

Biological Chemistry I

I Explain how the following knowledge about proteins has been (or can be) experimentally provided.

- (1) The native three-dimensional structure of a protein is determined by its amino acid sequence.
- (2) During the folding process, a protein can experience a conformational state characterized by native-like secondary structure but disrupted tertiary structure.
- (3) Substrate recognition by an enzyme is not always depicted as a lock-and-key model, but rather its active site undergoes conformational change to fit to the substrate.
- (4) F_1 -ATPase, a portion of ATP synthase, functions as a molecular motor showing unidirectional rotation.

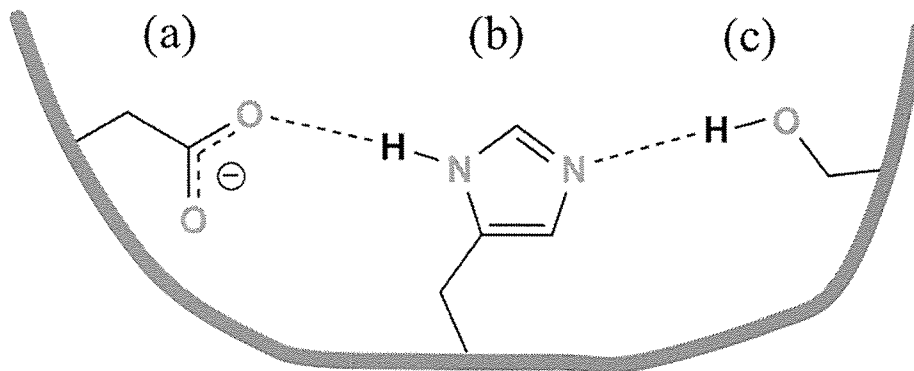
Biological Chemistry II

II— a

- (1) Explain the common and different points between enzymes and inorganic catalysts.
- (2) Give the definitions and units of two kinetic parameters of enzymes, the catalytic constant k_{cat} and the Michaelis constant K_M .

II— b

Chymotrypsin is one of enzymes which catalyze hydrolysis of peptide bond. The figure below shows the catalytic site of chymotrypsin.



- (1) Give the names of three amino acid residues (a), (b) and (c) forming this catalytic site.
- (2) Explain the roles of these amino acid residues and the catalytic reaction mechanism of chymotrypsin.