Notes: 11/6

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9:56 AM

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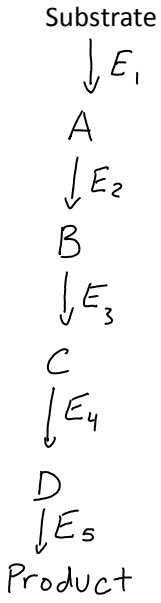
Bring photo ID to midterm.

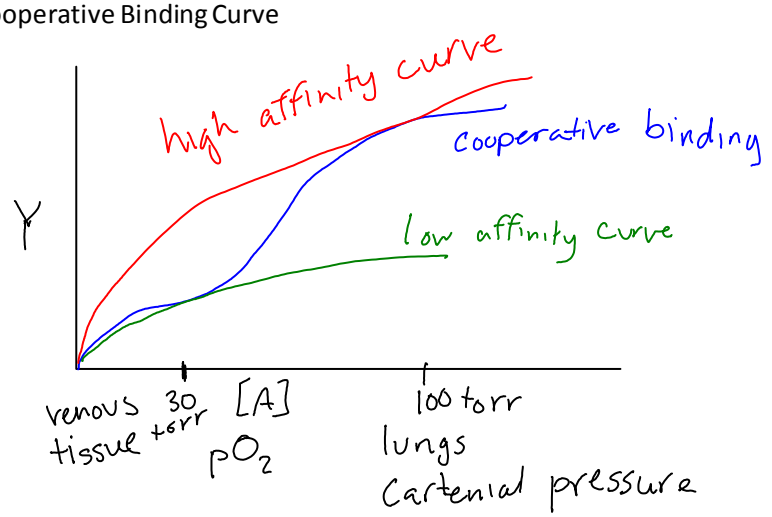
- Regulatory Enzymes
  - Example: serine proteases
    - Proteolytic cleavage (covalent)
  - Allosteric enzymes
    - Undergo a conformation changes in response to modulator binding.
    - Catalyze regulatory steps in many pathways
    - Kinetic properties diverge from M-M behavior
  - Metabolic pathway
    - Groups of enzymes work as teams
    - Enzyme team carries out a metabolic process in sequential pathway.
    - The reaction product of the 1st enzyme becomes the substrate of the next reaction and so on.
    - At least one enzyme catalyzes the slowest reaction (regulatory enzyme)
  - Regulatory Enzyme
    - Catalyzes the slowest reaction
    - Increase or decrease its activity in response to certain stimulus
    - Usually 1st enzyme of pathway (saves resources when 1st is regulated)



  - 2 major classes of regulatory enzymes
    - Those enzymes affected by reversible covalent modification

        - Example: methylation
        - Modification may be all or none
    - Those affected by binding of a reversible non-covalent binding compounds.
        - Permits fine-tuning of metabolic pathways
        - Allosteric enzymes
            - Bind regulatory compounds called allosteric modulator

- Allosteric Protein
    - A protein that undergoes a conformational change induced by the binding of a ligand (modulators)
    - Example of allosteric protein: hemoglobin
    - 2 different types:
        - Homotropic interaction - normal ligand + modulator are identical
            - Example: oxygen to hemoglobin
        - Heterotropic interaction - the normal ligand and the modulator are different
            - BPG doesn't bind on heme group… it binds elsewhere on hemoglobin
            - Heterotropic modulators of Hb
                - BPG, CO_2, H^+, + Cl^- (negative heterotropic modulators)
    - Cooperative Binding Curve

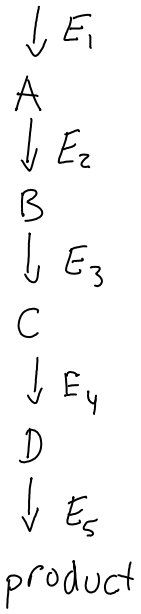


    - Sigmoidal binding: hybrid reflects a transition from low afinity state to high affinity state

- Back to Allosteric Enzymes
    - Conformational change in response to a modulator
    - Don't confuse with uncompetitive or mixed inhibitors with allosteric modulators because kinetic effects are different
    - Characterists of allosteric enzymes
        - One of more allosteric sites (aka regulatry site) for binding modulator
        - Homotropic enzyme - active site and regulatory site are the same.
        - Heterotropic enzyme - active site and regulatory site are different
        - Generally large + oligomeric
        - Catalyze regulatory steps

- Allosteric Feedback Inhibition

Substrate



- Kinetic Properties of Allosteric Enzymes
  - Diverged from Mechalis-Mintin behavior

M-M kinetics	Sigmoid Kinetics
Hyperbolic curve	Sigmoidal curve
K_m	$K_{0.5}$ (aka $[S]_{0.5}$)