

Chem 109 C

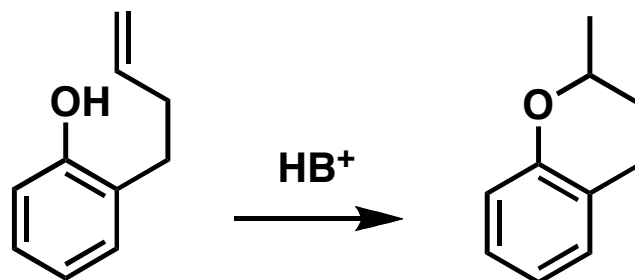
Bioorganic Compounds

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<http://labs.chem.ucsb.edu/~zakariangroup/courses.html>

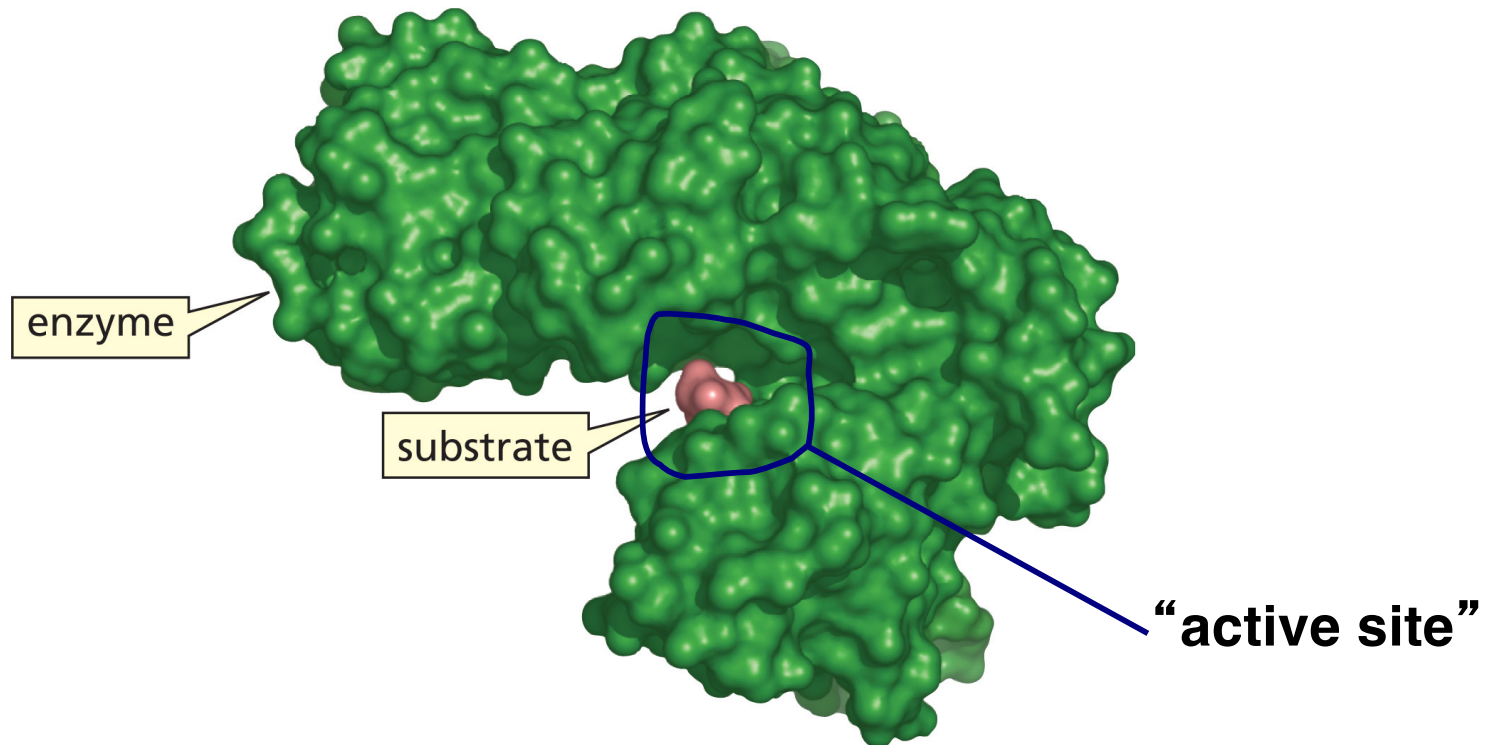
PROBLEM 4

Propose a mechanism for the following reaction if it takes place with general-acid catalysis:



ENZYMATIC CATALYSIS

catalysis in biological reactions

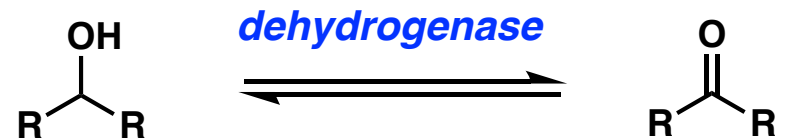
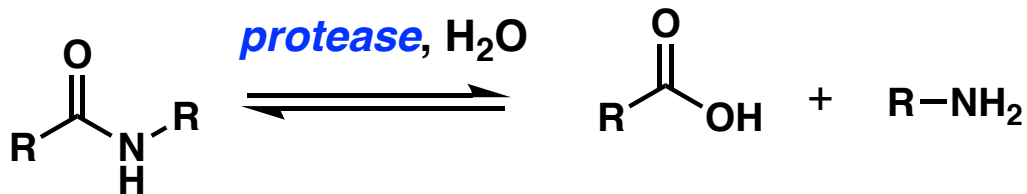
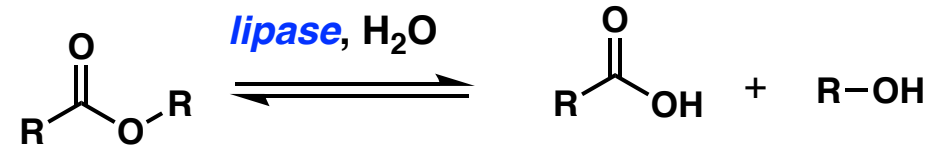
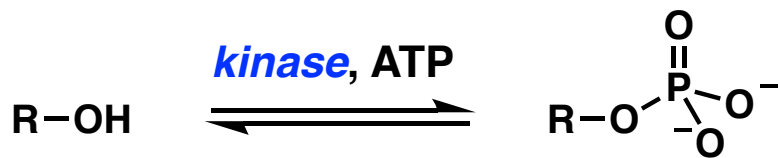


ENZYMATIC CATALYSIS



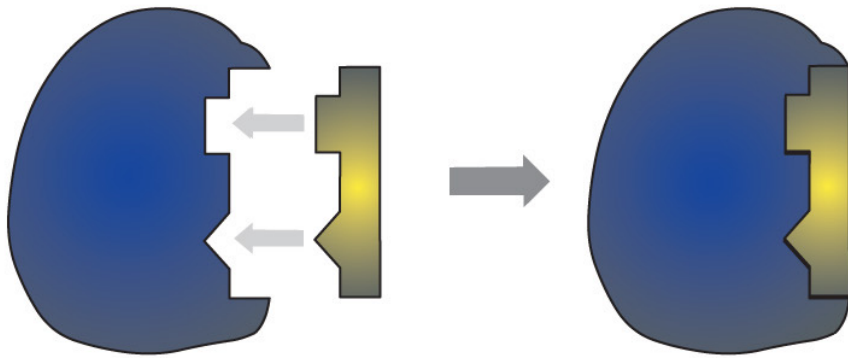
names: [activity]-ase

kinase, protease, lipase, dehydrogenase, etc.

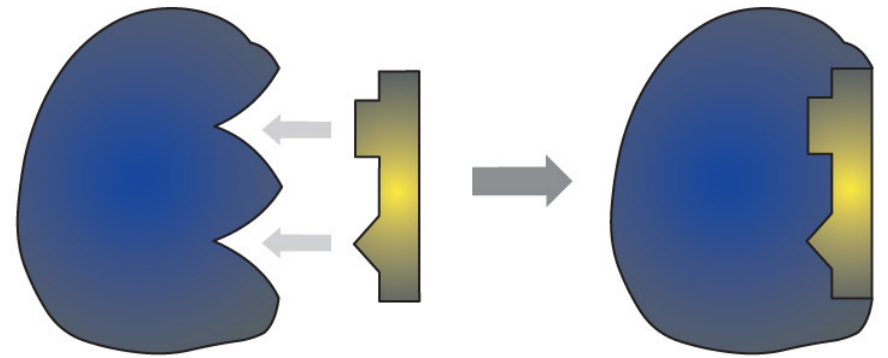


ENZYMATIC CATALYSIS

enzymes show high substrate specificity



lock-and-key model



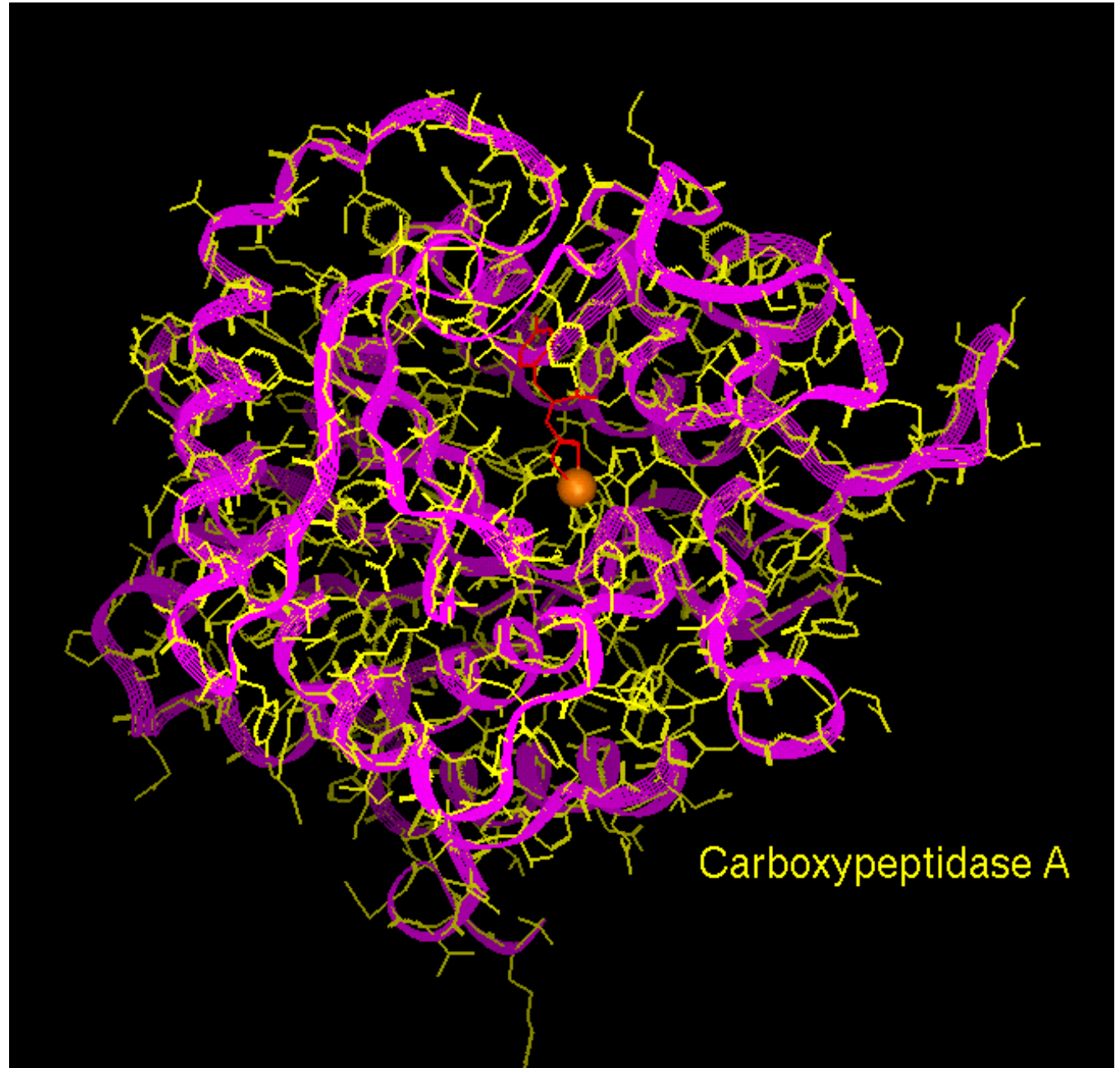
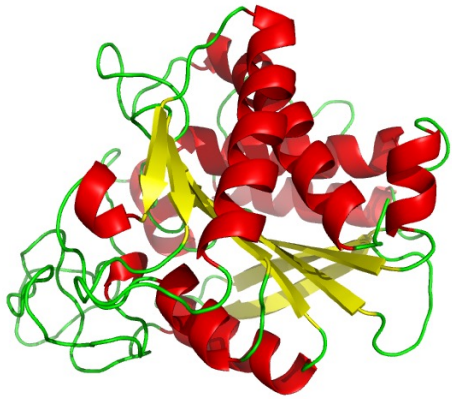
induced-fit model

ENZYMATIC CATALYSIS

factors contributing to high catalytic activity of enzymes:

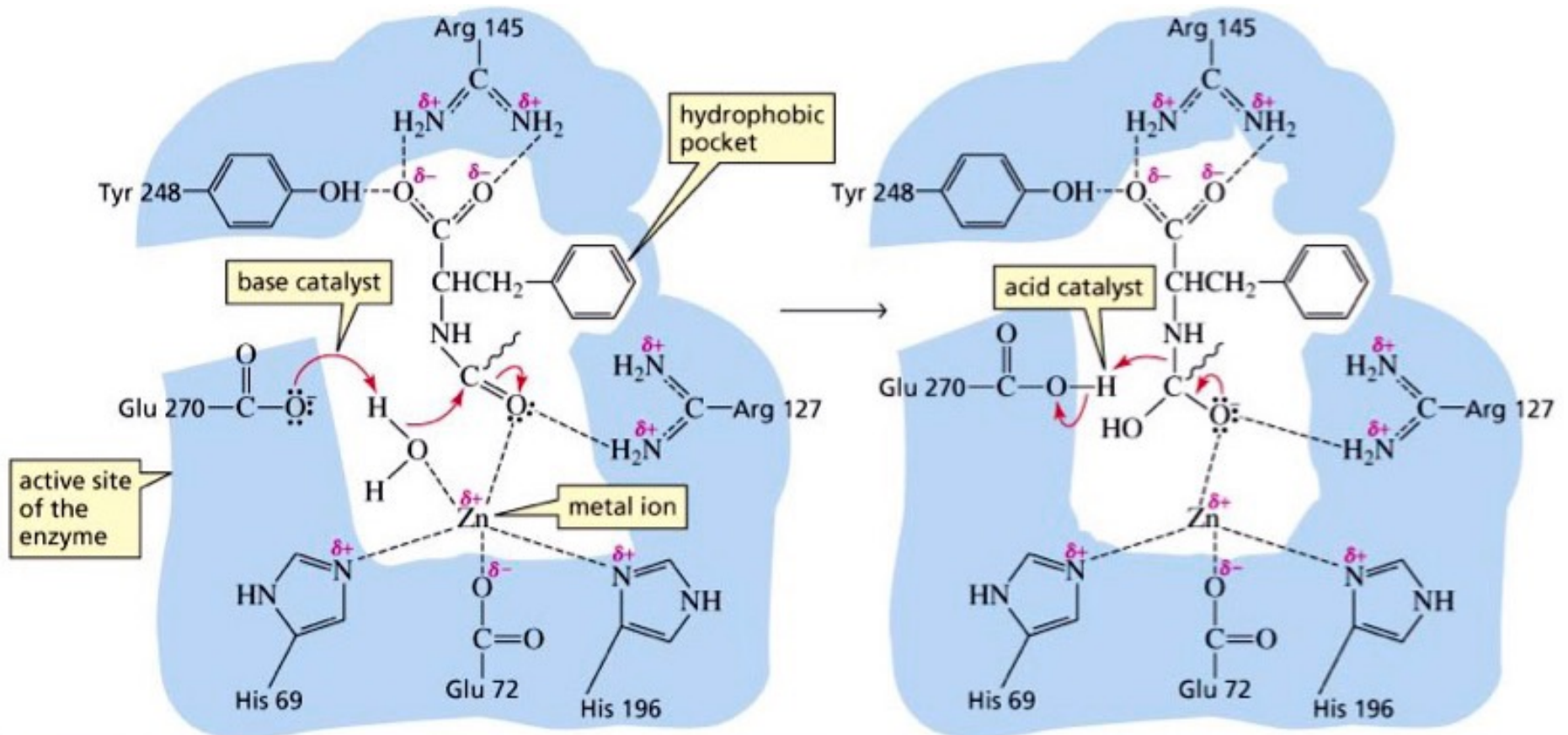
- reacting groups are properly oriented in active site
- acid/base or metal ions are at active site
- stabilization of transition states and intermediates

ENZYMATIC CATALYSIS

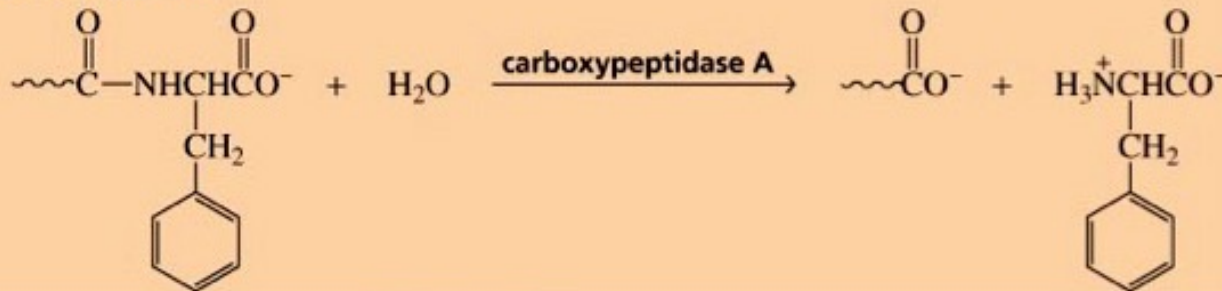


ENZYMATIC CATALYSIS

examples: *carboxypeptidase A*

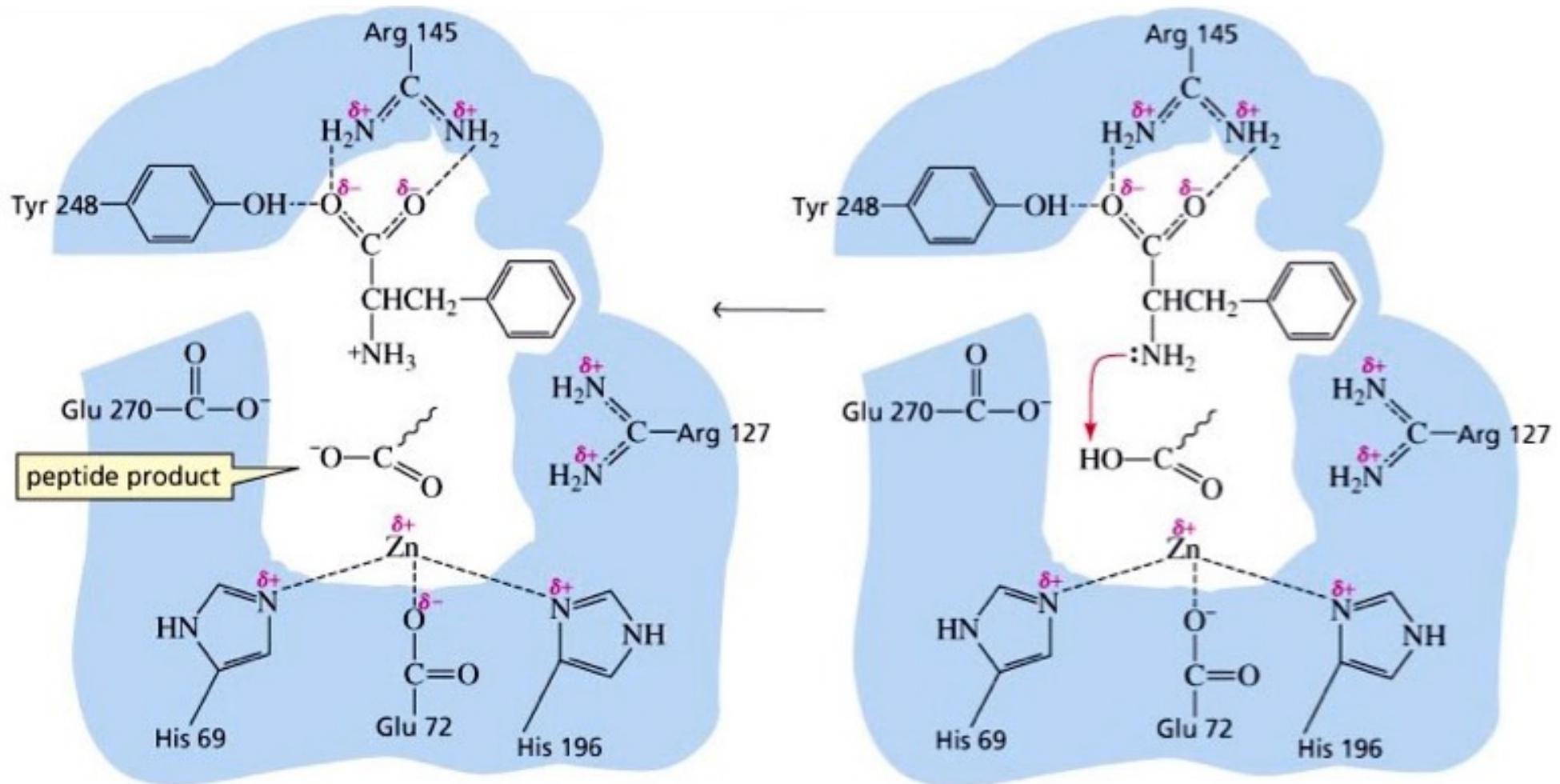


Overall Reaction



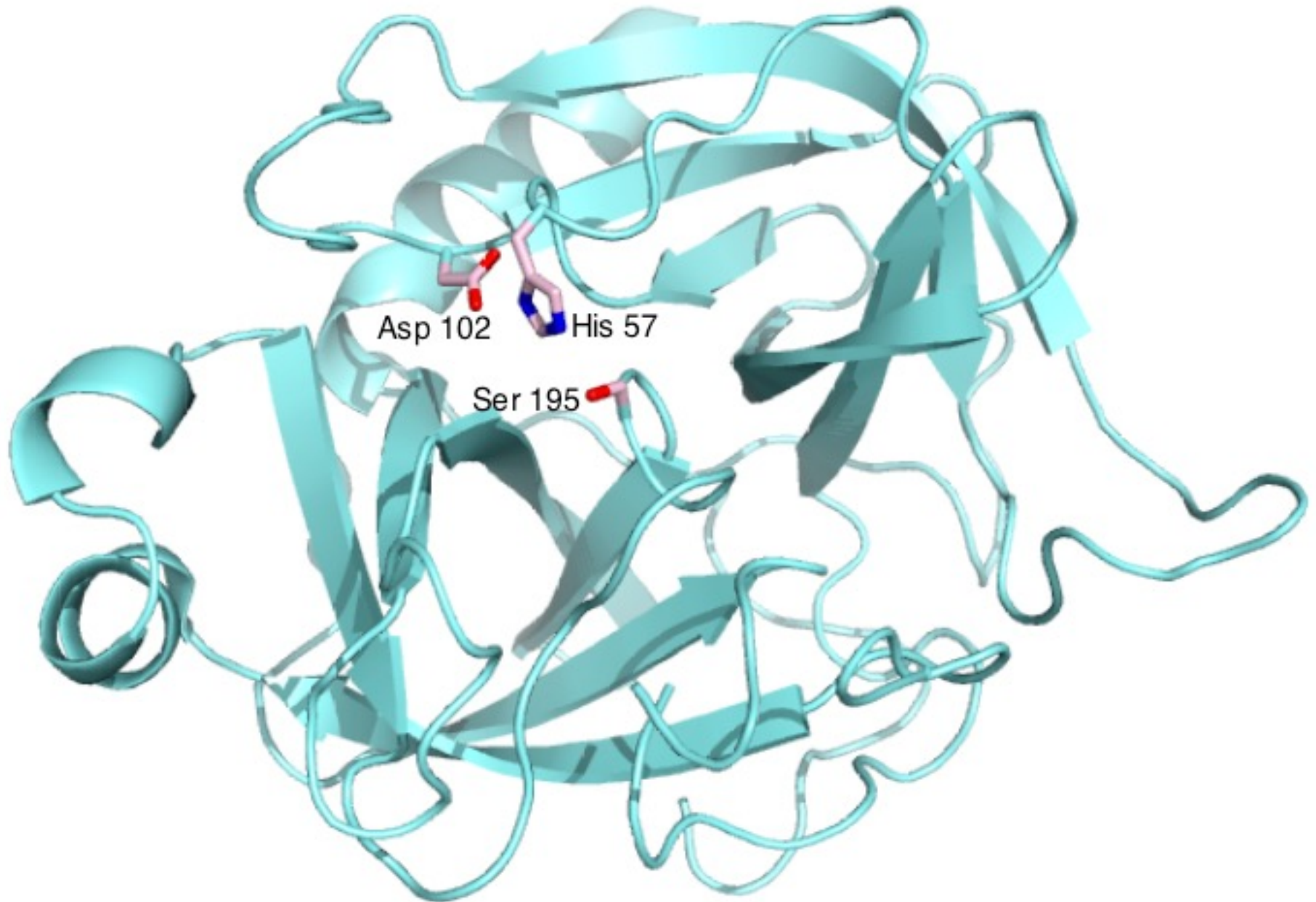
ENZYMATIC CATALYSIS

examples: *carboxypeptidase A*



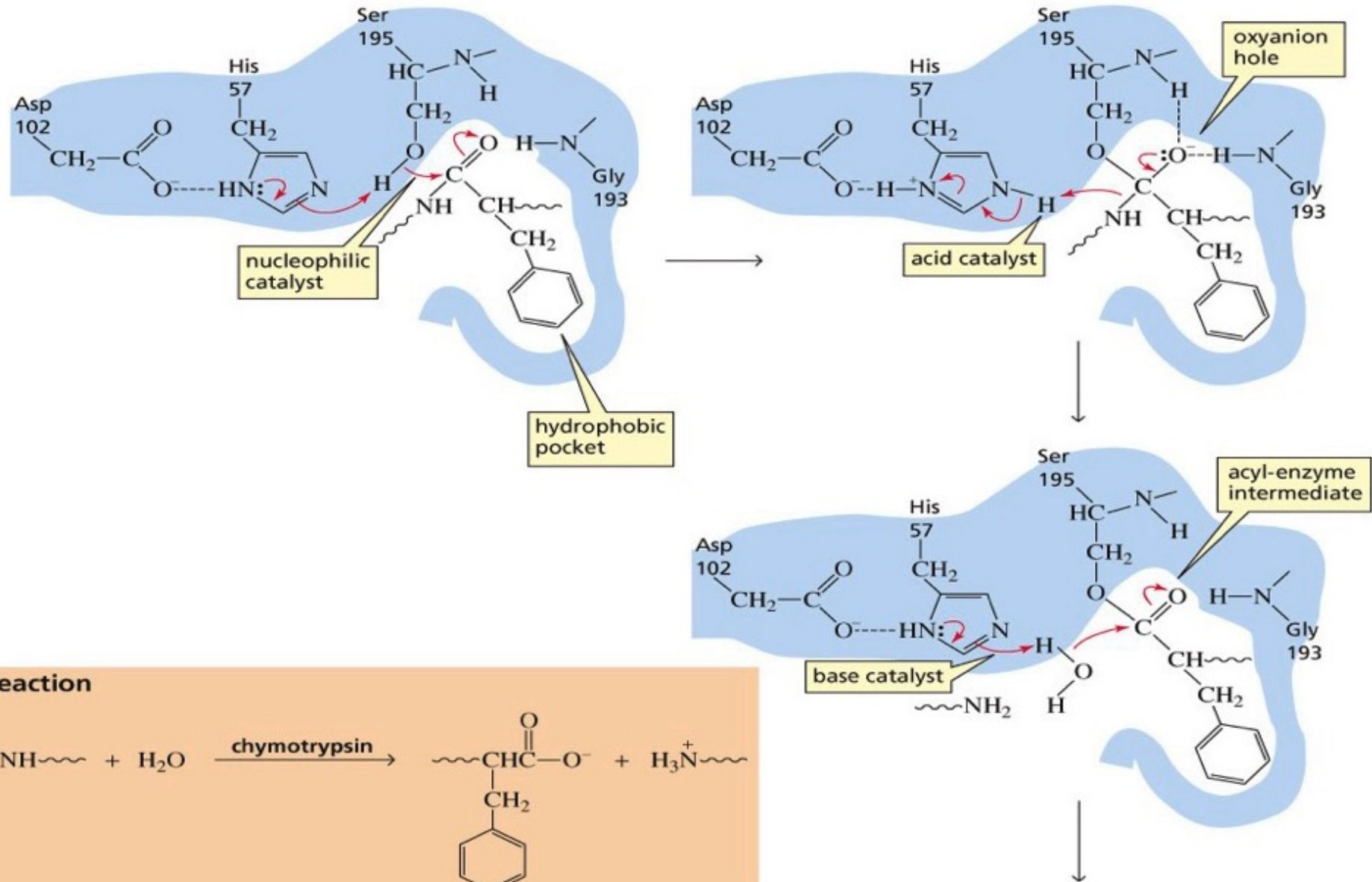
ENZYMATIC CATALYSIS

examples: serine proteases - chymotrypsin

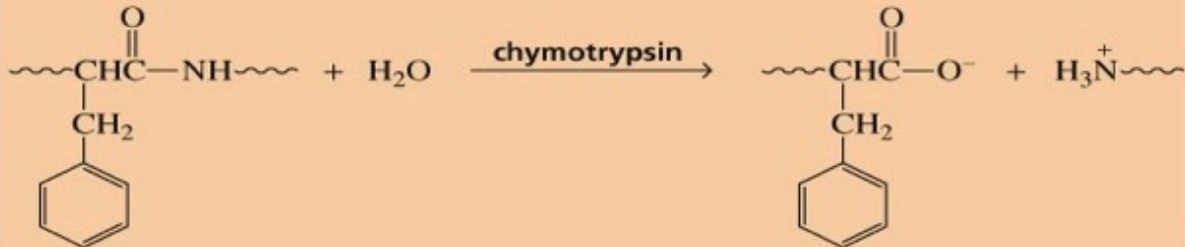


ENZYMATIC CATALYSIS

examples: serine proteases - chymotrypsin



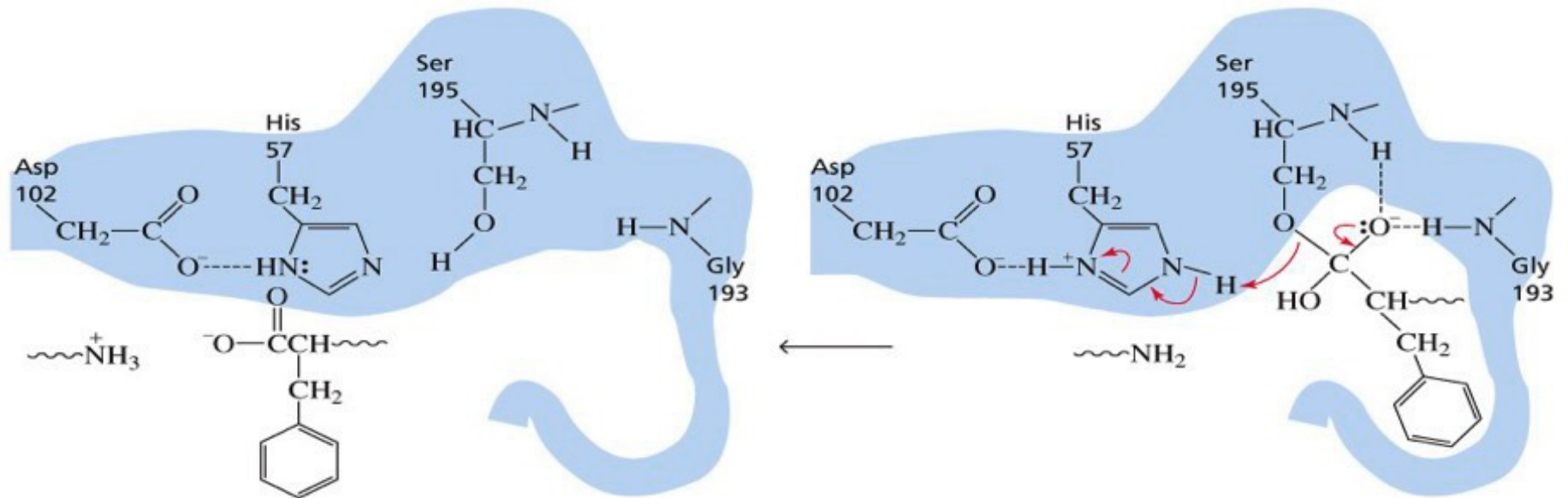
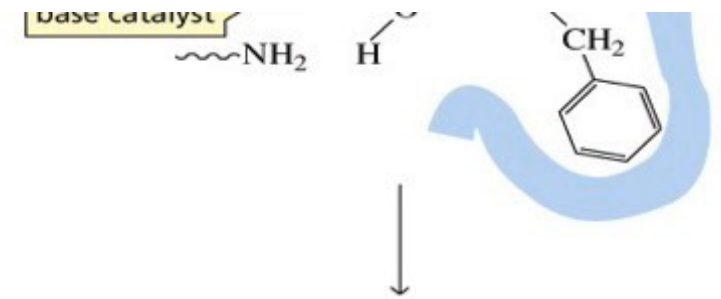
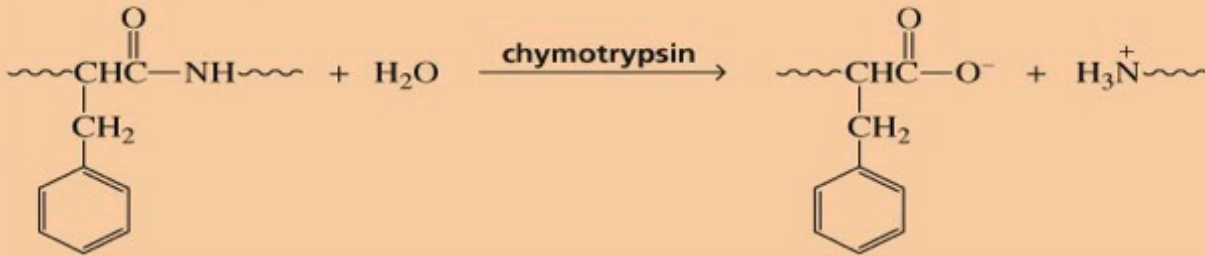
Overall Reaction



ENZYMATIC CATALYSIS

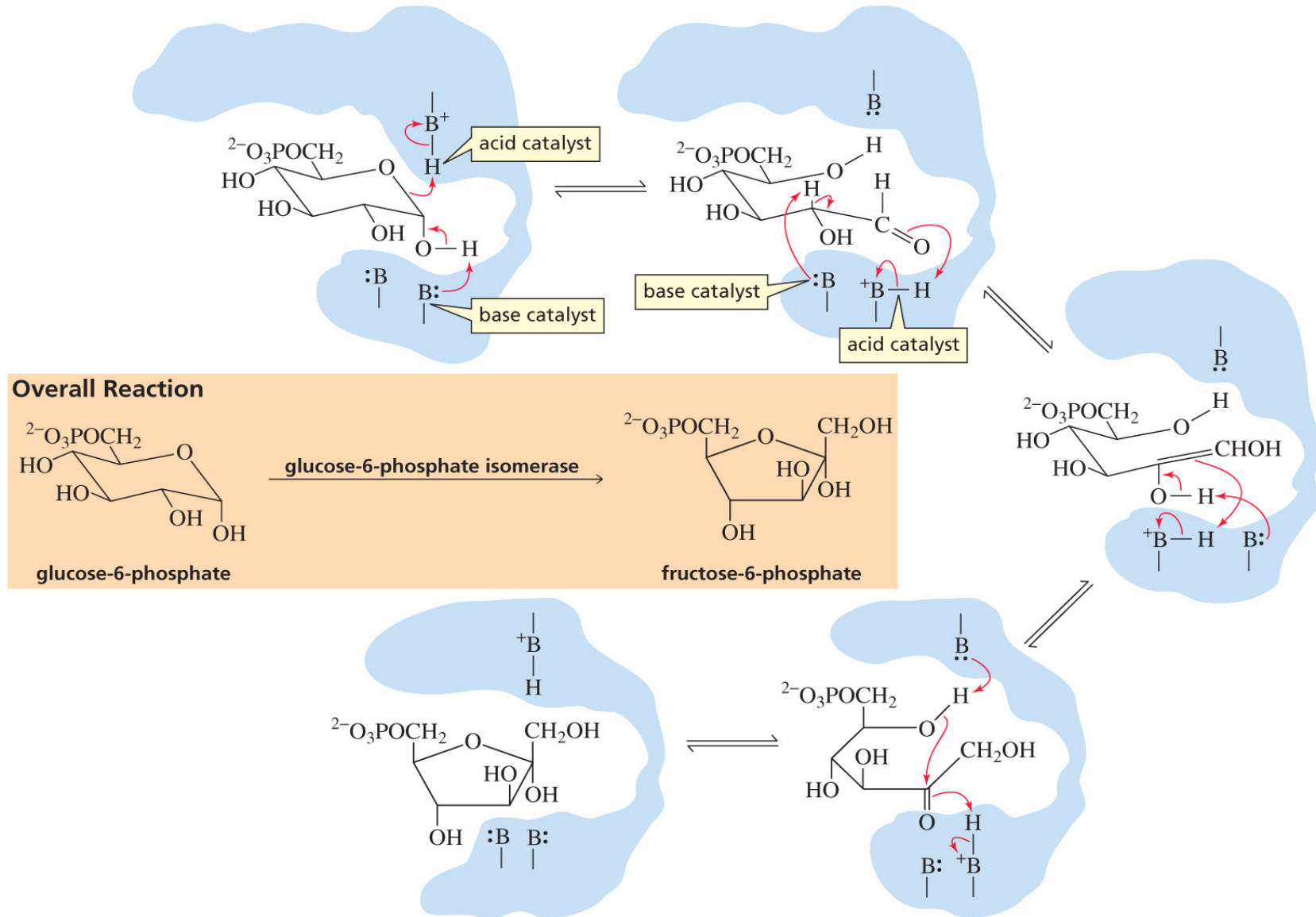
examples: serine proteases - chymotrypsin

Overall Reaction



ENZYMATIC CATALYSIS

examples: *glucose-6-phosphate isomerase*



Catalysis (ch 22)

definition of catalyst, energy diagrams illustrating catalytic action

types of catalysis:

acid: specific and general

base: specific and general

nucleophilic: stronger Nu are better catalysts

metal-ion: types of activation

intramolecular reactions

why are they faster? effective molarity etc...

intramolecular catalysis: examples of each class (acid, base, Nu, metal)

overview of enzyme catalyzed reactions:

names of enzyme ("substrate"ase)

lock-and-key model

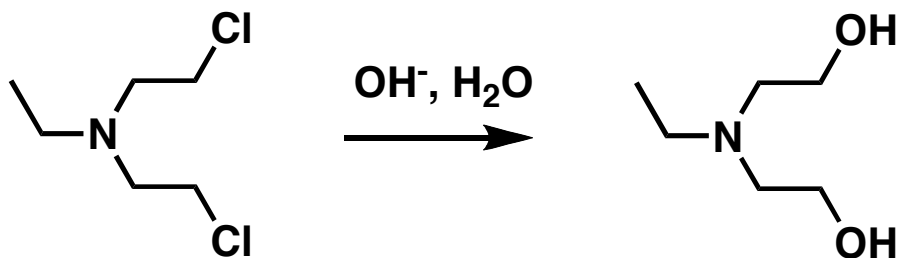
induced-fit model

examples of enzyme catalysis

carboxypeptidase A, chymotrypsin: what is going on in the active site (what types of catalysis occur there?)

SAMPLE PROBLEMS

Propose a mechanism for the following reaction



Why is this reaction slower with the following compound

