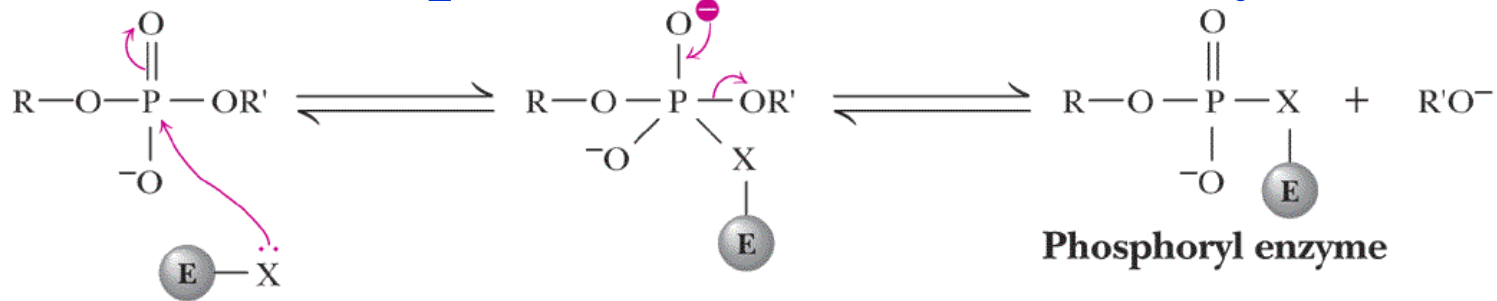


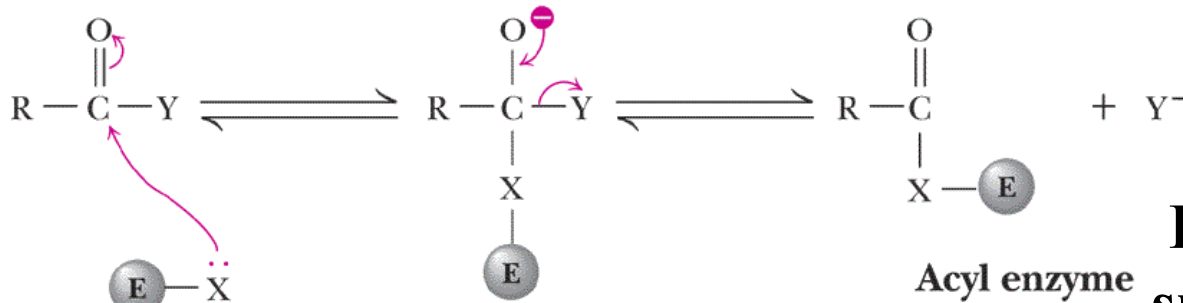
Enzyme Mechanisms

Examples of Covalent Catalysis

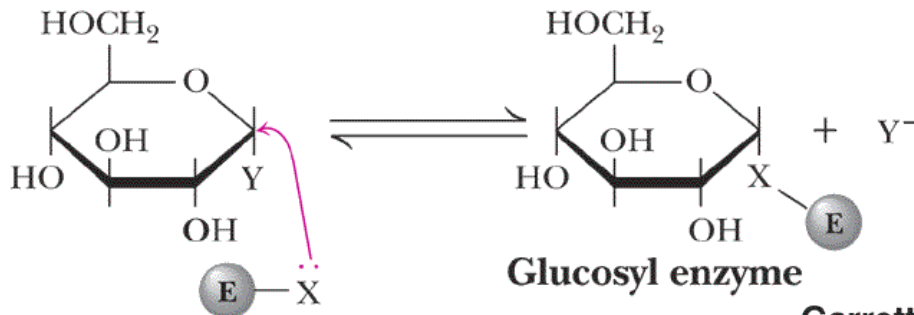
1)



2)



3)



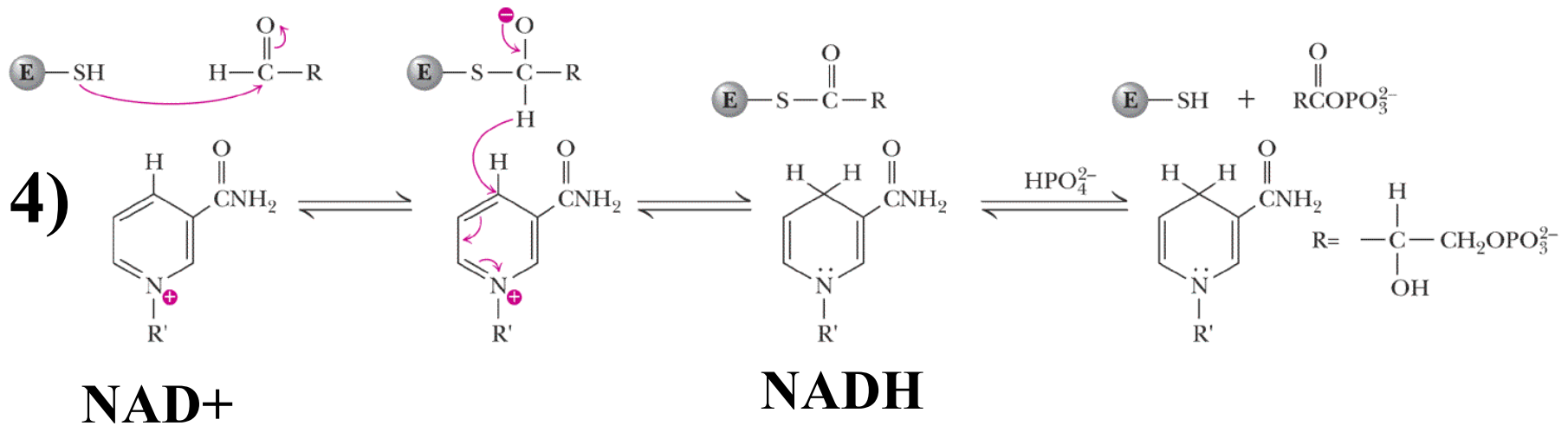
In each case, the substrate becomes covalently bound to the enzyme during catalysis.

Garrett/Grisham, Biochemistry with a Human Focus

Figure 11.7

Examples of Covalent Catalysis

Garrett/Grisham, Biochemistry with a Human Focus
Figure 11.8



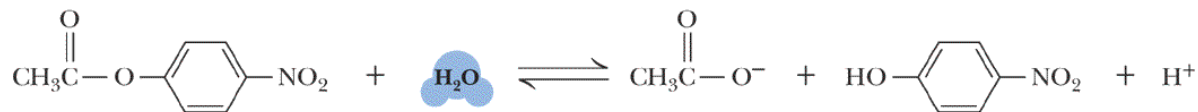
Glyceraldehyde 3-phosphate dehydrogenase reaction

Example of General Acid/Base Catalysis

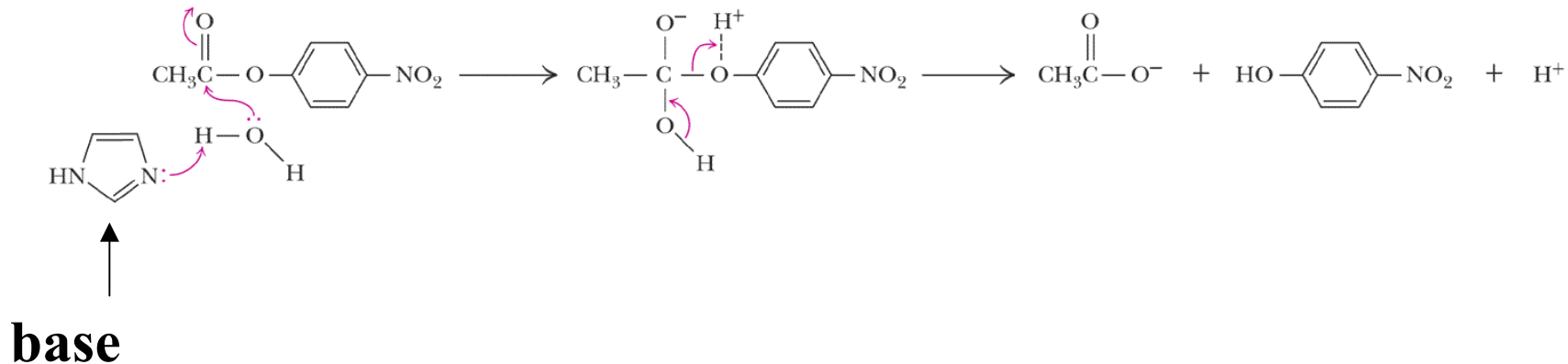
Garrett/Grisham, Biochemistry with a Human Focus
Figure 11.10

General base mechanism

Reaction

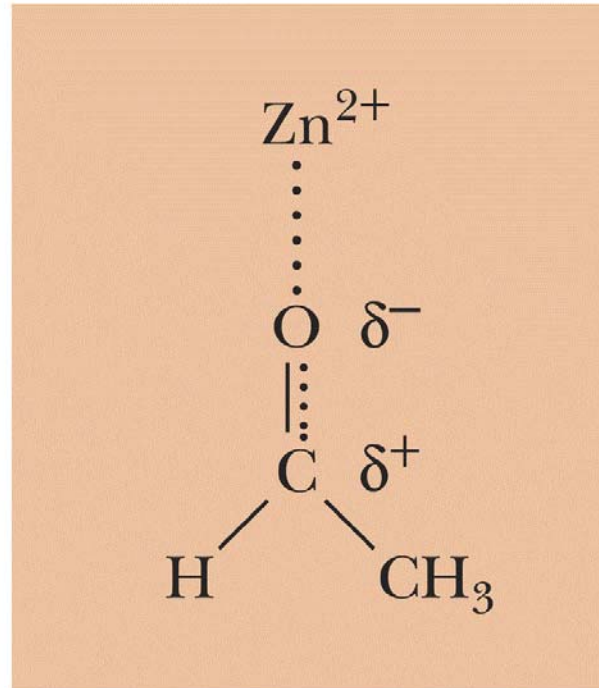


Mechanism



Metal Ion Catalysis

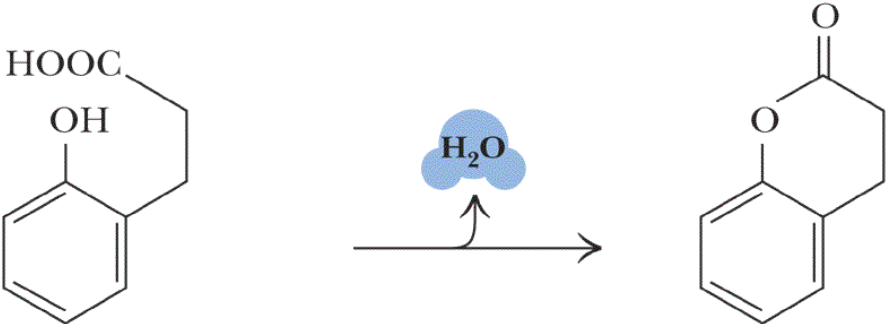
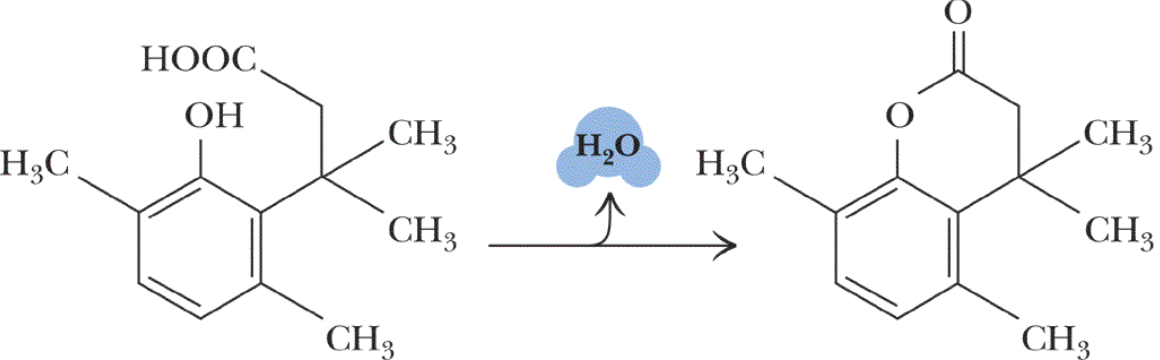
Garrett/Grisham, Biochemistry with a Human Focus
Figure 11.11



Proximity (orientation effects)

Garrett/Grisham, Biochemistry with a Human Focus

Figure 11.12

Reaction	Rate const. ($M^{-1}sec^{-1}$)	Ratio
 <p>The reaction shows salicylic acid (2-hydroxybenzoic acid) reacting with water (H_2O) to form salicylic anhydride. The salicylic acid molecule has a benzene ring with a hydroxyl group (-OH) and a carboxylic acid group (-COOH) in the ortho position. The anhydride product has a benzene ring with an oxygen atom at the ortho position and a carbonyl group (-C(=O)-) at the other ortho position, forming a six-membered cyclic anhydride ring.</p>	5.9×10^{-6}	
 <p>The reaction shows 2,4,6-trimethylsalicylic acid reacting with water (H_2O) to form its corresponding anhydride. The starting material has a benzene ring with a hydroxyl group (-OH) and a carboxylic acid group (-COOH) in the ortho position, and three methyl groups (-CH₃) at the 2, 4, and 6 positions. The anhydride product has a benzene ring with an oxygen atom at the ortho position and a carbonyl group (-C(=O)-) at the other ortho position, and three methyl groups (-CH₃) at the 2, 4, and 6 positions.</p>	1.5×10^6	2.5×10^{11}