Figure 8-13
Lock-and-key model of the interaction of substrates and enzymes. The active site of the unbound enzyme is complementary in shape to that of the substrate.

Figure 8-14
Induced-fit model of the interaction of substrates and enzymes. The enzyme changes shape upon binding substrate. The active site has a shape complementary to that of the substrate only after the substrate is bound.
Enzyme Catalysis

Principles of Transition State Binding

(a) No enzyme

Substrate (metal stick) → Transition state (bent stick) → Products (broken stick)

(b) Enzyme complementary to substrate

Magnets

(c) Enzyme complementary to transition state

Reaction coordinate
Steady-State Kinetics

Saturation Curve

Double-reciprocal Plot.

\[ \text{Slope} = \frac{K_M}{V_{\text{max}}} \]

\[ \text{Intercept} = -\frac{1}{K_M} \]

\[ \text{Intercept} = \frac{1}{V_{\text{max}}} \]

FIGURE 13-9. A double reciprocal (Lineweaver-Burk) plot with error bars of ±0.05 \( V_{\text{max}} \). The indicated points are the same as those in Fig. 13-8. Note the large effect of small errors at small [S] (large \( 1/[S] \)) and the crowding together of points at large [S].