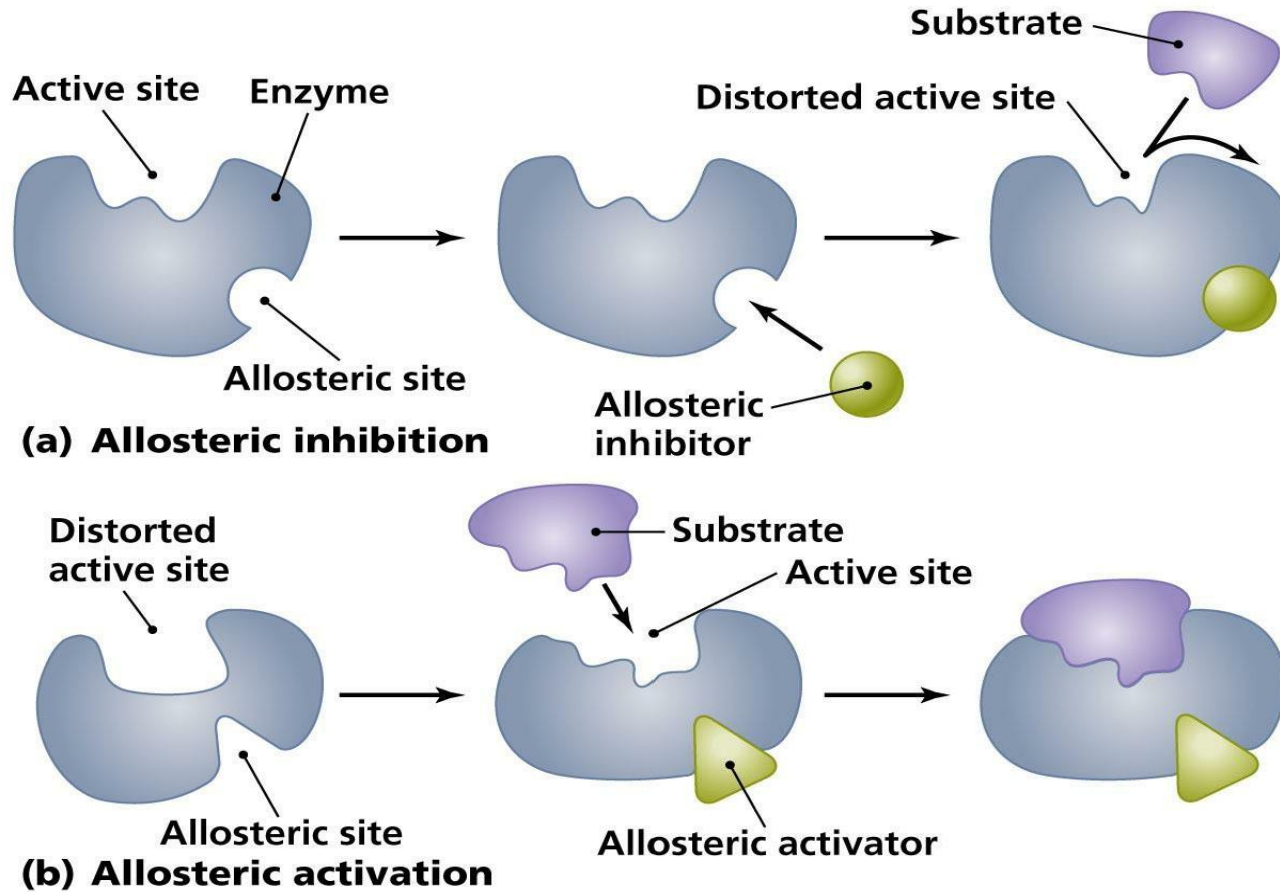


ENZYMES

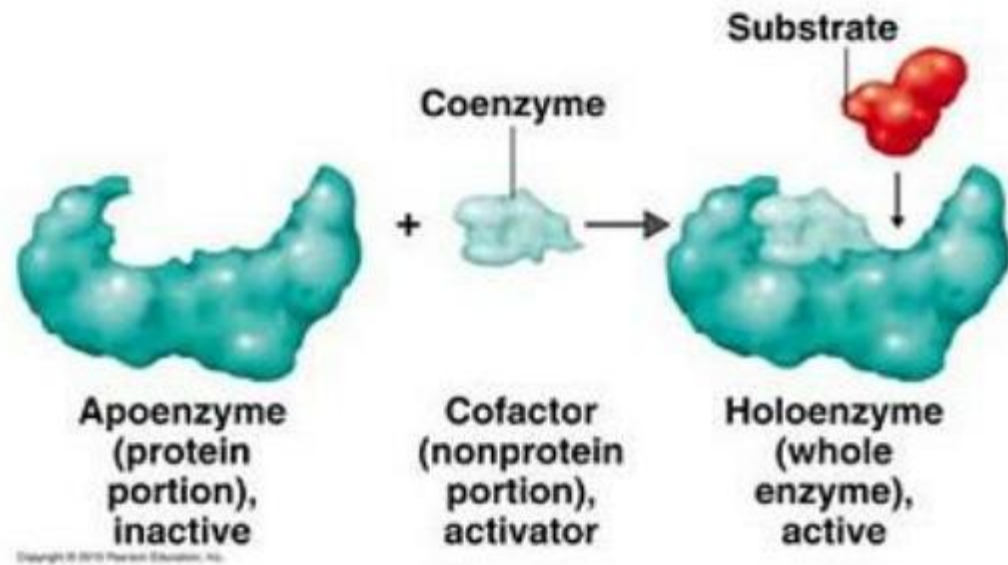
- DEFINITION : Enzymes are proteneous biocatalyst (except ribozyme) which work by lowering the activation energy and remain unchanged after reaction.
- PROPERTIES OF ENZYME :
- Enzymes are protein in nature except ribozymes
- Enzymes are highly specific .They are specialized protein and have high degree of specificity for their substrate.
- Enzyme exhibit enormous catalytic power. It increases the rate of a reaction by lowering the activation energy

ENZYME STRUCTURE



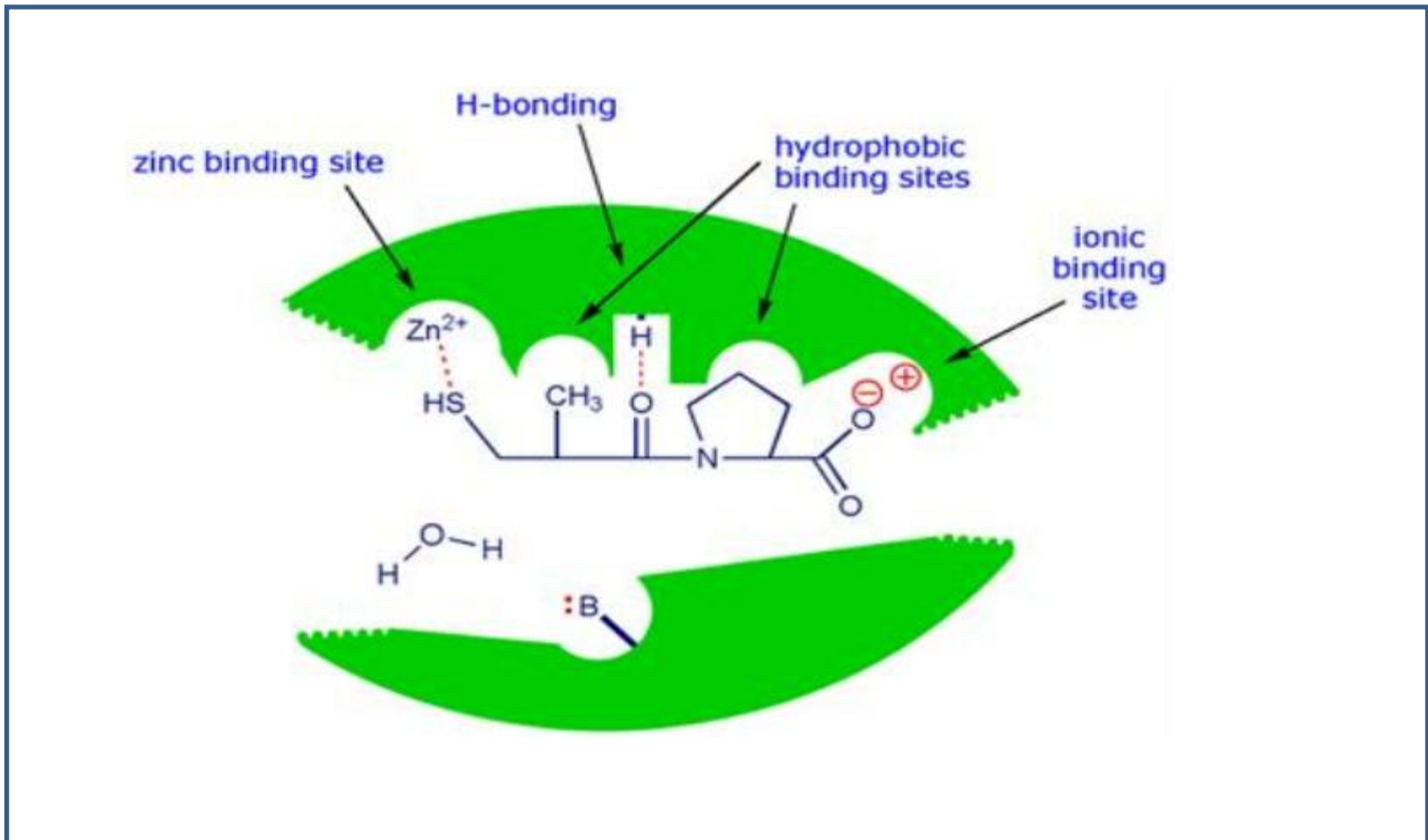
TERMS

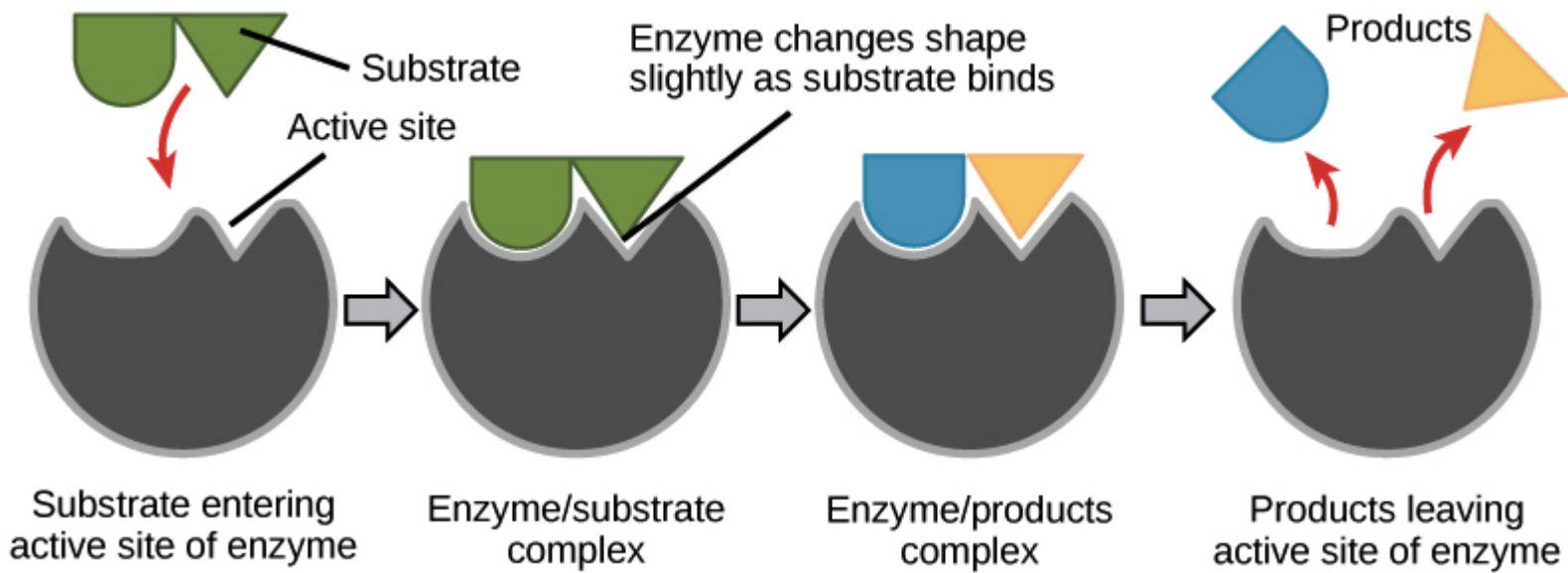
- APOENZYME
- COFACTOR,
- HOLOENZYME
- PROSTHETIC GROUP



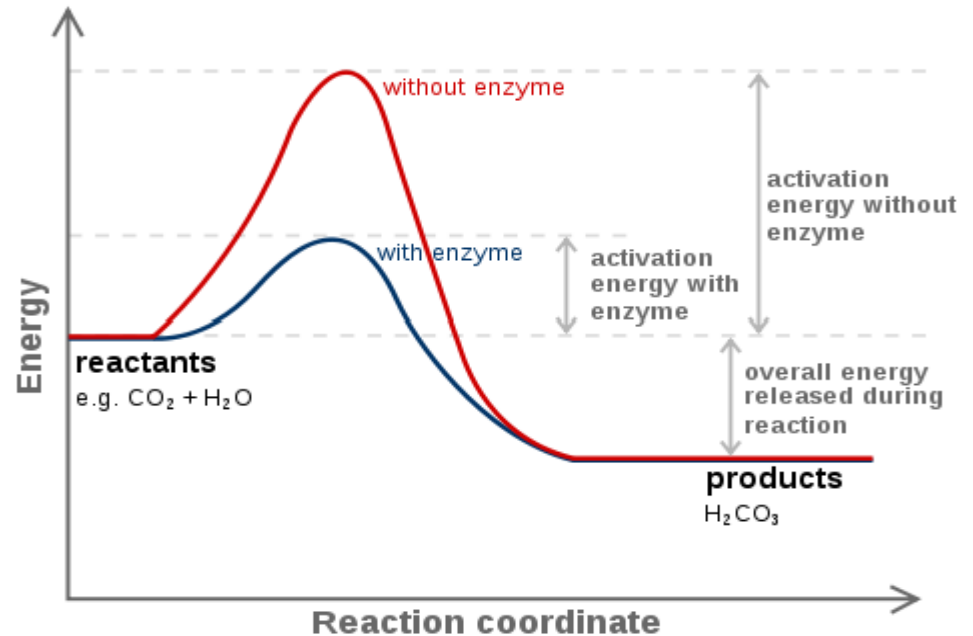
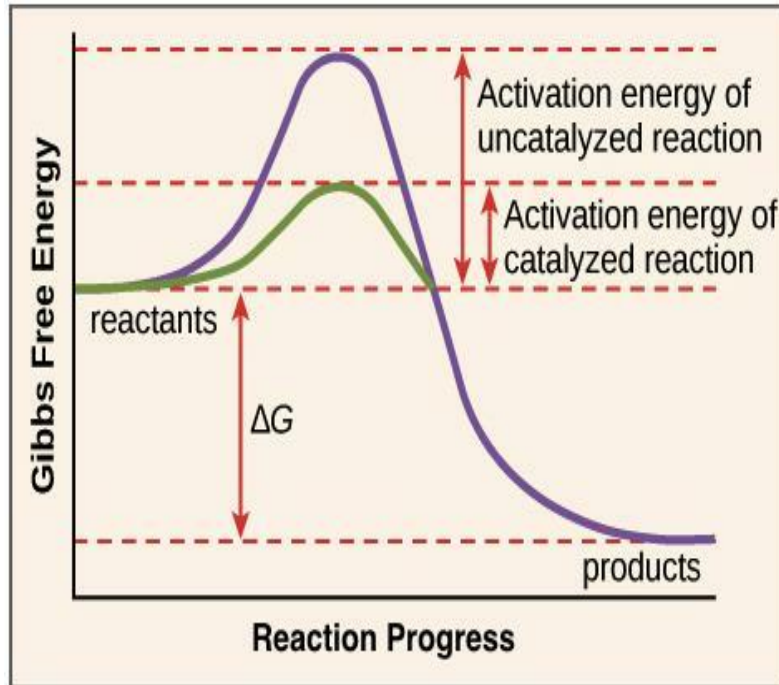
- The binding energy released due to the interaction between enzyme and substrate lowers the activation energy.
- Only the correct substrate can form maximum interactions with the enzyme and thus maximized binding energy .
- Furthermore, the full complement of such interactions is formed only when the enzyme facilitates the formation of transition state.
- Transition state is the point of highest free energy.

Different bonds at the active site of an enzyme with substrate



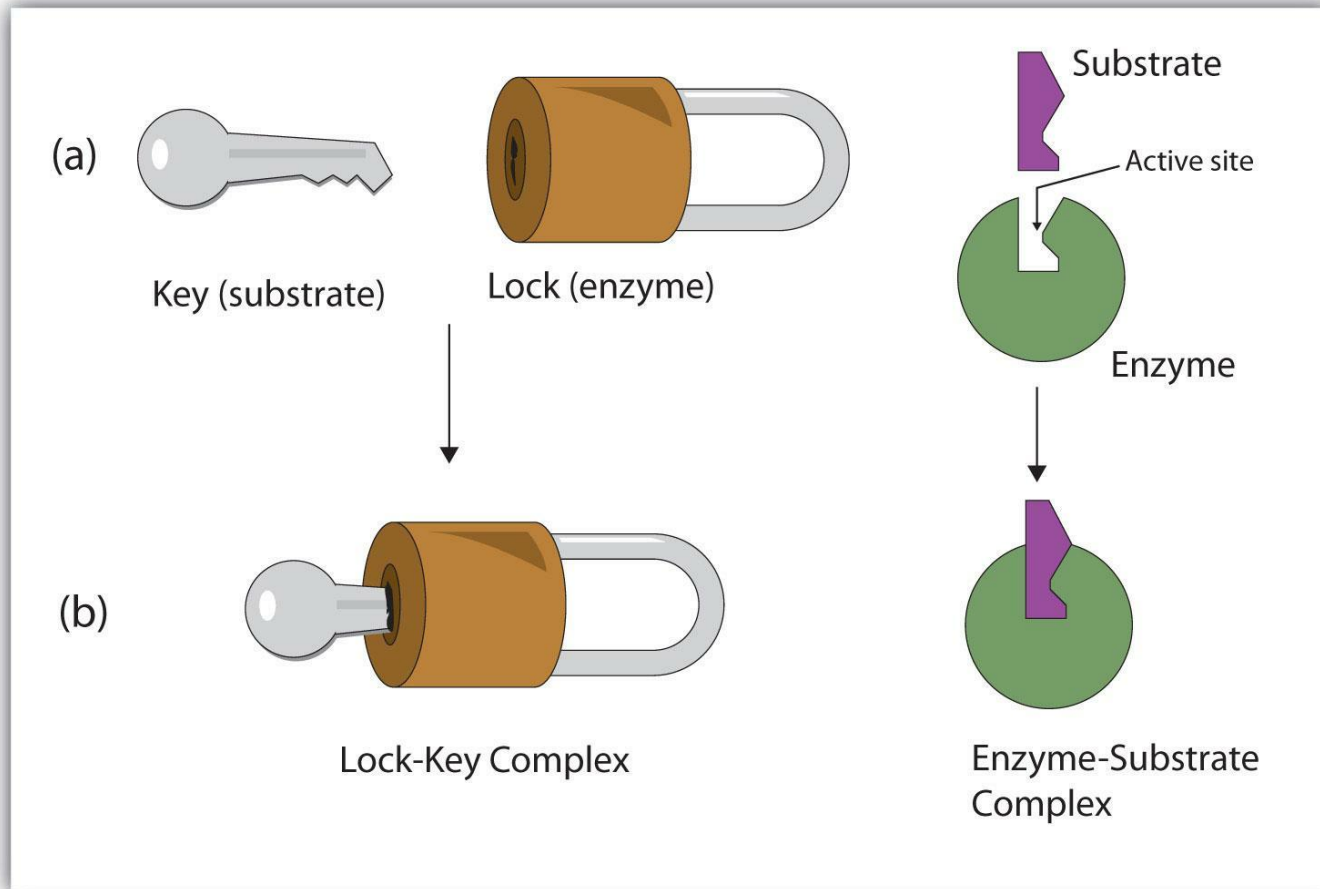


HOW enzyme work?

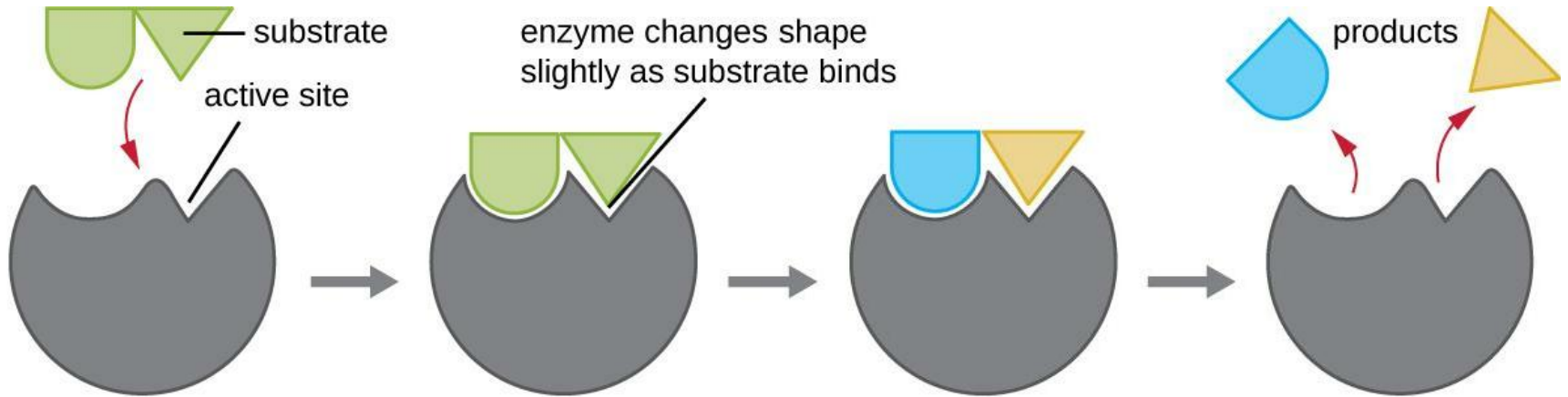


An enzyme accelerates the rate of a chemical reaction several times as compared to uncatalyzed reaction in water. It increases the rate of a chemical reaction by lowering the activation energy.

model of enzyme action



INDUCED FIT MODEL



1 Substrate enters active site of enzyme.

2 Enzyme/substrate complex forms.

3 Substrate is converted to products.

4 Products leave the active site of the enzyme.

ENZYME KINETICS

- Enzyme inhibition : a. competitive
- b. Non competitive
- c. uncompetitive.



Determination of v_{max} , K_m

Michaelis-Menten Curve

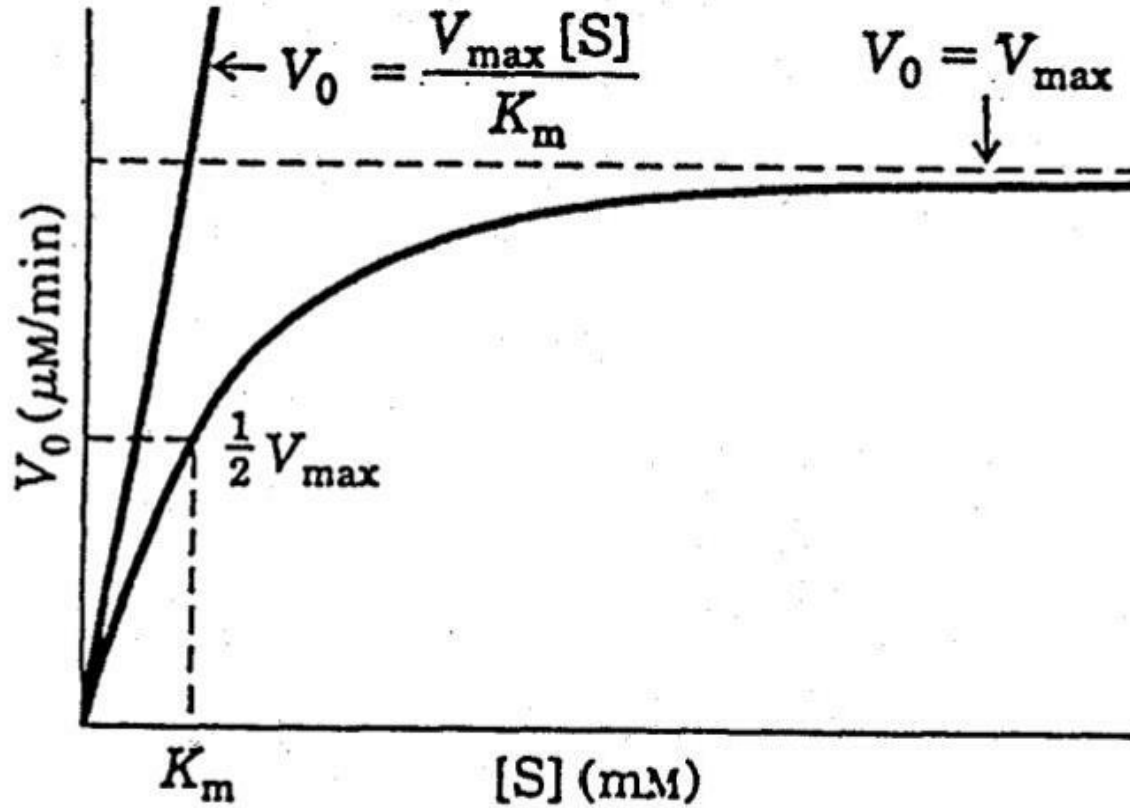
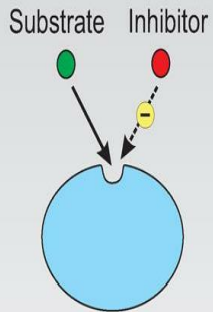
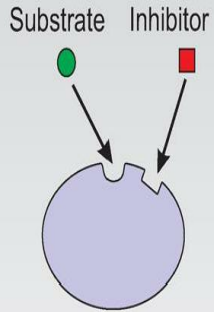


Diagram of the inhibition

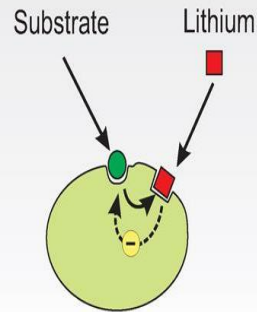
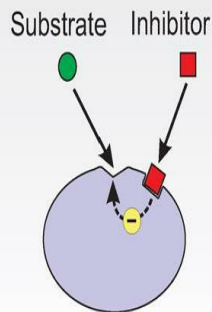
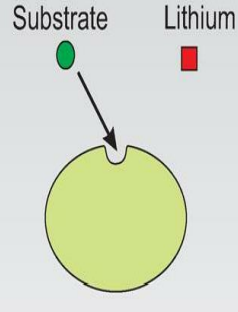
COMPETITIVE INHIBITION



NON-COMPETITIVE INHIBITION



UNCOMPETITIVE INHIBITION



Enzyme Inhibition (Mechanism)

	▶ Competitive	▣ Non-competitive	▣ Uncompetitive
Cartoon Guide	<p>Substrate Inhibitor E Compete for active site</p>	<p>Substrate Inhibitor E Different site</p>	<p>Substrate Inhibitor E ES I</p>
Equation and Description	$E + S \rightleftharpoons ES \rightarrow E + P$ $E + I \rightleftharpoons EI$	$E + S \rightleftharpoons ES \rightarrow E + P$ $E + I \rightleftharpoons EI$ $EI + S \rightleftharpoons EIS$	$E + S \rightleftharpoons ES \rightarrow E + P$ $ES + I \rightleftharpoons ESI$
	[I] binds to free [E] only, and competes with [S]; increasing [S] overcomes inhibition by [I].	[I] binds to free [E] or [ES] complex; increasing [S] can not overcome [I] inhibition.	[I] binds to [ES] complex only, increasing [S] favors the inhibition by [I].

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