Class 3
(Ch. 3, pp. 75-85)

Amino acids: structure & chemistry

- This class will be taught mostly using the blackboard – come prepared to draw structures!
- You need to memorize **1-letter code, 3-letter code, chemical structure of the 20 standard amino acids**.

Standard amino acids – 1 and 3 letter codes

(on blackboard)

Standard amino acids – chemical structures

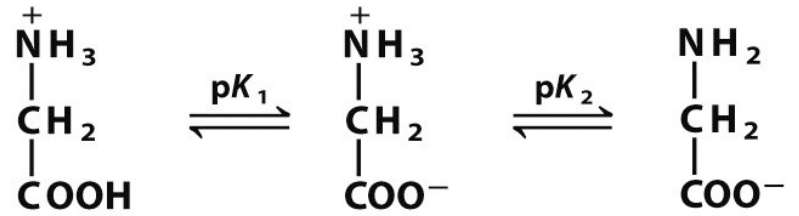
(on blackboard)

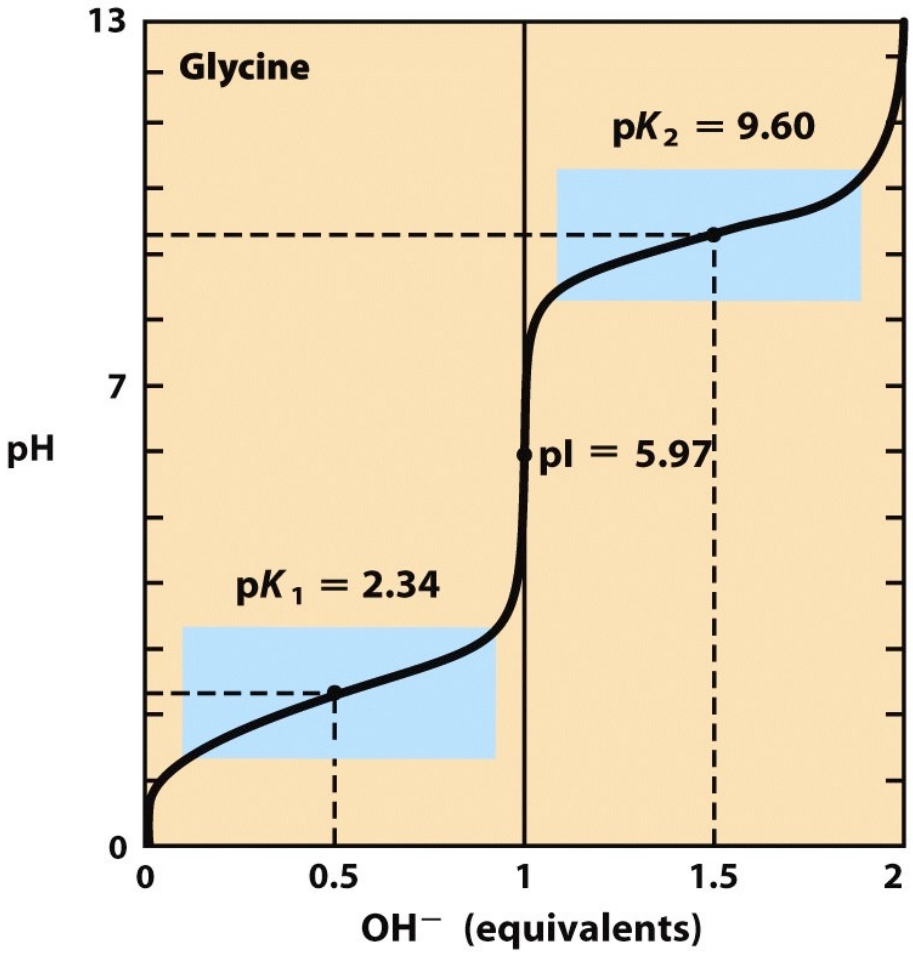
Acid-base properties of amino acids

(mostly on blackboard)

Titration curve of glycine

Net charge:





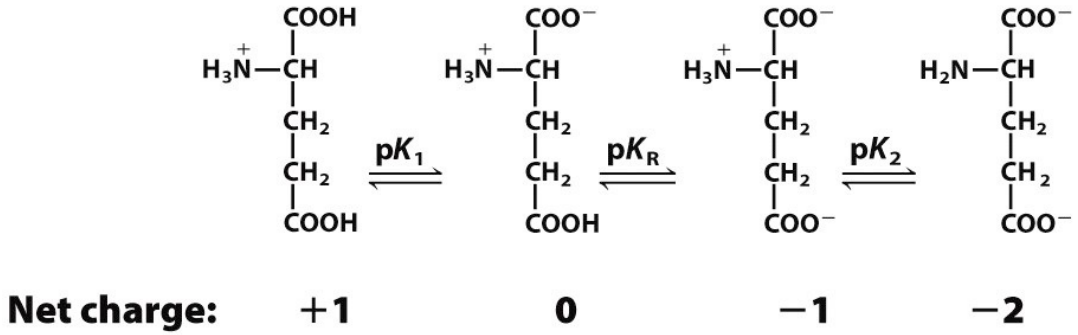
pI = pH at which molecule has no net charge (Zwitterion)

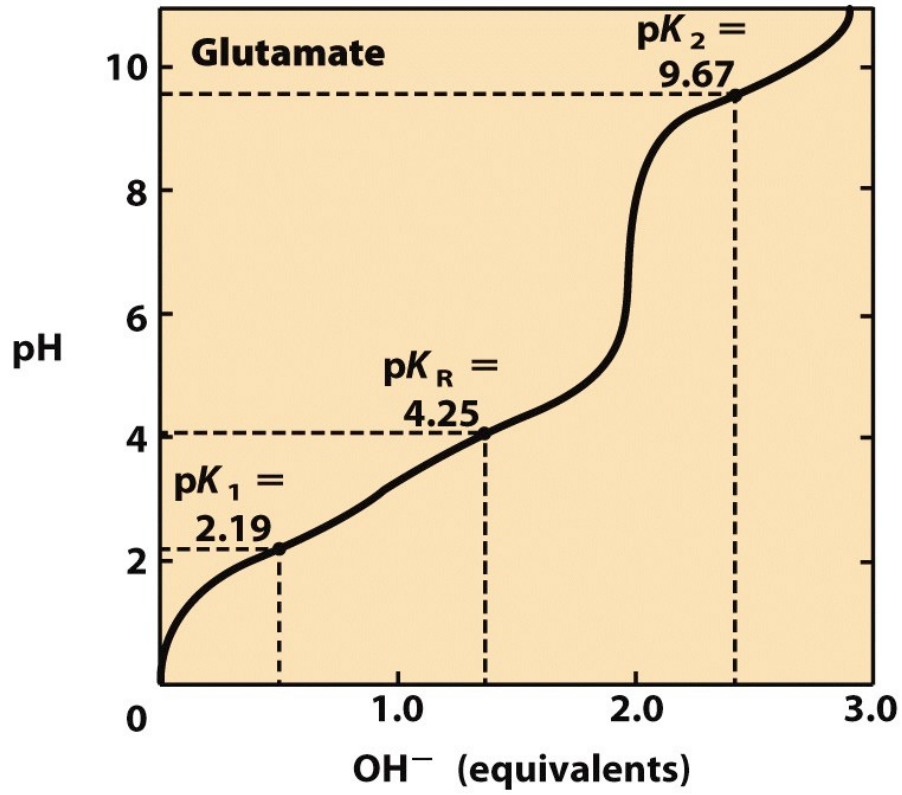
What is net charge on Gly at pH 7.4?

Titration curves of amino acids with non-ionizable R groups resemble Gly's.

Titration curve of glutamate

Net charge:





What is net charge on Glu at pH 7.4?

Titration curve of histidine

Net charge:

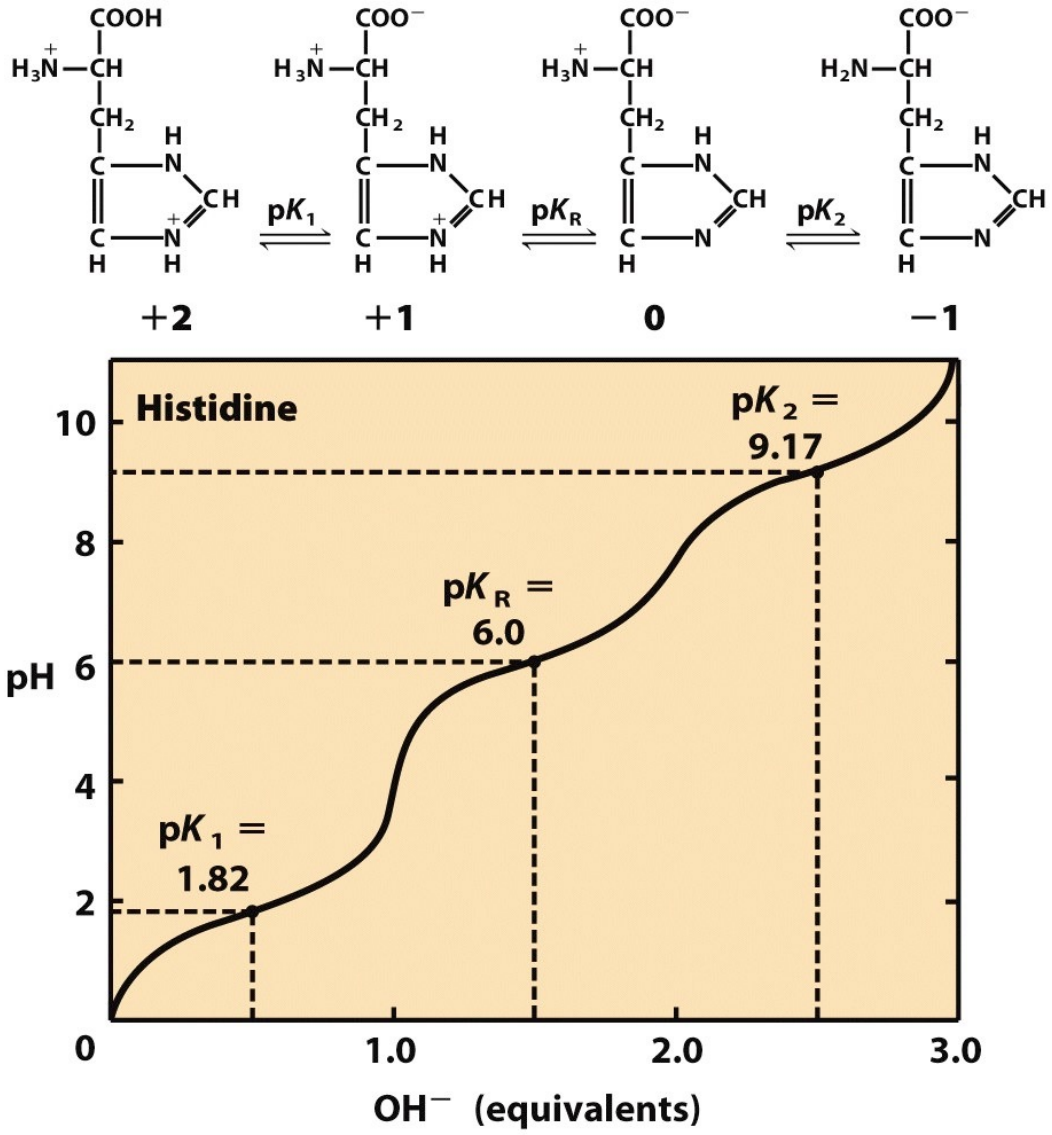


Figure 3-12b

What is net charge on His at pH 7.4?

Separation of amino acids in an electrical field

	pI	pH 3.3	pH 6.0	pH 7.6
Gly	6.0			
Glu	3.3			
His	7.6			

pI of protein has to be empirically determined

(pH at which protein has minimal solubility)

Amino acids problem set due Thursday (9/17)!!

Helpful tip:

- Write out chemical structure of the fully protonated form of the amino acid/peptide (species I) and determine net charge.

- Then start deprotonating one proton at a time and determine net charge of resulting species (II, III, etc) without writing out entire chemical structure (unless asked for).

Non-standard amino acids are also important in life!!

(but you do not need to memorize these for Bio375)