

Enzymes & Kinetics IV

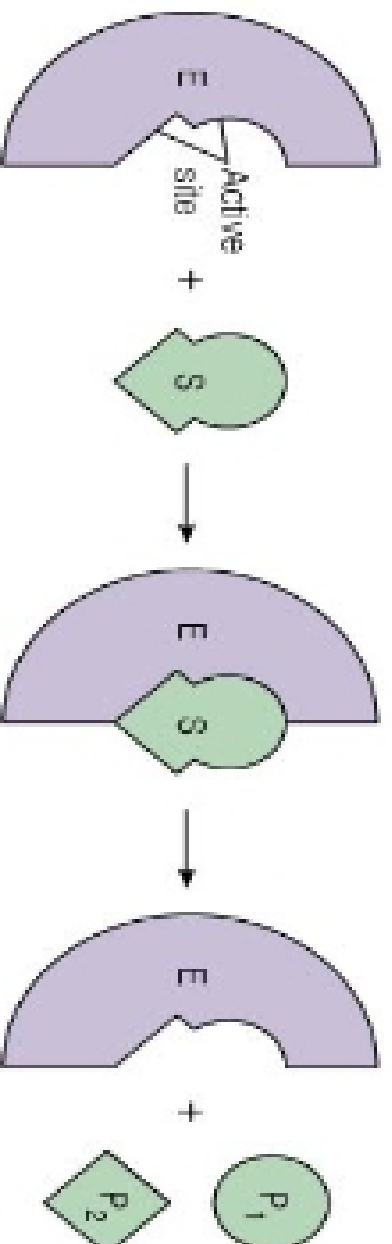
Regulation and Allostery

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ENZYME-SUBSTRATE INTERACTIONS

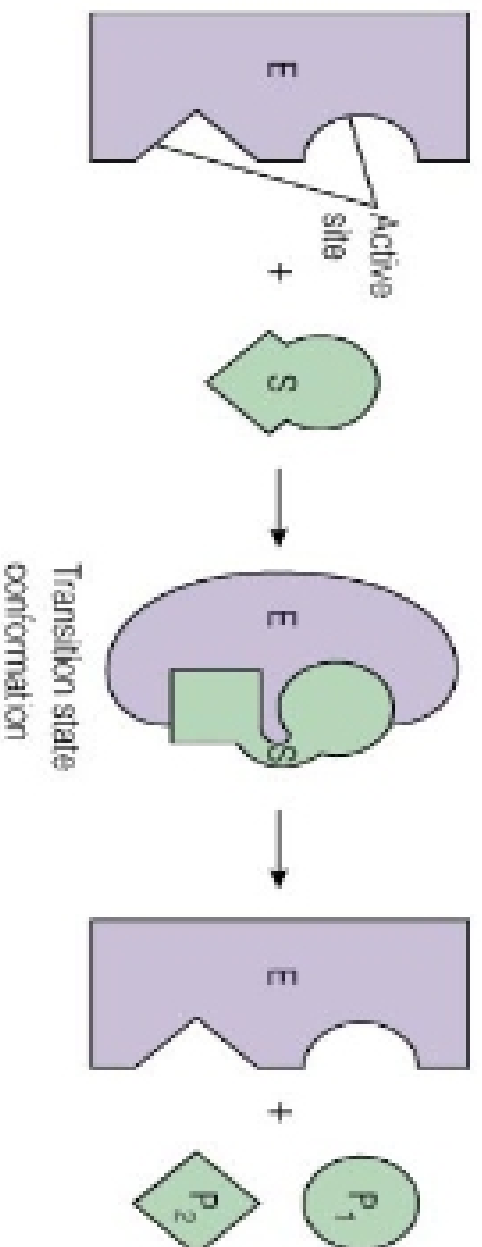
THE LOCK & KEY MODEL



A perfect match between enzyme and substrate can explain enzyme specificity
does not explain enzymatic catalysis

ENZYME-SUBSTRATE INTERACTIONS

THE INDUCED FIT MODEL



KEY FEATURES:

ENZYME STRUCTURE CHANGES IN PRESENCE OF SUBSTRATE

--- BRINGS CATALYTIC GROUPS INTO CORRECT POSITION TO DO CHEMISTRY

---SUBSTRATE IS FORCED INTO TRANSITION STATE CONFORMATION

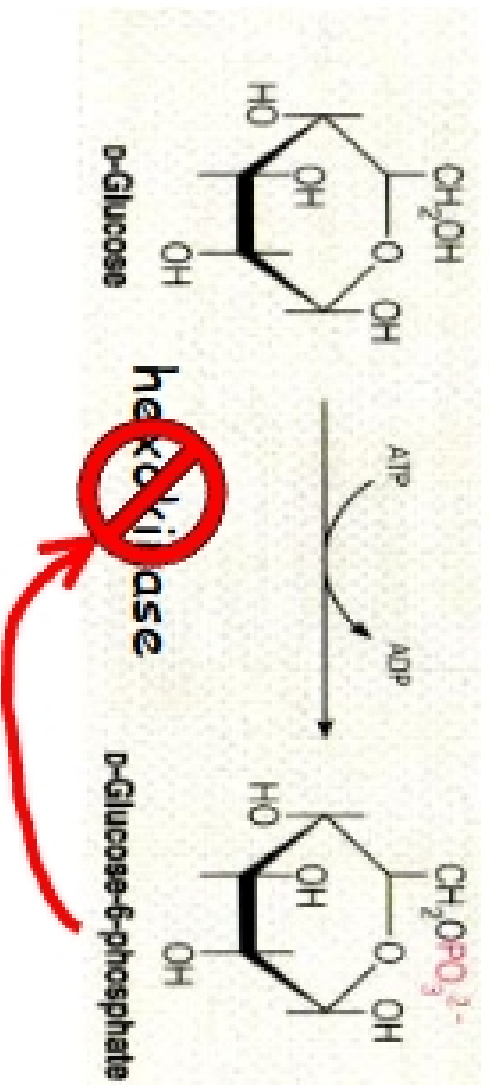
GENERAL THOUGHTS ON REGULATION

- 1). Enzymes slow down as product accumulates
- 2). Availability of substrates (and cofactors) determines reaction rate
- 3). Enzymes are controlled at the level of DNA
- 4). Many enzymes are regulated via reversible covalent modification
- 5). Many enzymes regulated via non-covalent interactions with small molecules

REGULATION OF ENZYME ACTIVITY?

How does the cell know when "enough is enough"?

First step in glycolysis:

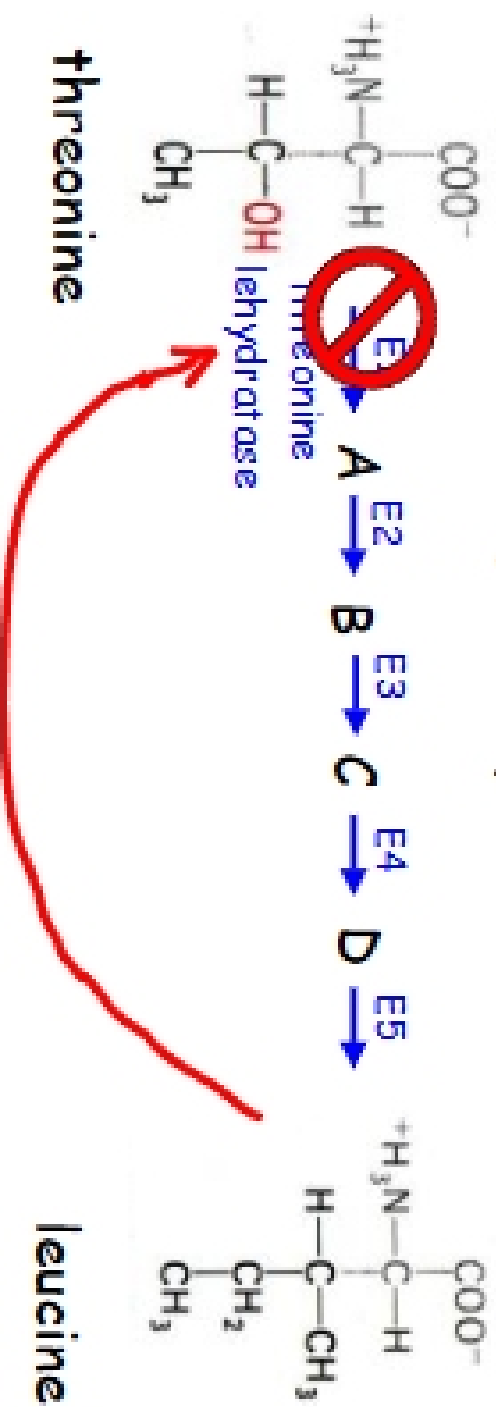


Substrate-level control

BIOC 205

REGULATION OF ENZYME ACTIVITY?

Problem: Most metabolic pathways involve many enzymes that act sequentially



Feedback inhibition: the end product of the pathway binds to, and inhibits a regulatory enzyme on the pathway.

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