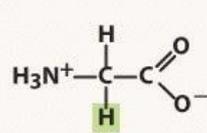


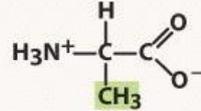
# Amino Acid Structures

# Amino Acids

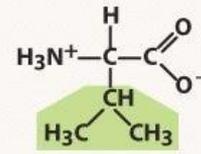
## Nonpolar side chains



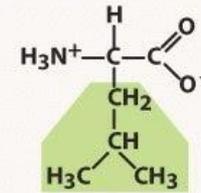
Glycine (G)  
Gly



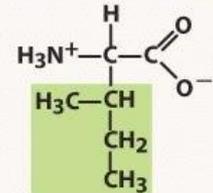
Alanine (A)  
Ala



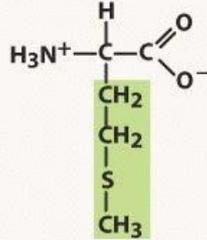
Valine (V)  
Val



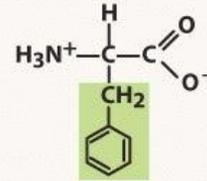
Leucine (L)  
Leu



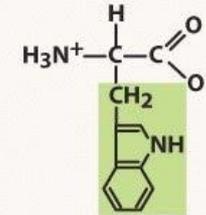
Isoleucine (I)  
Ile



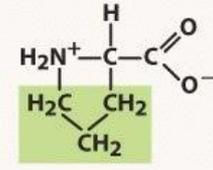
Methionine (M)  
Met



Phenylalanine (F)  
Phe

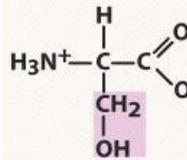


Tryptophan (W)  
Trp

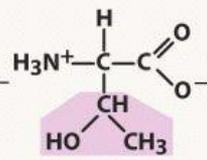


Proline (P)  
Pro

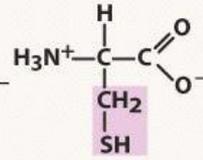
## Polar side chains



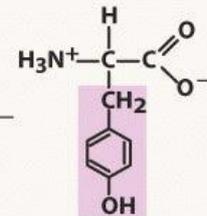
Serine (S)  
Ser



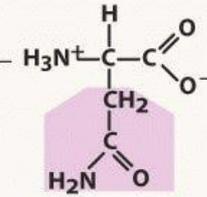
Threonine (T)  
Thr



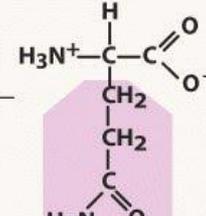
Cysteine (C)  
Cys



Tyrosine (Y)  
Tyr



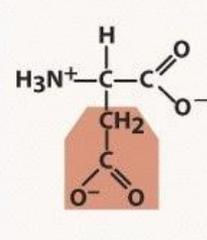
Asparagine (N)  
Asn



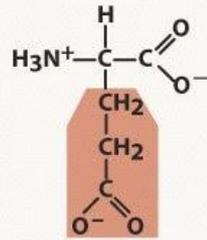
Glutamine (Q)  
Gln

## Electrically charged side chains

### Acidic

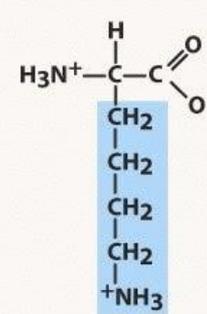


Aspartate (D)  
Asp

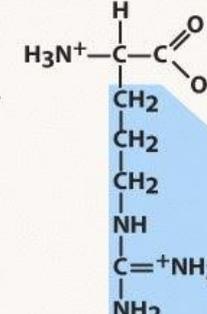


Glutamate (E)  
Glu

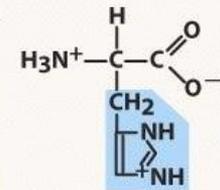
### Basic



Lysine (K)  
Lys



Arginine (R)  
Arg

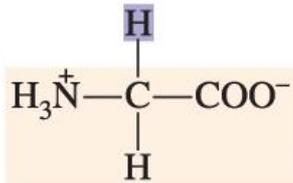
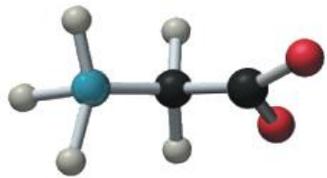


Histidine (H)  
His

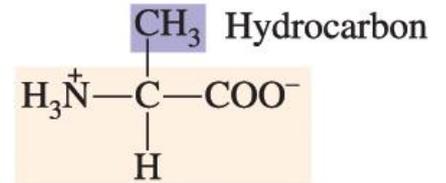
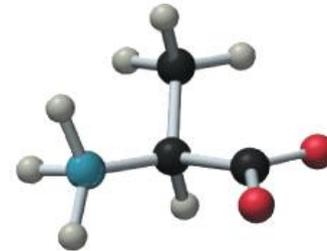
# Amino Acids – Nonpolar

- Contains nonpolar side chains
- Hydrophobic

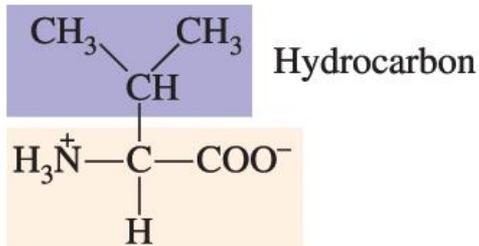
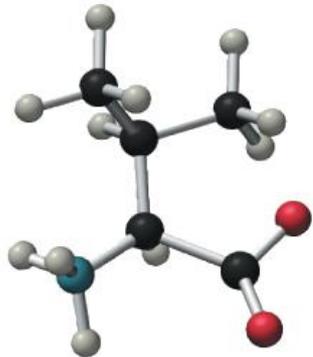
## Nonpolar Amino Acids



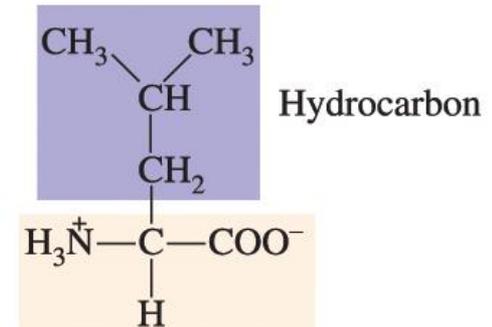
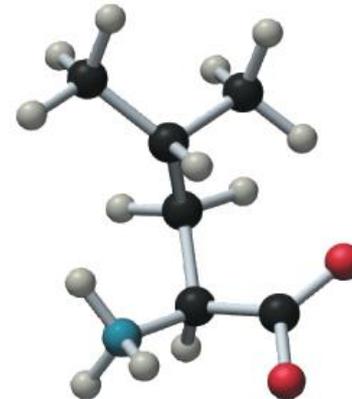
Glycine (Gly, G)



Alanine (Ala, A)



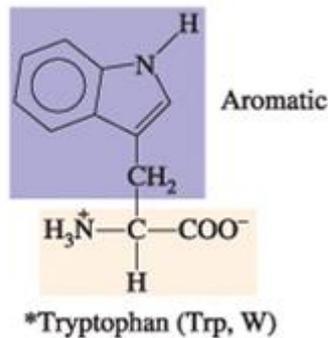
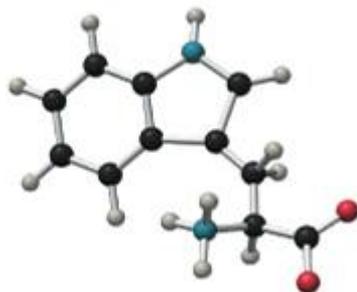
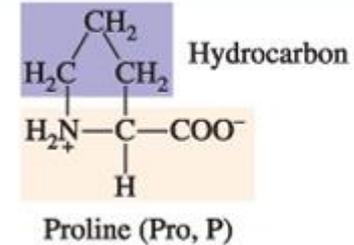
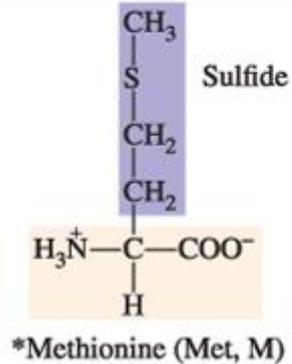
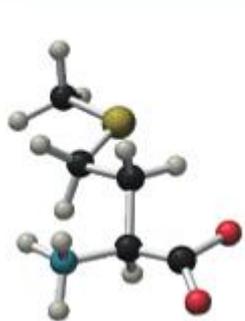
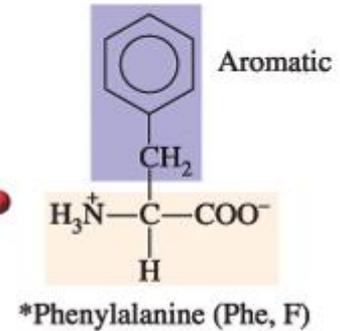
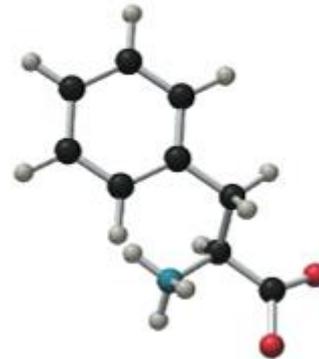
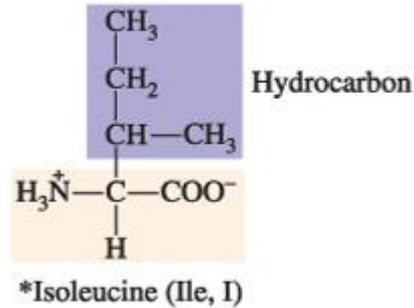
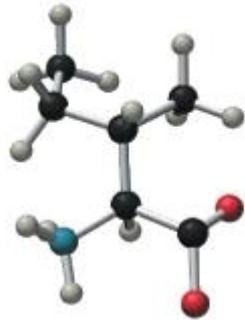
\*Valine (Val, V)



\*Leucine (Leu, L)

# Amino Acids – Nonpolar

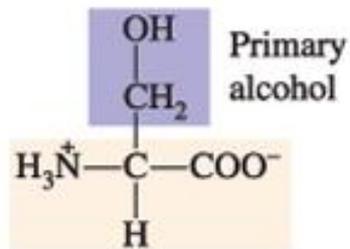
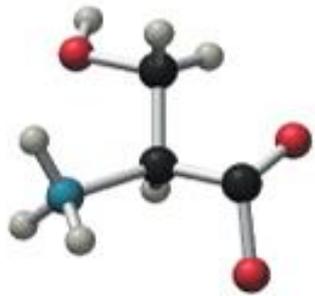
## Nonpolar Amino Acids



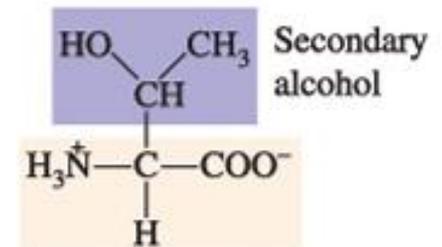
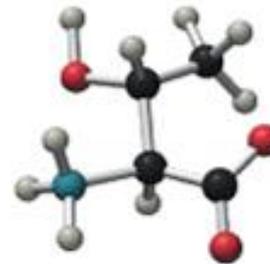
# Amino Acids – Polar

- Contains polar side chains
- Hydrophilic

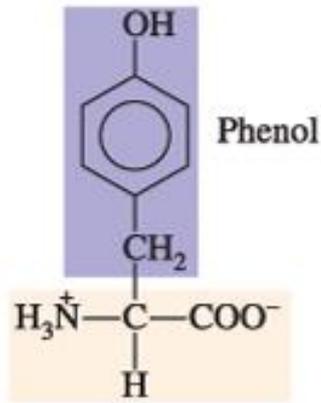
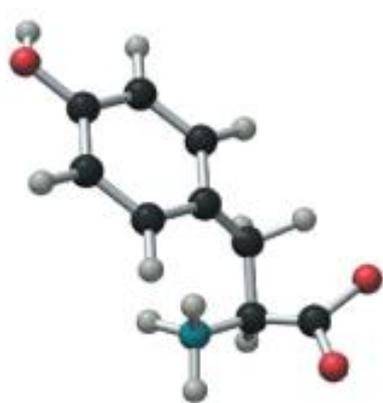
## Polar Amino Acids (Neutral)



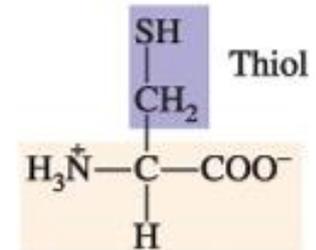
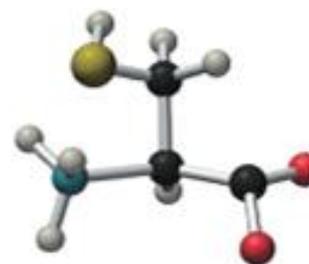
Serine (Ser, S)



\*Threonine (Thr, T)



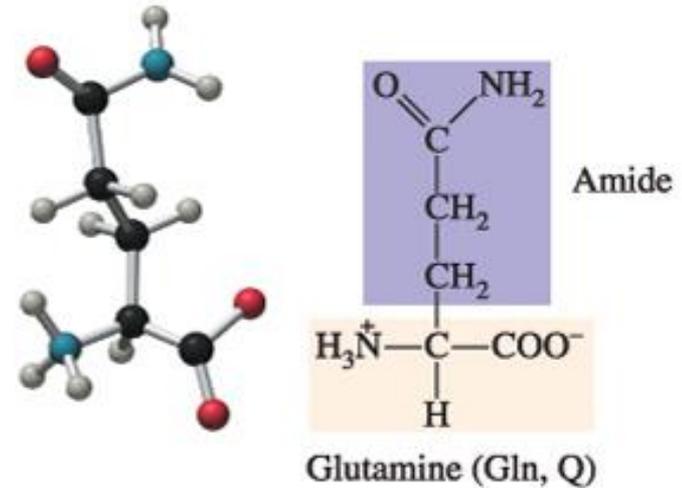
Tyrosine (Tyr, Y)



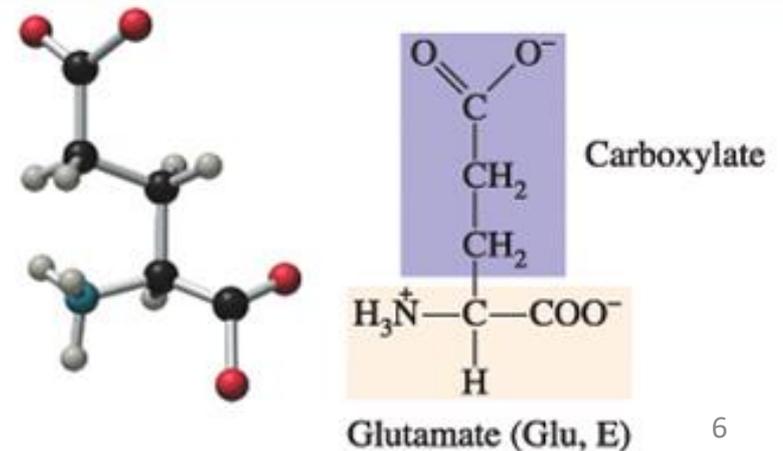
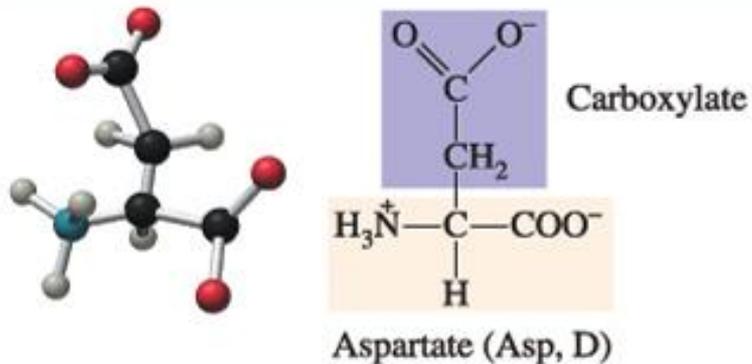
Cysteine (Cys, C)

# Amino Acids – Polar

## Polar Amino Acids (Neutral)

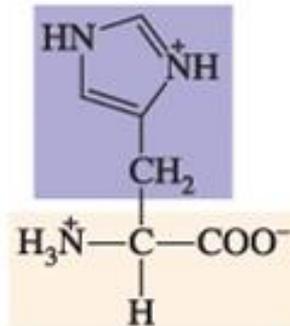
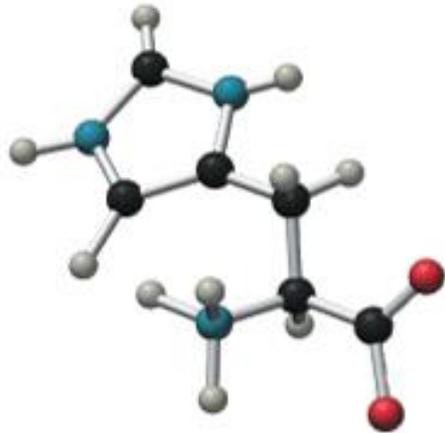


## Polar Amino Acids (Acidic)

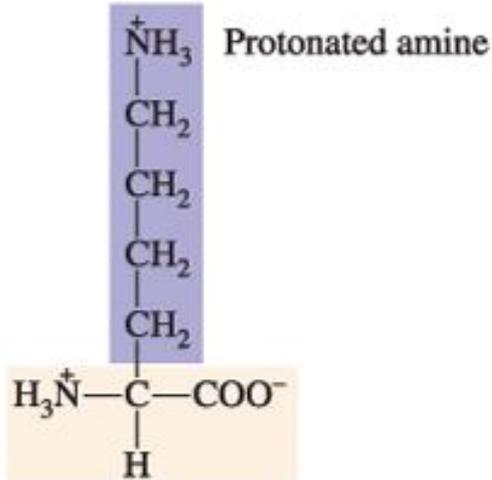


# Amino Acids – Polar

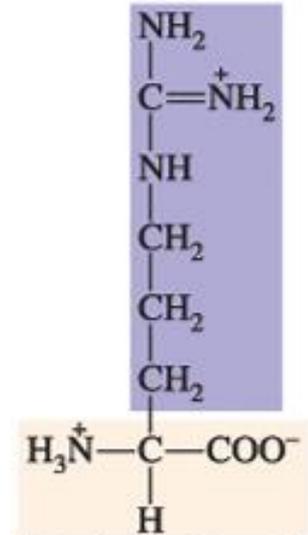
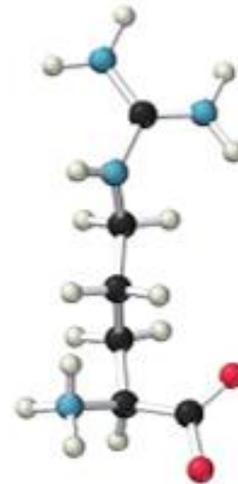
## Polar Amino Acids (Basic)



\*Histidine (His, H)



\*Lysine (Lys, K)



\*Arginine (Arg, R) 7