

Introduction to Enzymes

Pasteur (1880)

Buchner (1896)

Sumner (1926)

Catalyst

Enzyme

Composition

Nomenclature: -ase

Transition-state

Mechanisms

1. "Concentration"

2. Position

3. Strain

4. Acid-base chemistry

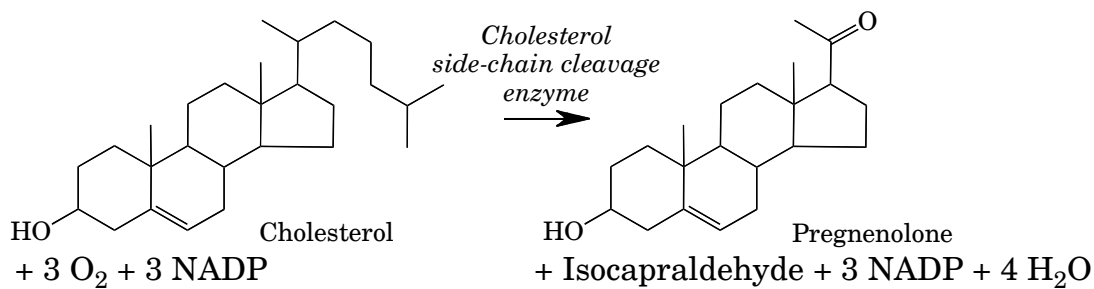
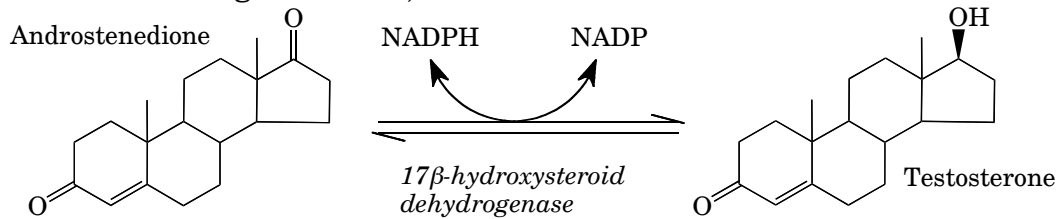
5. Charge stabilization

6. Covalent interactions

International classification of enzymes

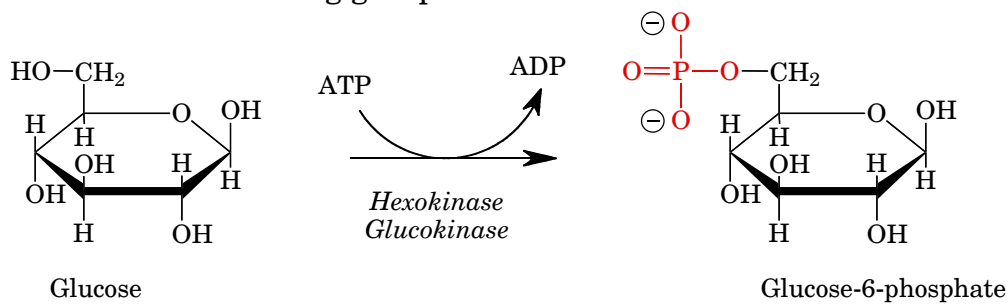
1. Oxidoreductases (oxidation-reduction reactions)

- 1.1 Acting on CH-OH
- 1.2 Acting on C=O
- 1.3 Acting on HC=CH
- 1.4 Acting on CH-NH₂
- 1.5 Acting on CH-NH-
- 1.6 Acting on NADH; NADPH



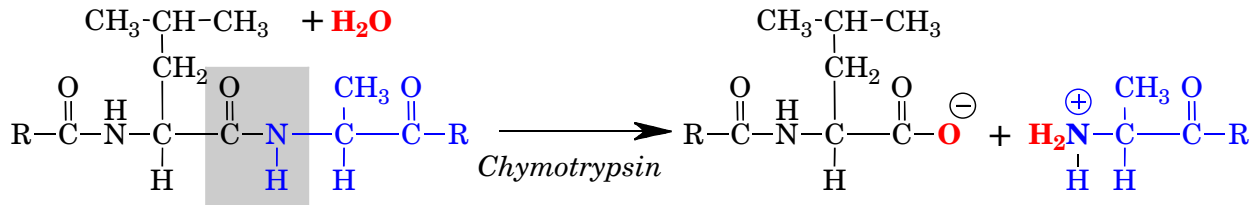
2. Transferases (transfer of functional groups)

- 2.1 One-carbon groups
- 2.2 Aldehydic or ketonic groups
- 2.3 Acyl groups
- 2.7 Phosphate groups
- 2.8 S-containing groups



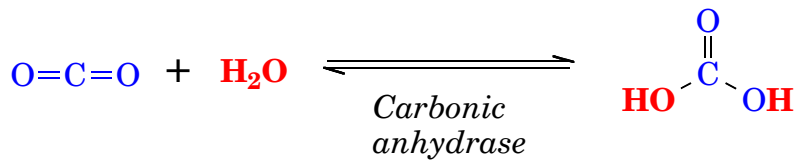
3. Hydrolases (hydrolysis reactions)

- 3.1 Esters
- 3.2 Glycosidic bonds
- 3.4 Peptide bonds
- 3.5 Other C-N bonds
- 3.6 Acid anhydrides



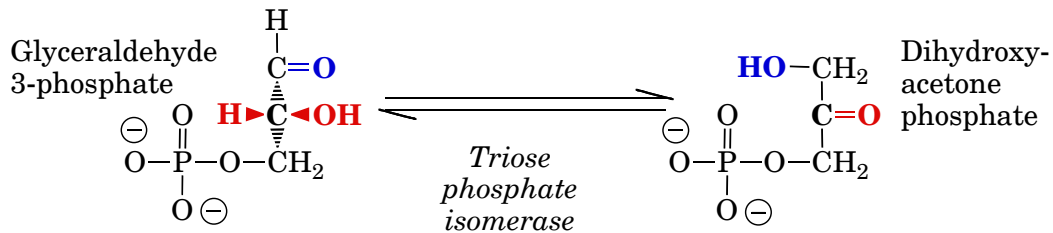
4. Lyases (addition to double bonds)

- 4.1 C=C
- 4.2 C=O
- 4.3 C=N



5. Isomerases

- 5.1 Racemases
- 5.2 *cis-trans* isomerases
- 5.3 Intramolecular oxidoreductases
- 5.4 Mutases (intramolecular transferases)
- 5.5 Intramolecular lyases



6. Ligases (formation of bonds with ATP cleavage)

- 6.1 C-O
- 6.2 C-S
- 6.3 C-N
- 6.4 C-C

