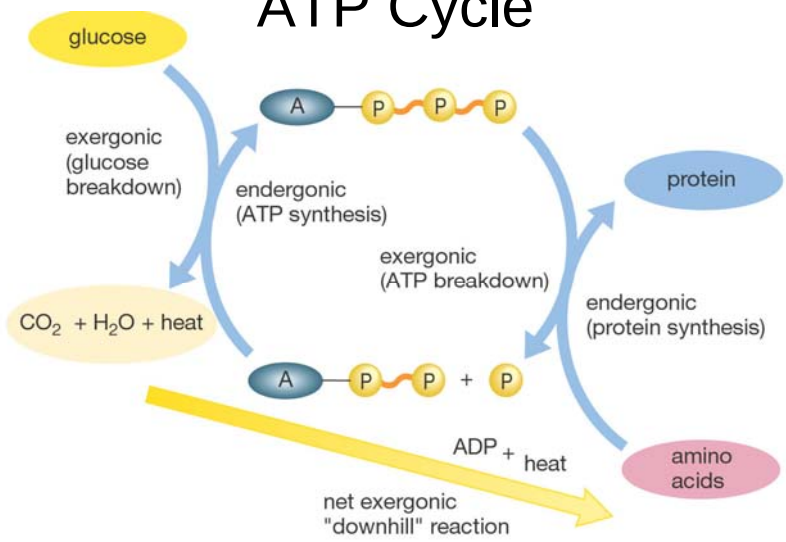
Chapter 5b

- ATP Energy Carrier
- NAD Electron Carriers
- Enzymes
  - Mechanism
  - Three Traits
    - Specificity
    - Coupling Reactions
    - Regulation
- Metabolic Pathways
- Overview of Energy Metabolism

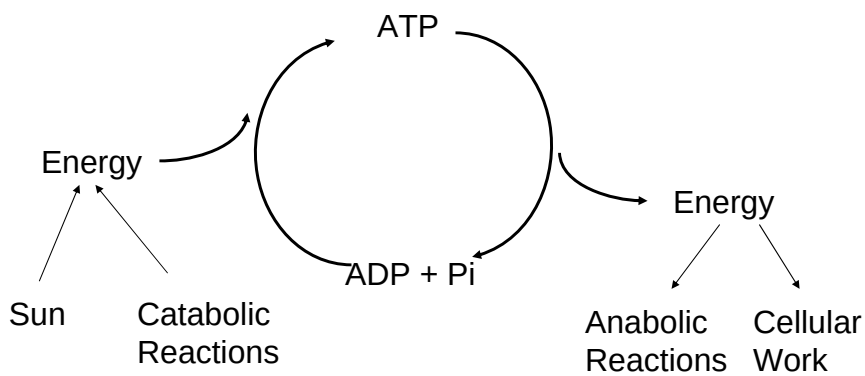
ATP Hydrolysis

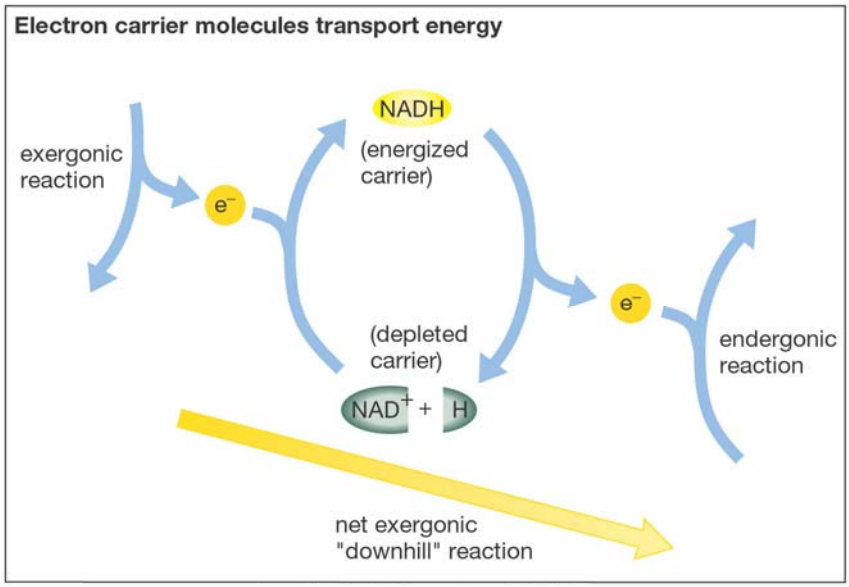


ATP Cycle



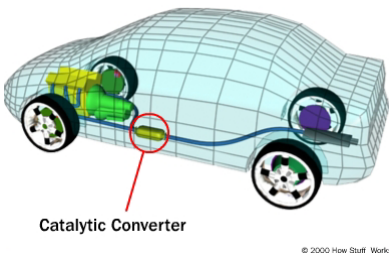
ATP Cycle

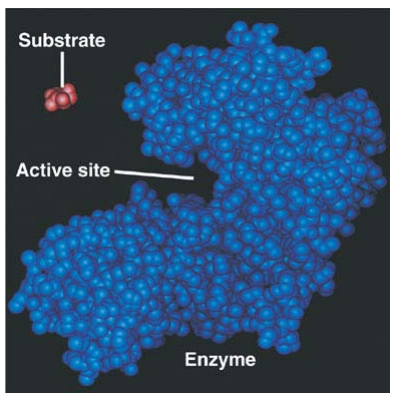




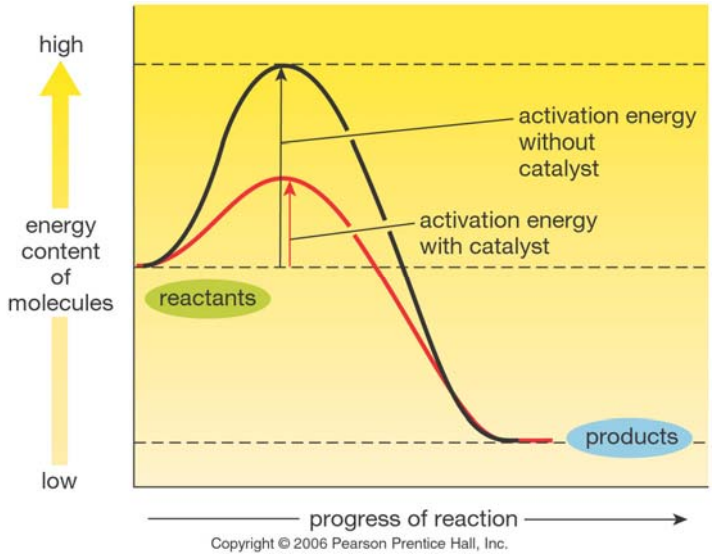
Enzyme Catalyst

- All catalyst speedup chemical reactions.
- Enzymes are biological catalyst made of protein

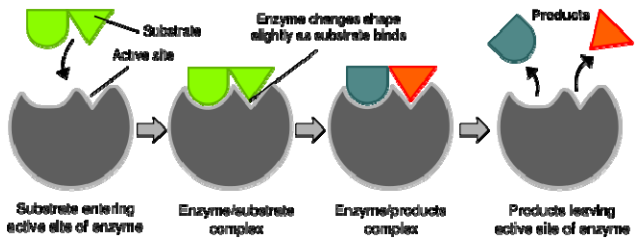


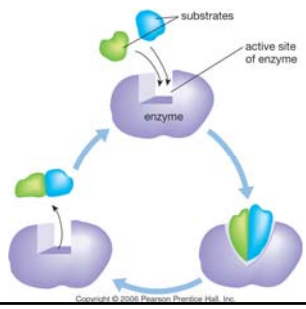


Enzymes and Activation Energy



Enzyme Active Sites

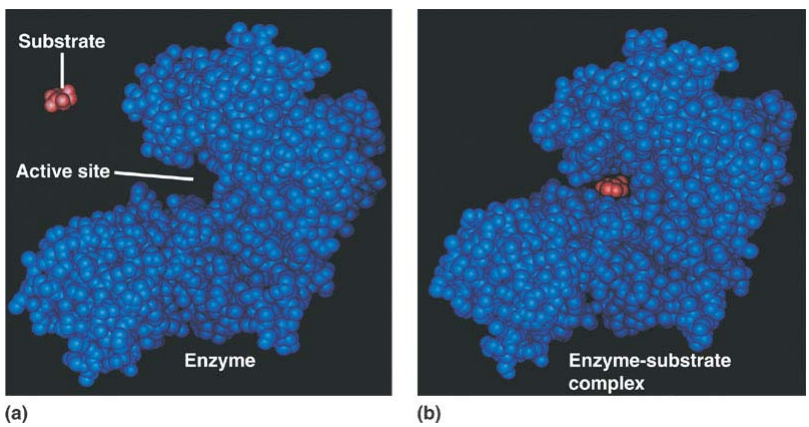




Special Traits of Enzymes

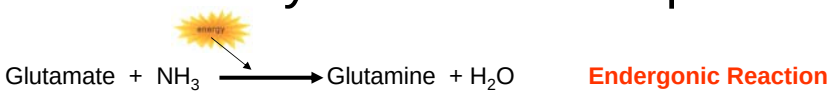
- Enzyme Specificity
- Coupling Exergonic and Endogonic Reactions
- Regulation of Enzyme Activity

Substrate Specificity

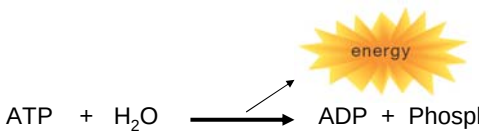


Due to shape of active site

Coupling Reactions
Glutamine Synthetase Example

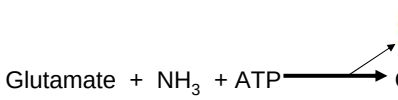


Endergonic Reaction



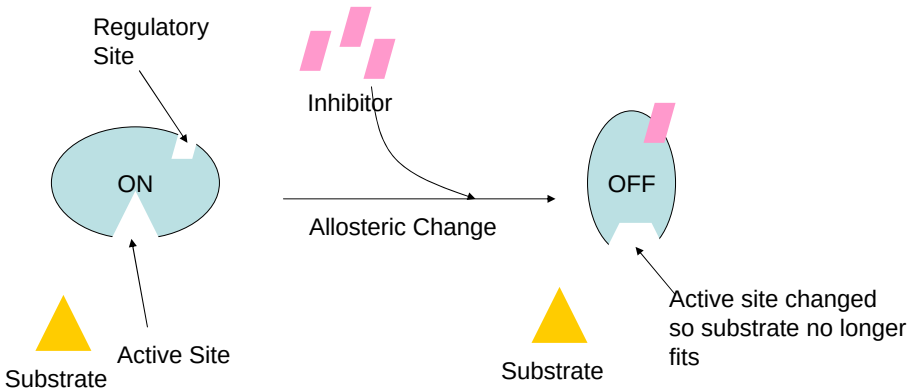
Exergonic Reaction

Enzyme: Glutamate Synthetase – has an active site that binds ATP, H_2O, NH_3 and Glutamate

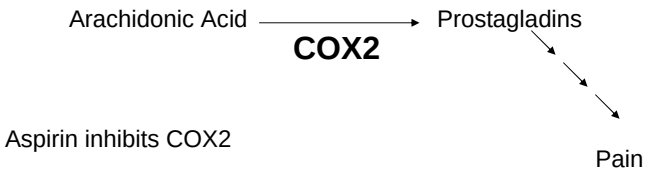


Exergonic Reaction

Enzyme Regulation
Enzymes can be turned off.



Many drugs are inhibitors
Cox2 Inhibitors

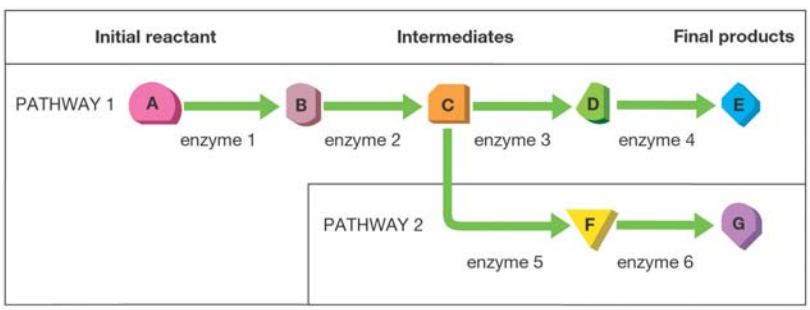


Aspirin inhibits COX2

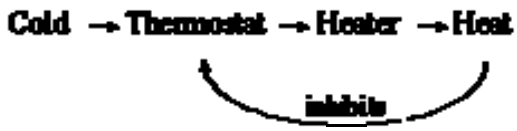
Other Drugs

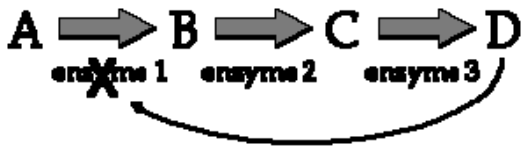
- Lipitor blocks a liver enzyme that makes cholesterol
- Viagra blocks phosphodiesterase which destroys cGMP
- AZT blocks the reverse transcriptase of HIV virus

Metabolic Pathways



Feedback Inhibition





Overview of Energy Metabolism