
03-231 Biochemistry SI
Thursday, September 8, 2005

Andy Hsieh AMDyMoN@cmu.edu
231A

Thursdays 7:30 - 8:30 PM, OSC

Marciella DeGrace mdegrace@andrew.cmu.edu Wednesdays 9-10 PM, WeH 5403

Academic Development Office:

OSC 212 • (412) 268 - 6878

<http://www.cmu.edu/academic-development/>

Call, stop by, or check out our website!

Services Available:

Supplemental Instruction

Individual/Walk-In Tutoring

Academic Counseling

- a. Lysine has three ionizable functional groups. Write the equilibrium equations for its three ionizations and assign the proper pK_a for each ionization.
- b. Draw the structure of Lys in each ionization state.
- c. What is the net charge on the Lys molecule in each ionization state?
- d. Draw the structures of the predominant ionization state of Lys at pH 1, 4, 10, and 12.
- e. What is the net charge on the Lys molecule at pH 1, 4, 10, and 12

Enkephalins are naturally occurring opiates (pain relievers). One of them, Met-enkephalin has the following sequence:

Tyr-Gly-Gly-Phe-Met

a) Draw the chemical structure of Met-enkephalin at pH 7.

b) What is the net charge of the peptide at:

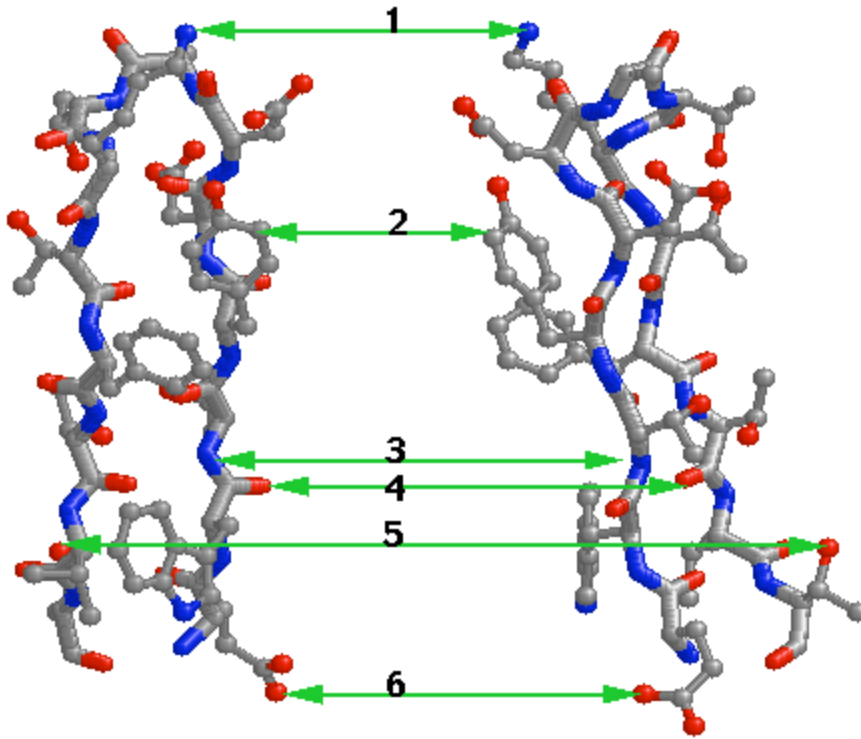
pH 1:

pH 7:

pH 12:

c) Indicate with numbered arrows the bonds that could be hydrolyzed (if any) by digestion with:

1. Trypsin
2. Chymotrypsin
3. CNBr (cyanogen bromide)



The following features are numbered on the Chime Image above:

- ___ a) Hydrophobic R-group.
- ___ b) Main chain H-bond acceptor.
- ___ c) Main chain H-bond donor.
- ___ d) Negatively charged functional group on a side chain.
- ___ e) Positively charged functional group on a side chain.
- ___ f) Uncharged polar functional group on a side chain.

Put the number from the image to the left of the correct feature in the above list.