



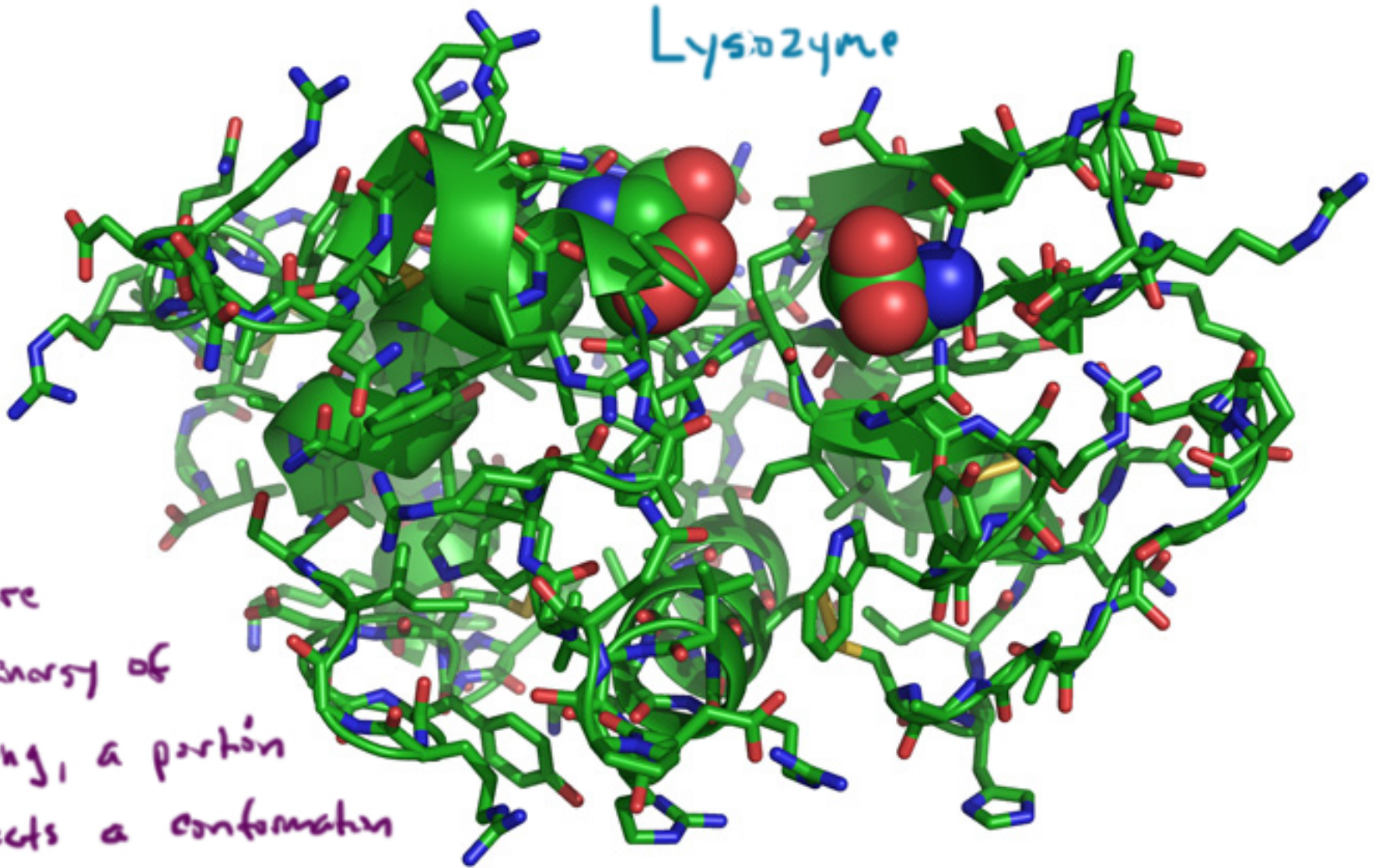
Enzyme Mechanisms

Session Slides with Notes

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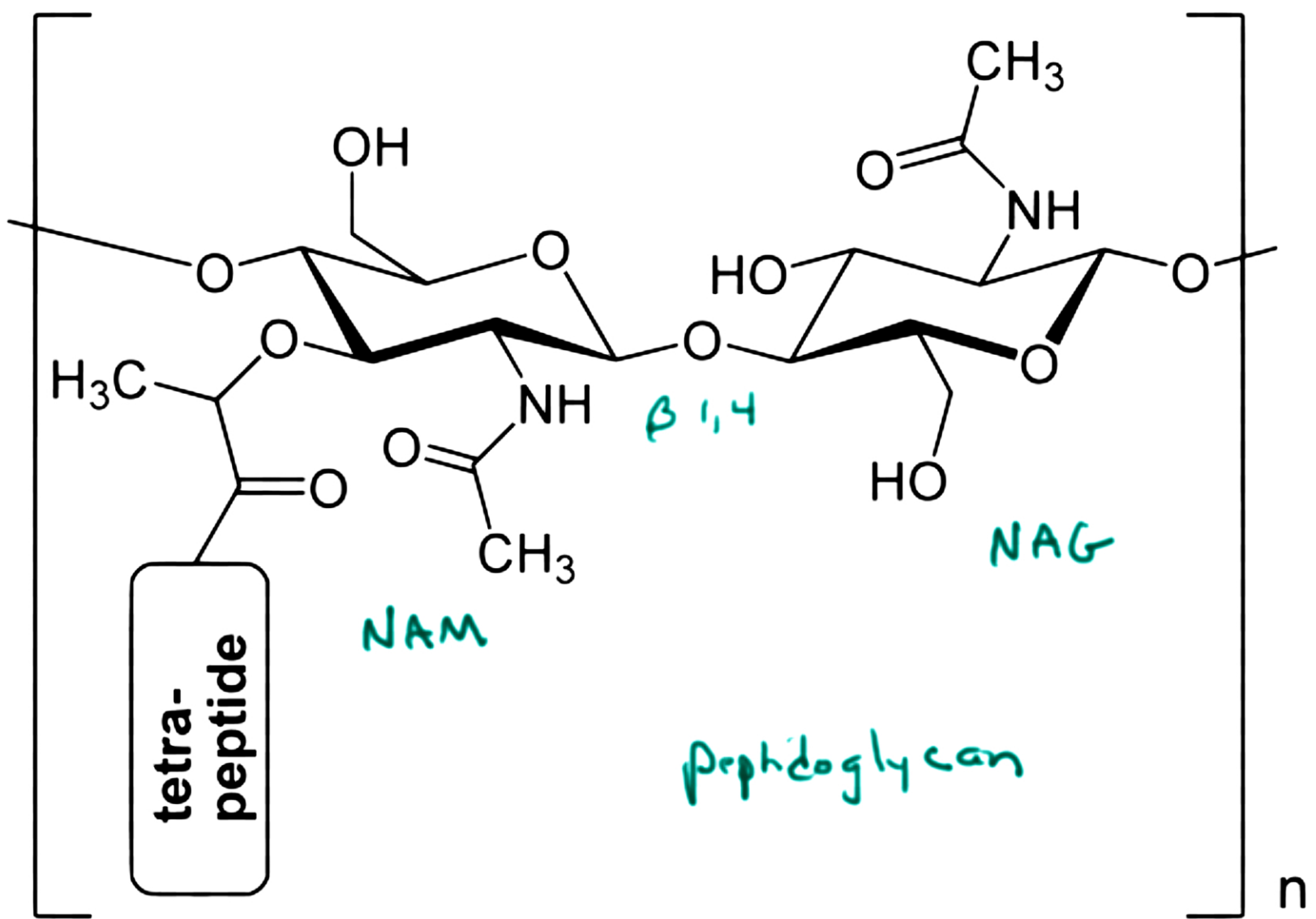
Lysozyme

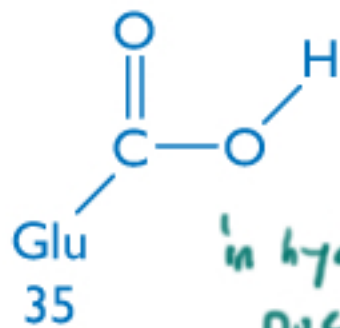
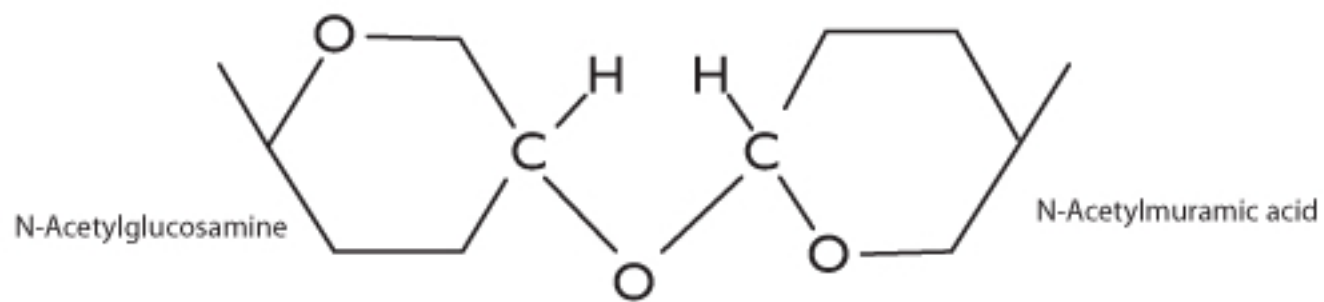
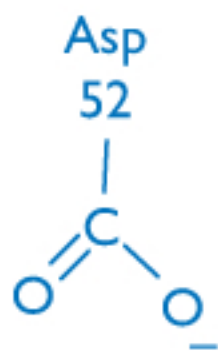


• Where free energy of binding, a portion affects a conformation change in the substrate

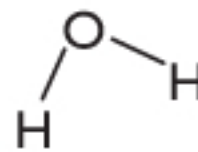
Cleaves peptidoglycan
↑
bacterial cell wall

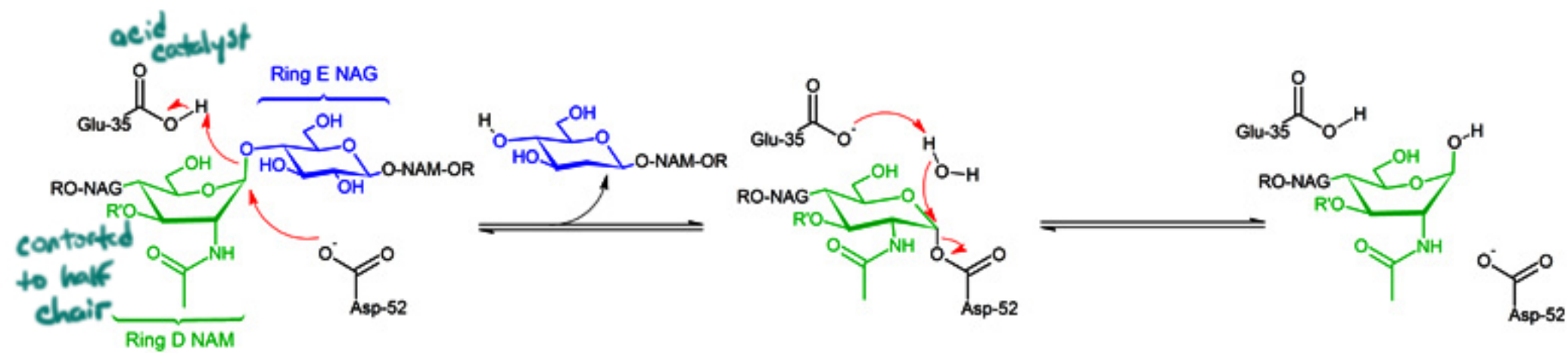
peptidoglycan - long carbohydrate chains
- NAG - N-acetyl glucosamine
- NAM - N-acetyl muramic acid
crosslinked with tetrapeptides



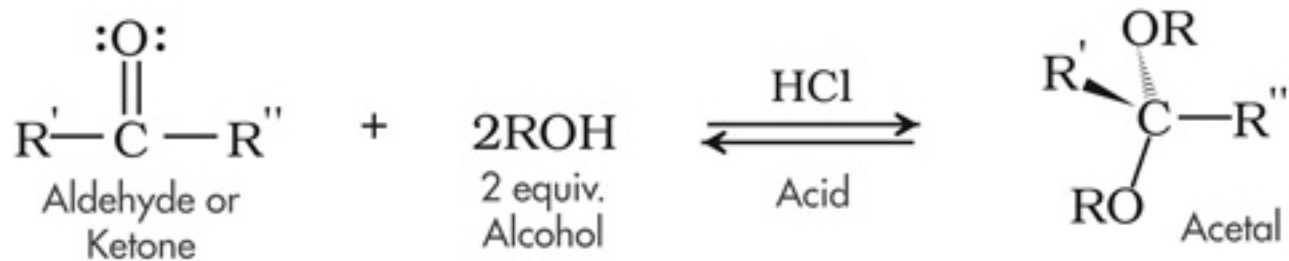


in hydrophobic
pocket
raised pKa

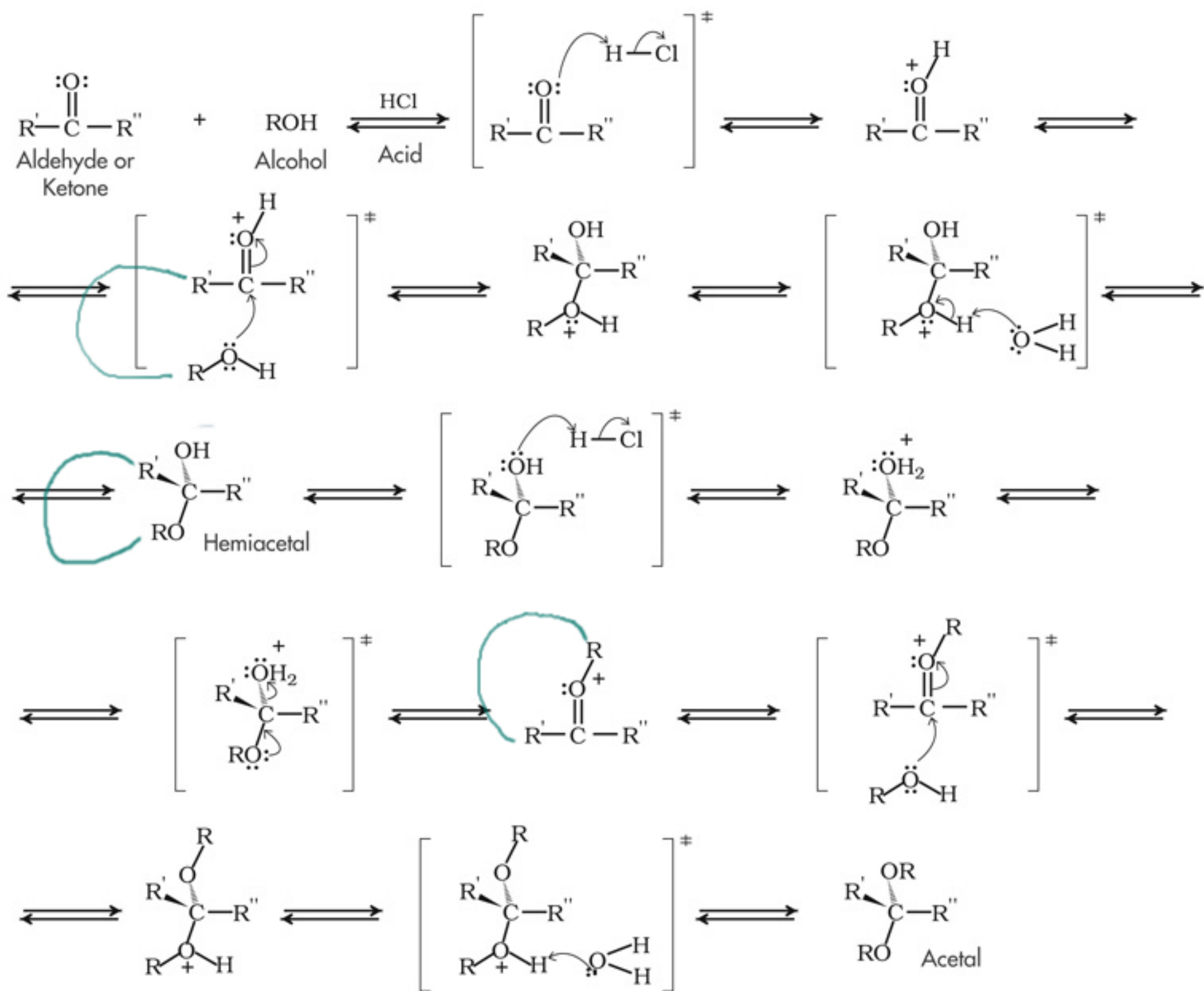


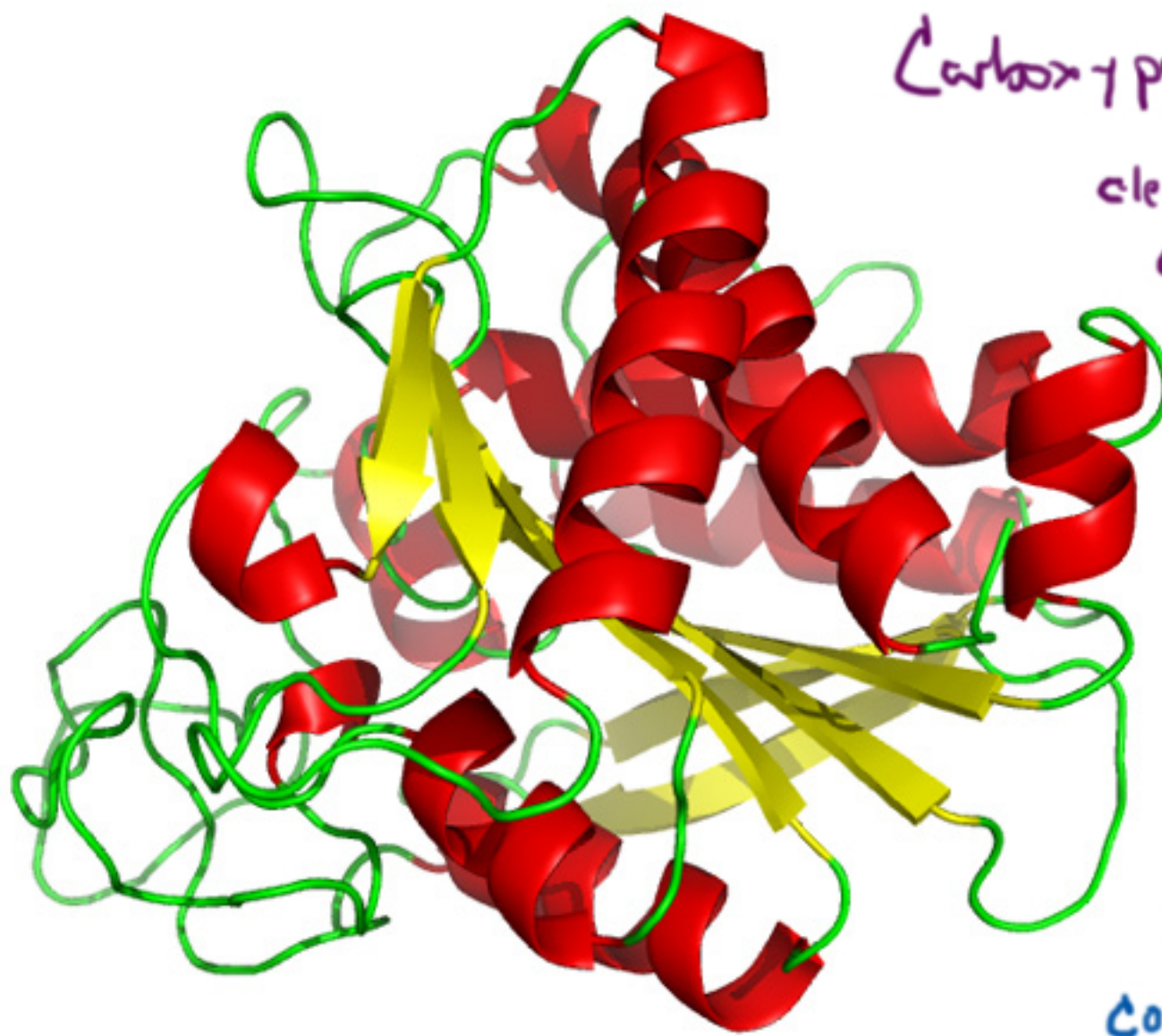


R = cell wall oligosaccharide chain
 R' = cell wall peptide side chain



acetal formation





Carboxypeptidase

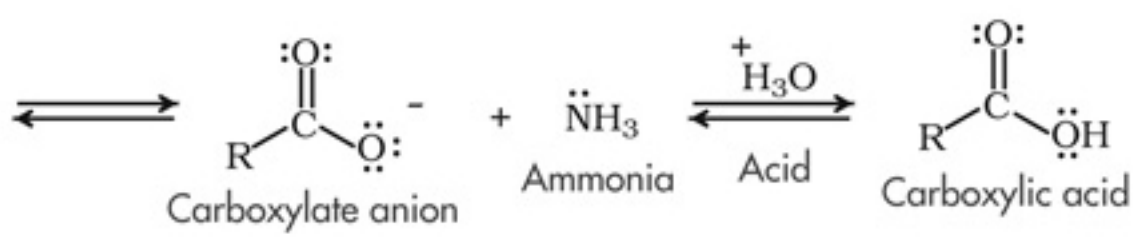
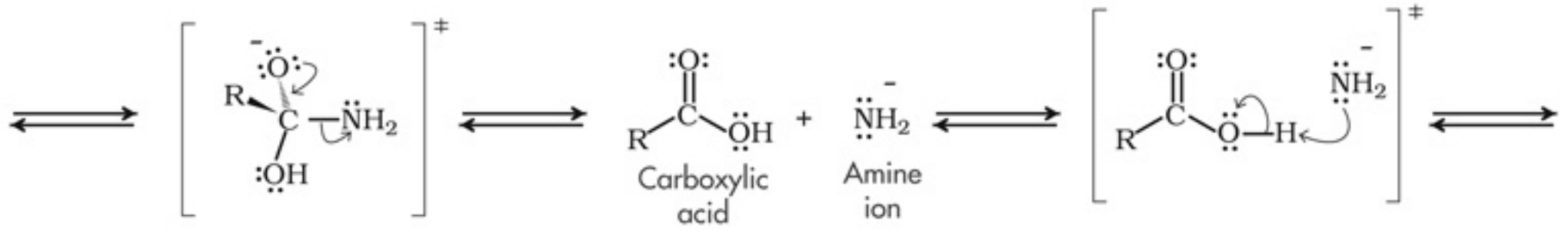
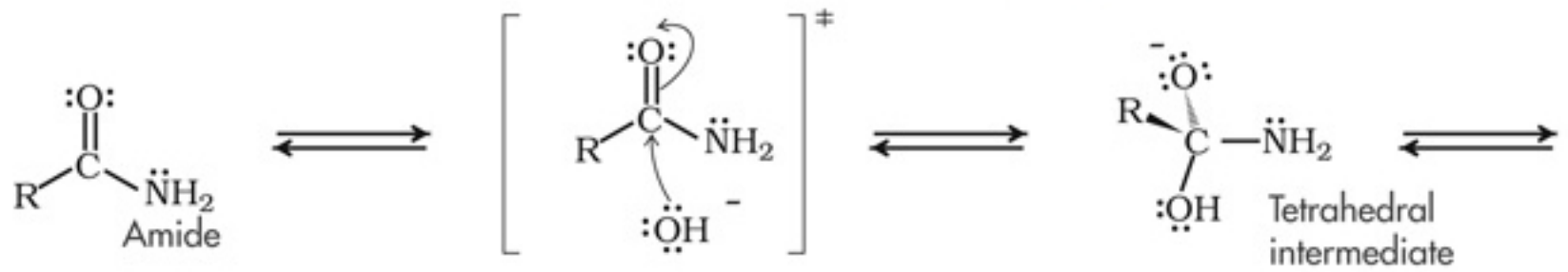
cleaves the
C-terminal
peptide

Zinc
protease

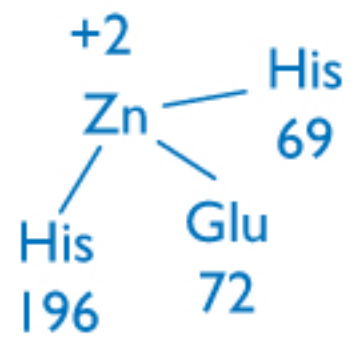
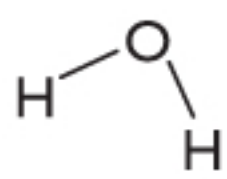
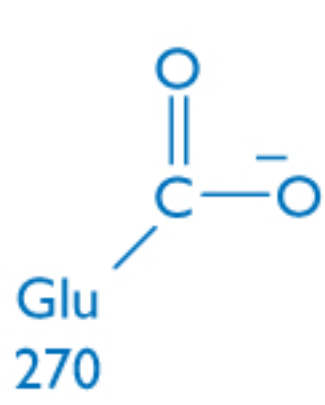
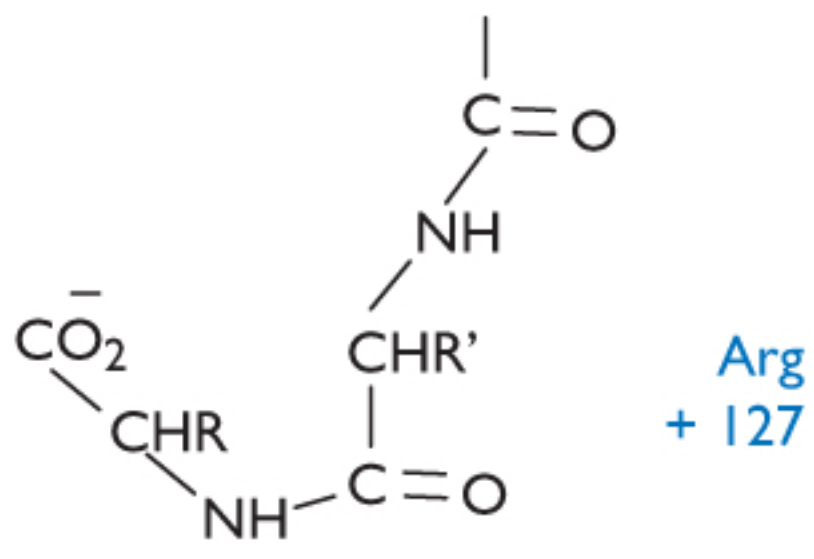
Zn cofactor
coordinated
tetrahedrally

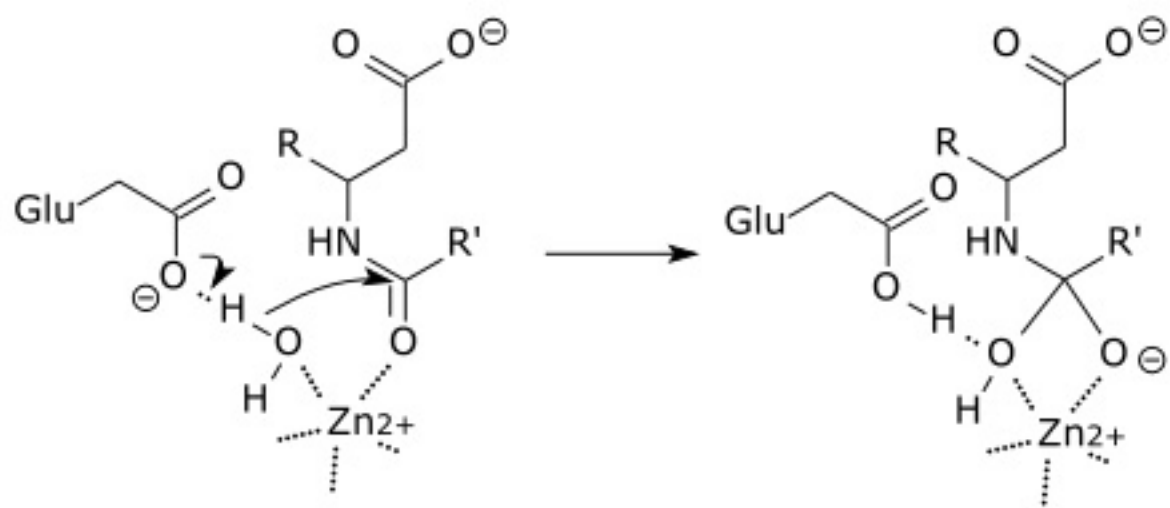
2 His
1 Glu
H₂O

Hydrolysis of Amide



Nucleophilic
Acyl Substitution

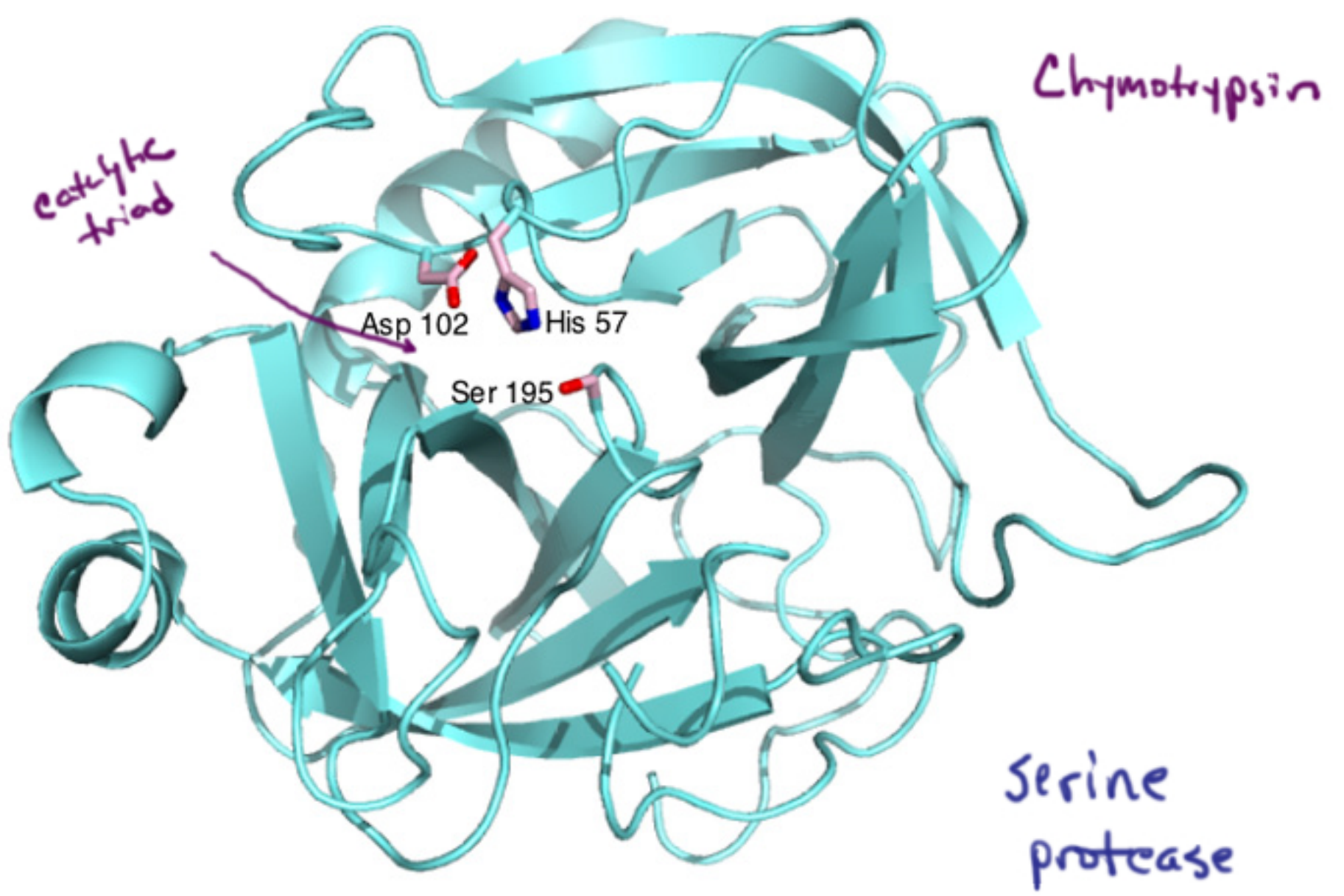




Enzyme substrate complex

Tetrahedral intermediate

*Zn stabilizes
tetrahedral
intermediate*



Chymotrypsin

*aromatic, bulky
residue*



Trypsin

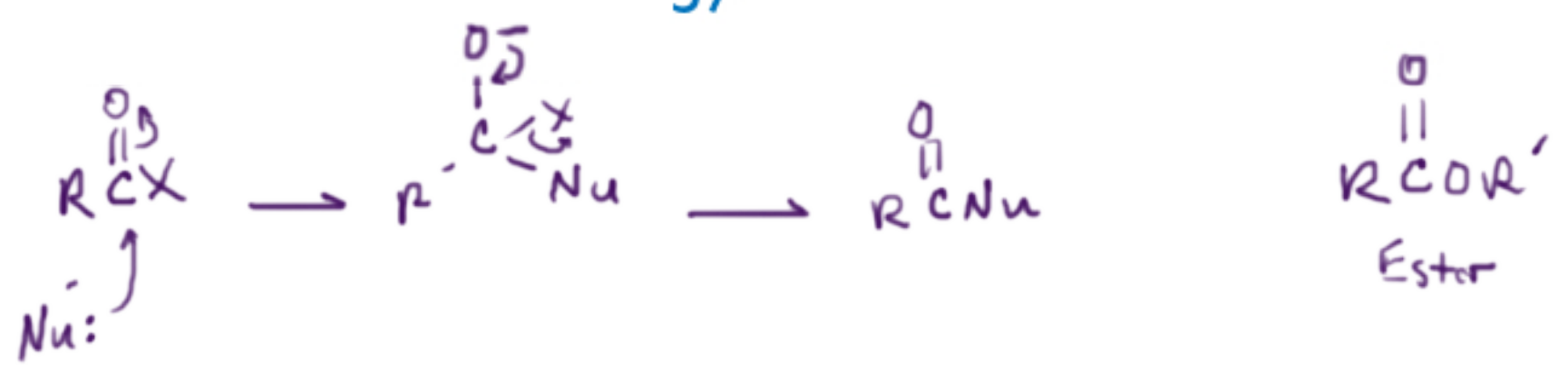
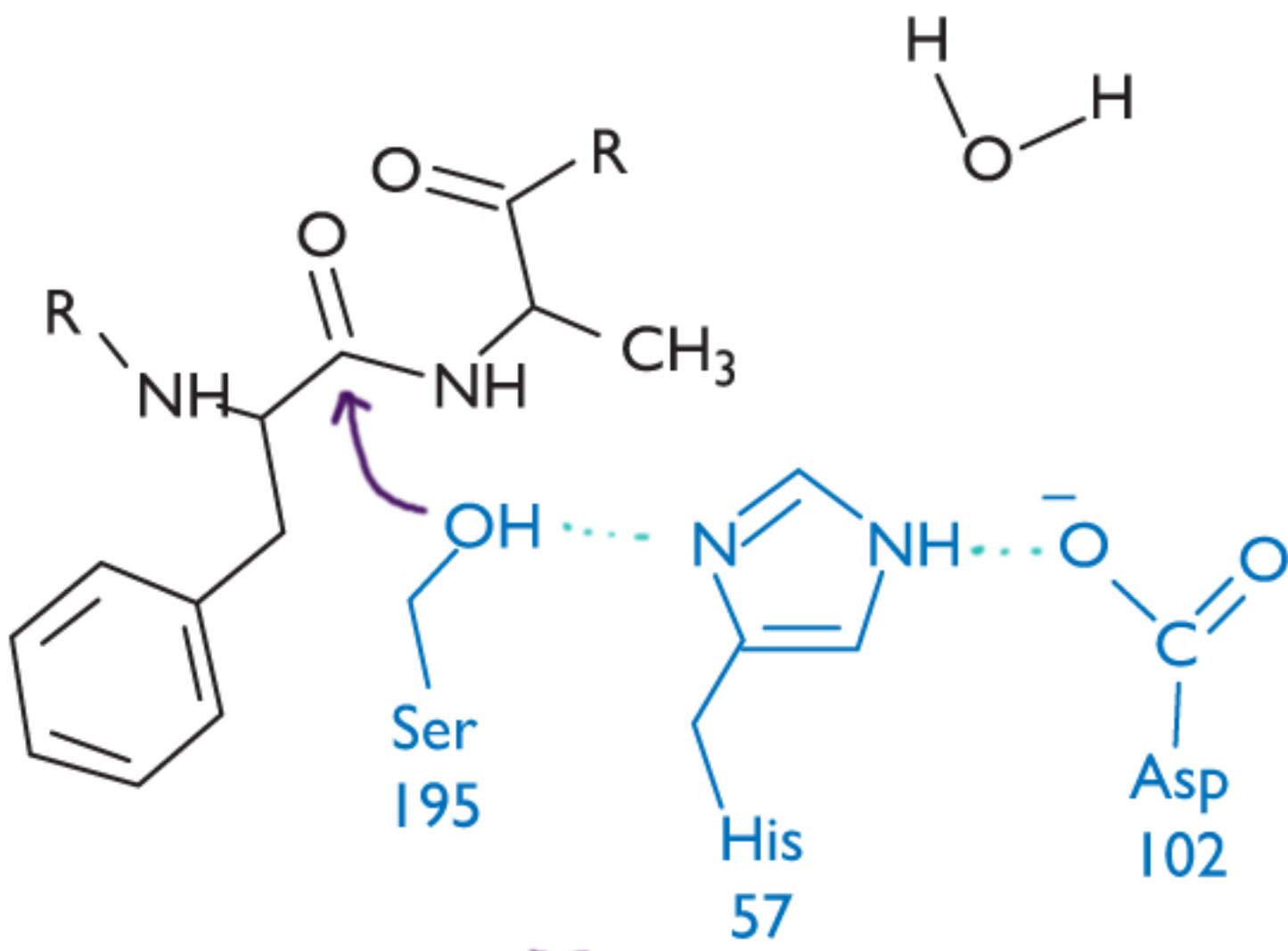
*lysine or
arginine*

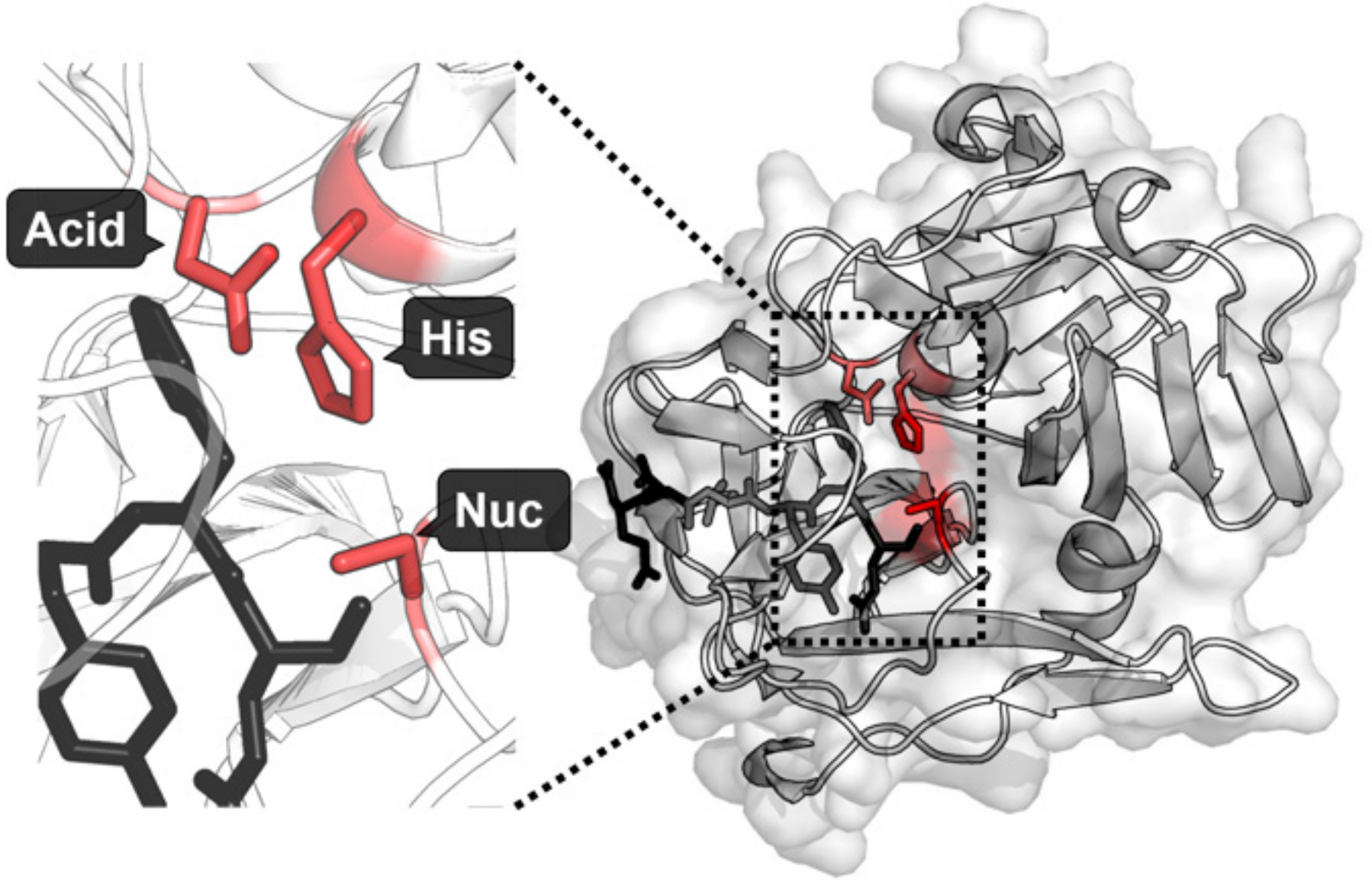


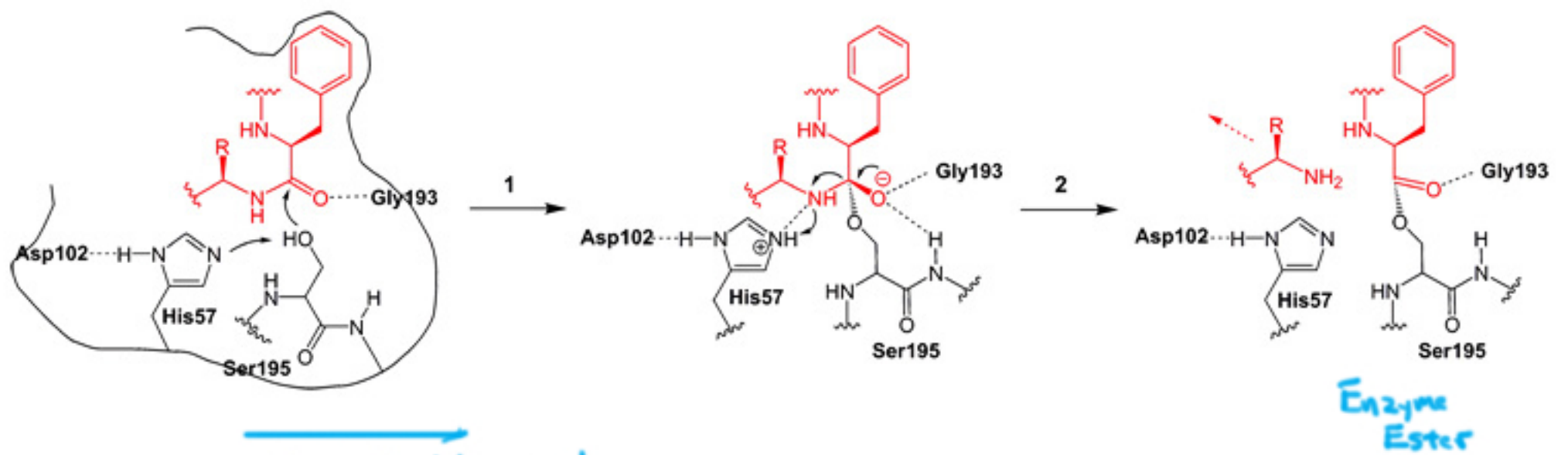
Elastase

*smaller, uncharged
residue*



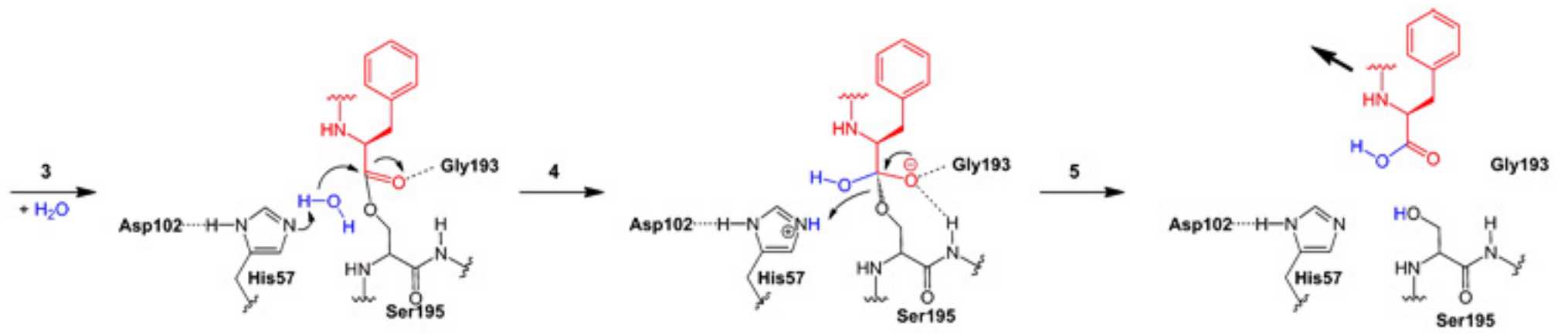






1st nucleophilic acyl substitution
formation of enzyme ester

Enzyme Ester



2nd nucleophilic acyl substitution

Hydrolysis of enzyme ester

