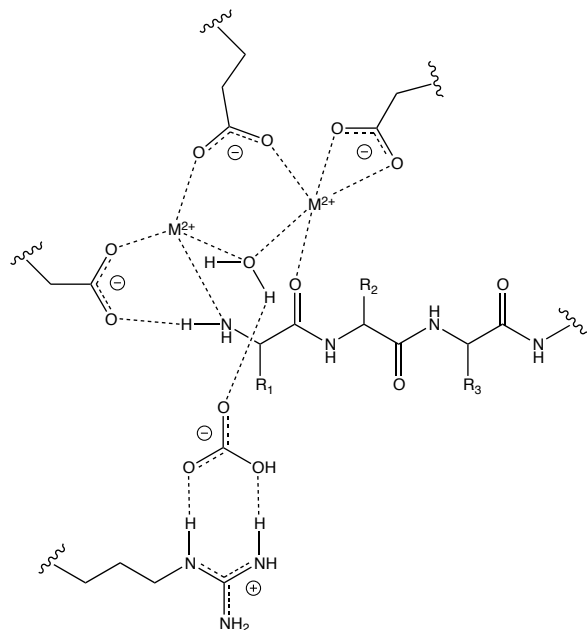


Active Site SQ

Aminopeptidases are enzymes that cut amino acid residues off of the amino terminus of proteins. They play a number of important roles in cells. One particular example is called Leucine Aminopeptidase or just LAP. LAP is a metalloproteinase because its active site contains metal ions. Shown below is an approximate sketch of the active site of LAP (in 2D, of course, with many details omitted).



Succinctly answer the following questions.

1. Circle the substrate in this diagram.
2. Put a squiggly line through the bond that is broken by LAP.
3. What kind of reaction does a peptidase catalyze? Be as specific as you can.
4. Write and balance the reaction catalyzed. You may use abbreviations for the peptide(s).
5. If the arg in the active site were mutated to lys, what would you expect to happen to k_{cat} ?
6. If the acidic amino acids in the active site were mutated to val, what would you expect to happen to K_m ?
7. There is a bicarbonate ion in the active site. Mark it. What role does this ion likely play? Write and balance a reaction relevant to this role.
8. This enzyme works best around pH 8. Give two reasons why a lower pH could negatively affect the action of this enzyme.