

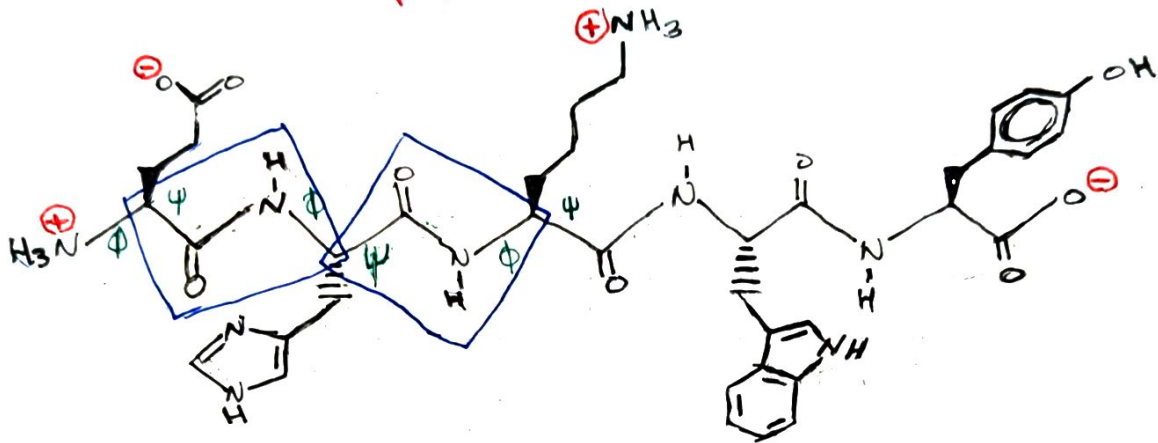
Due to resonance, no rotation occurs around  $\psi$ .  
 As a result the atoms that make up the  $\psi$  bond  
 are both in trigonal planar conformation and  
 the atoms they connect to are in the same plane

1) EHKWY  $\rightarrow$  N-Glu-His-Lys-Trp-Tyr-C

$\uparrow$   
pKa = 6.0

at pH = 6.5

pH is above pKa, therefore, Histidine will be predominantly deprotonated which results in a neutral charge

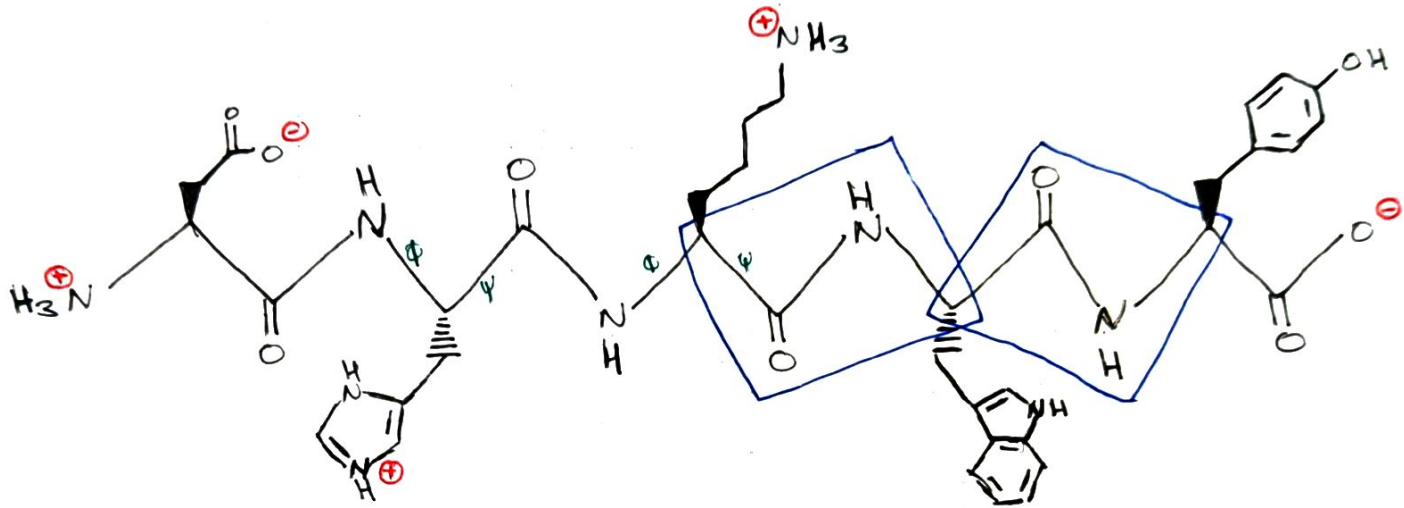




at pH=5.5

$\uparrow$  pKa=6.0

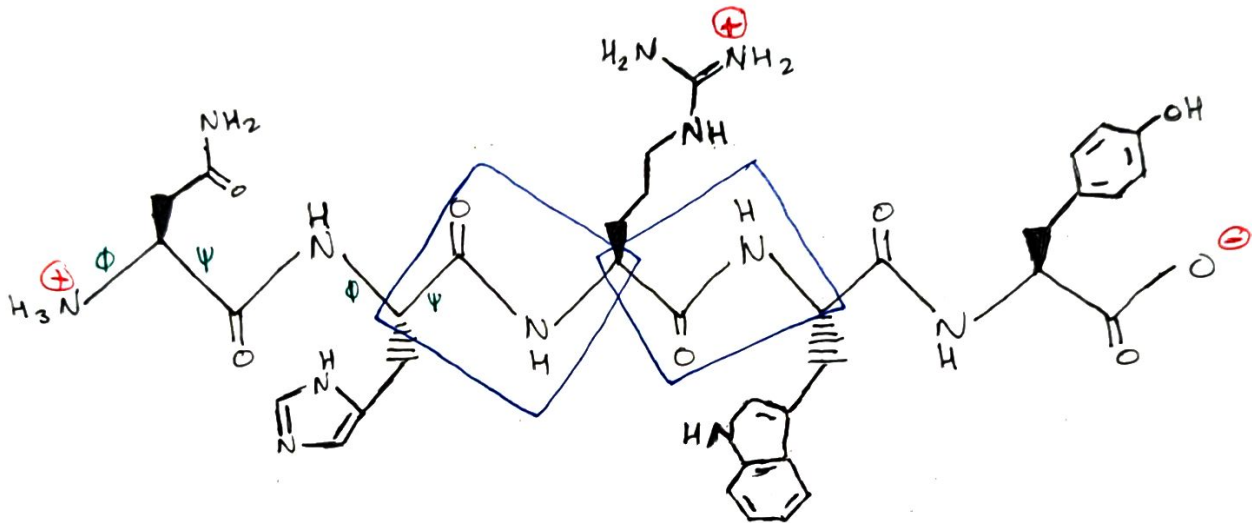
pH is below pKa and therefore His will be protonated and positively charged.



3) NHRWY  $\rightarrow$  N-Asn-His-Arg-Trp-Tyr-C

at pH=6.5

$pK_a = 6.0 \therefore$  no charge at pH=6.5  
because deprotonated form



4) QK<sup>T</sup>YWH → N-Gln-Lys-Tyr-Trp-His-C  
at pH=5.5

<sup>T</sup>  
pKa = 6.0  
∴ protonated at pH = 5.5  
and charged.

