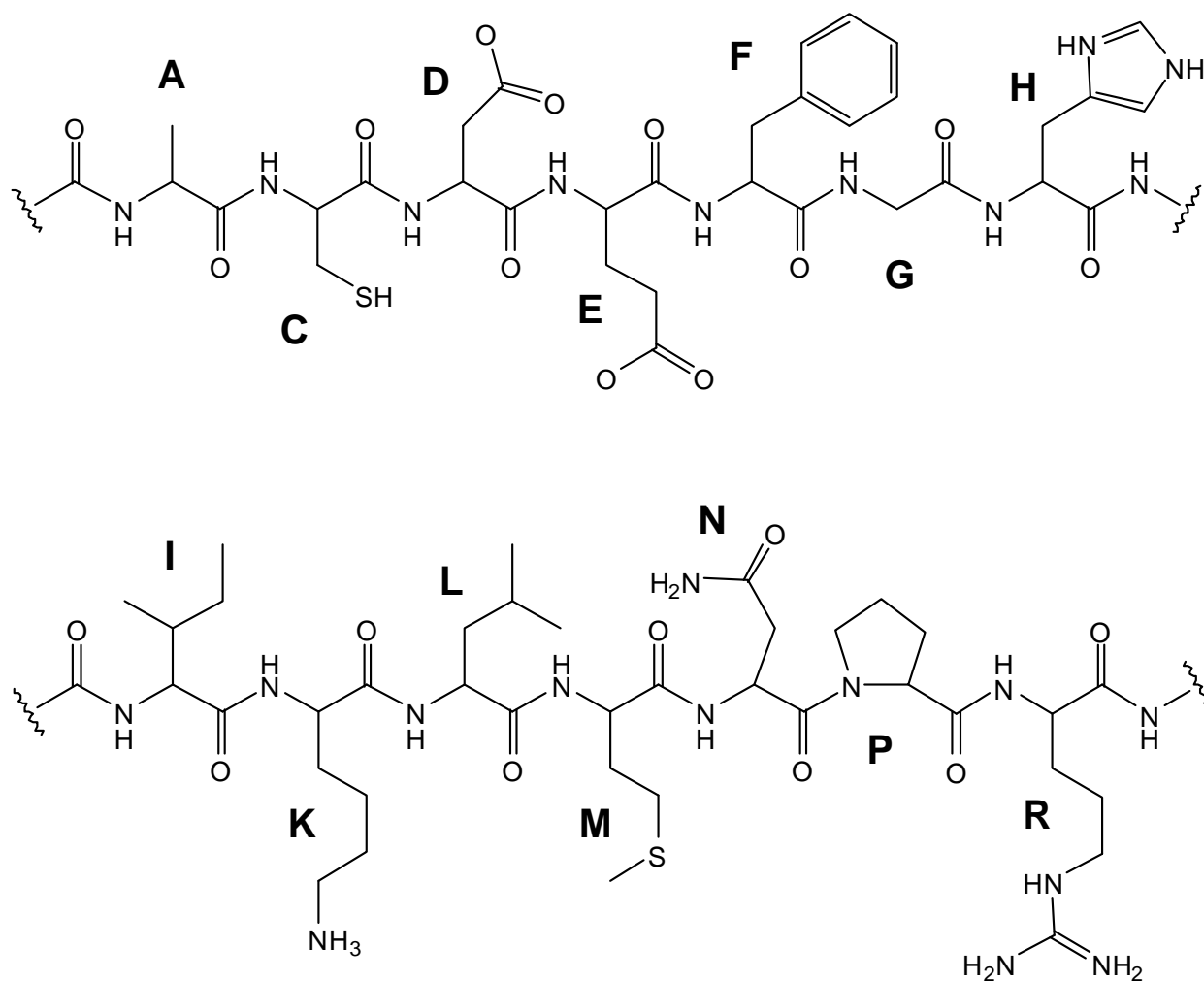


### Workshop 2 Valency and Formal Charges

All of the protein in your body is composed of 20 amino acids, 14 of which are shown below. (The bold letters are standard abbreviations for the amino acids.) Some of these amino acids are charged. On the protein chains below,

- Look for heteroatoms (N, O, S) that depart from typical valency. In order to have a filled octet, these atoms must be charged.
- Draw the appropriate formal charge on these atoms.

Notes: These are line-angle structures. So, H's on carbon have been omitted, but all H's on heteroatoms (N, O, S) are shown. Assume all octets are filled. Lone pairs aren't shown, but they are there.



*Bonus:* For **F**, **G** and **H**, draw all C-H's that have been omitted.