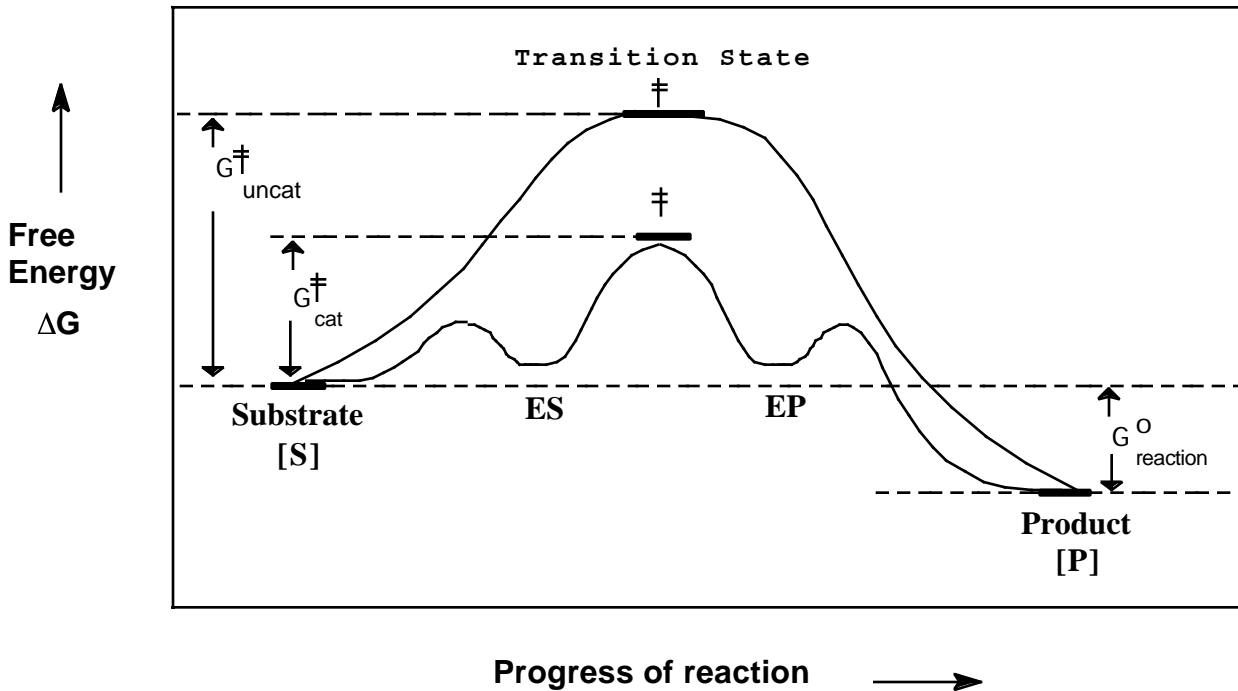


ENZYMES AS CATALYSTS



1) **Catalytic Power** speed up rate of reaction over uncatalyzed by $10^6 - 10^{12}$

$$\frac{\text{catalyzed rate}}{\text{uncatalyzed rate}} = e^{(G^{\ddagger}_{\text{uncat}} - G^{\ddagger}_{\text{cat}})/RT}$$

2) **Substrate Specificity** lock and key model; induced fit model

molecular recognition through structural complementarity
(size, stereochemistry, non-covalent interactions)

3) **Regulation** amount of enzyme synthesized (induction, repression)

positive and negative modulators (activators, inhibitors)

covalent control (one enzyme controls another)

product/substrate ratio (mass action)

multiple forms (isozymes)