

# Introducing, The Amino Acids!

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from chapter(s) \_\_\_\_\_ in the recommended text

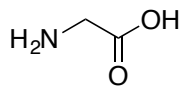
## A. Introduction

## B. Nomenclature And Conventions

*left,*  
*right.*

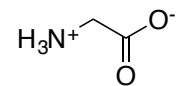
*ammonium* and a C-terminal *carboxylate*.

*zwitterionic* form.




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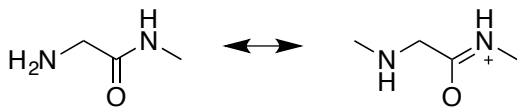
*glycine, neutral form*




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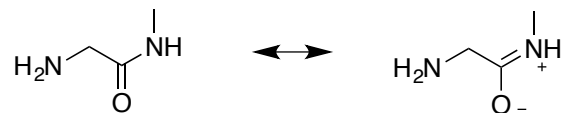
*glycine, charged form*

*slow* compared  
*resonance.*




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*trans*




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*cis*

*flat*  
*sp<sup>2</sup>*  
*alkenes.*

*trans*  
*is not*

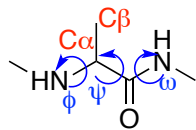
*20* genetically

*aliphatic*

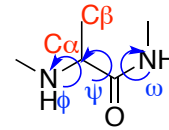
*C<sub>α</sub>* and the  
 labeled *C<sub>β</sub>*.

*C<sub>β</sub>*.

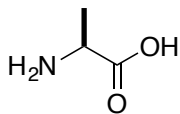
### C. Amino Acids With Lypophilic Side Chains



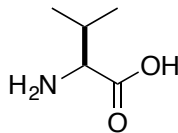
*trans*



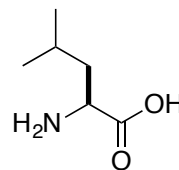
*cis*



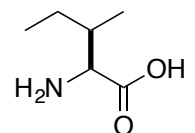
*alanine, Ala, A*



*valine, Val, V*



*leucine, Leu, L*



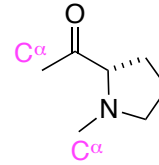
*iso-leucine, Ile, I*

*L*-configurations  
*the configuration of glyceraldehyde.*

*secondary* amine.



*trans*



*cis*

*more*

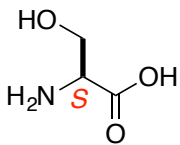
## D. Alcohol And Thiol Amino Acids

*Ser*

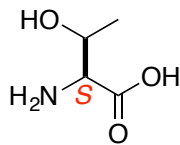
*Thr*

*Cys* (CH<sub>2</sub>SH)

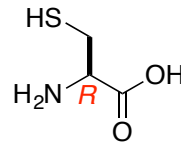
*Met* (CH<sub>2</sub>CH<sub>2</sub>SMe).



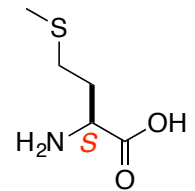
*serine*



*threonine*



*cysteine*

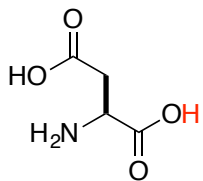


*methionine*

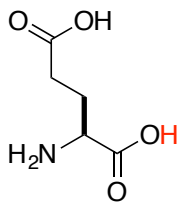
*Cys*,

sulfur atom connected to C<sub>β</sub> has higher priority than carbonyl group.

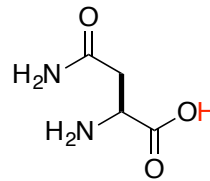
## E. Acidic Amino Acids And Their Derivatives



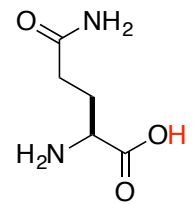
*D*



*E*



*N*



*Q*

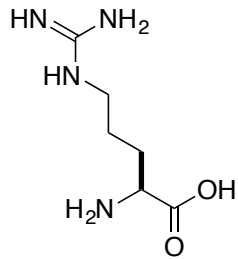
*more* acidic

## F. Basic Amino Acids

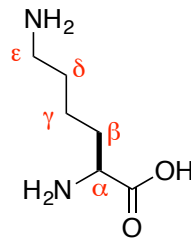
*H*

*Lys*

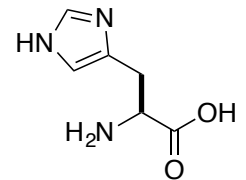
*Arg* ( $\text{CH}_2\text{CH}_2\text{CH}_2\text{NHCNHNH}_2$ )



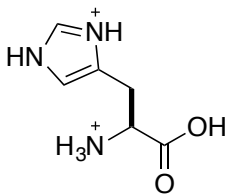
*most basic*



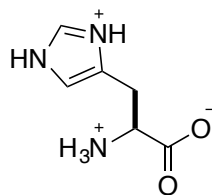
*intermediate*



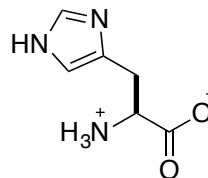
*least basic*



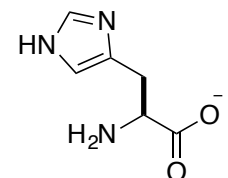
*pH = 0*  
*di-cation*



*4*

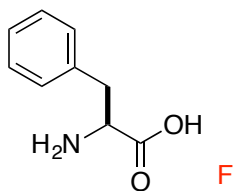


*8*

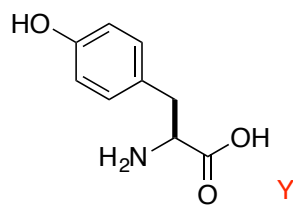


*12*  
*monoanion*

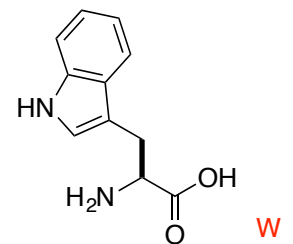
## G. Aromatic Amino Acids



*phenylalanine*



*tyrosine*



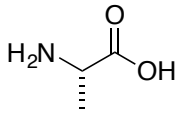
*tryptophan*

*weaker*

*indole*

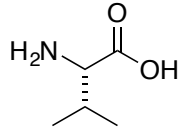
*is not*

## H. Summary



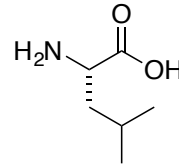
*hydrophobic 1*

name: alanine, Ala, A



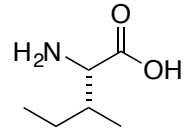
*hydrophobic 2*

valine, Val, V



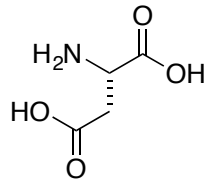
*hydrophobic 3*

leucine, Leu, L



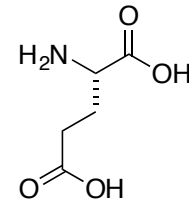
*hydrophobic 4*

iso-leucine, Ile, I



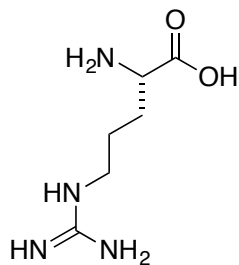
*acidic 1*

aspartic acid, Asp, D



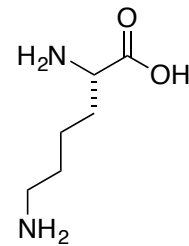
*acidic 2*

glutamic acid, Glu, E



*basic 1*

arginine, Arg, R



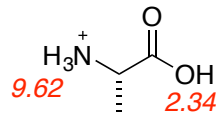
*basic 2*

lysine, Lys, K

## I. Isoelectric Points

*isoelectric* point

*midway between*



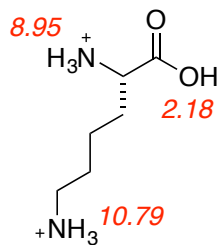
*structure of alanine indicating pKa's*

$$pI = \frac{pKa(\alpha\text{-COOH}) + pKa(\alpha\text{-NH}_3^+)}{2}$$

$$pI = (2.34 + 9.62)/2 = 5.98$$

*calculation*

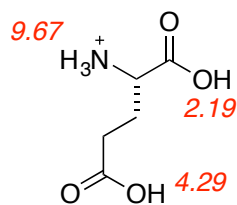
*average*



*structure of Lys indicating pKa's*

$$pI = (8.95 + 10.79)/2 = 9.87$$

*calculation*



*structure of glutamic acid indicating pKa's*

$$pI = (2.19 + 4.29)/2 = 3.24$$

*calculation*

Asp, *acid*    Asn, *neutral*    Arg, *basic*  
 Glu, *acid*    Gln, *neutral*  
 Ser, *neutral*    Thr, *neutral*

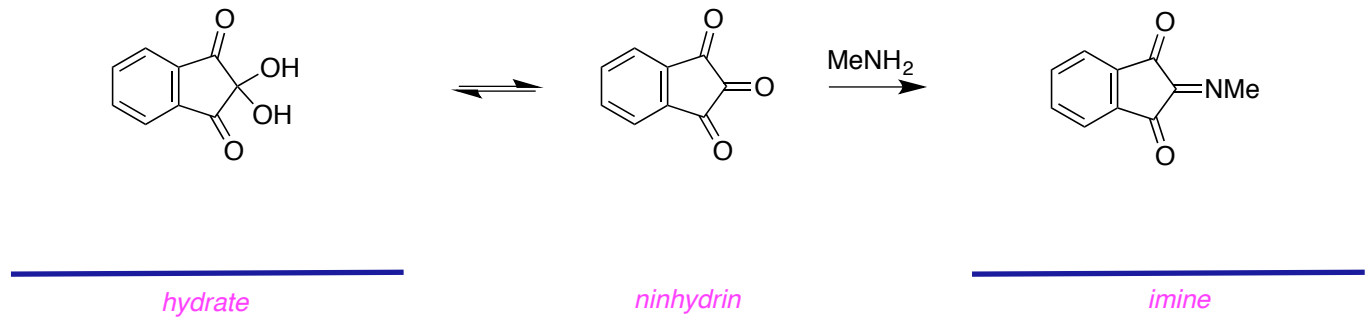
the *highest* pI value *Arg*      the *lowest* pI value *Glu*  
most *negative* charge at pH 6 *Glu*      most *positive* charge at pH 2 *Lys*

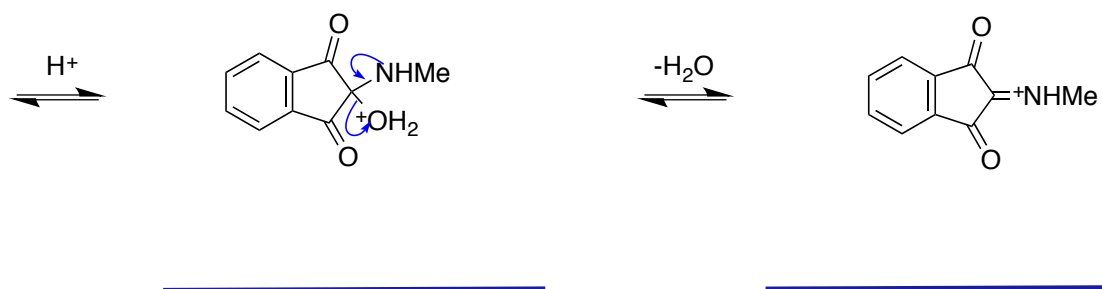
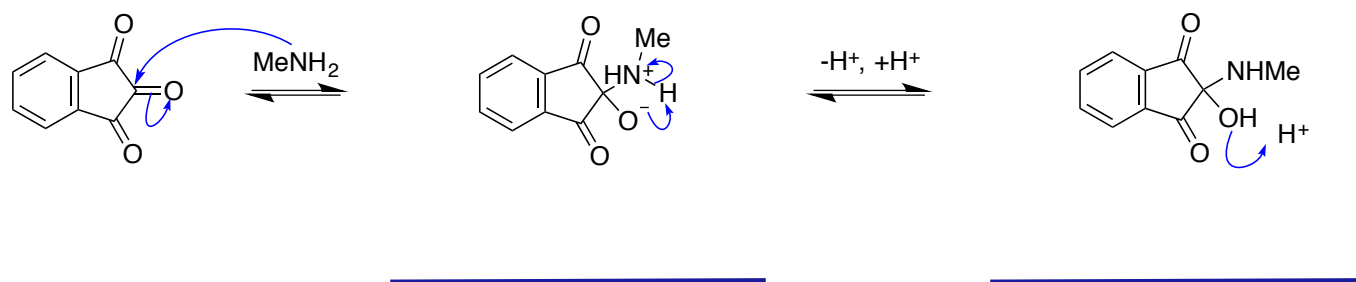
*mass divided by charge.*

*Lys*  
*not at all*  
*migrate to the positive electrode.*

## J. The Ninhydrin Test

*central*



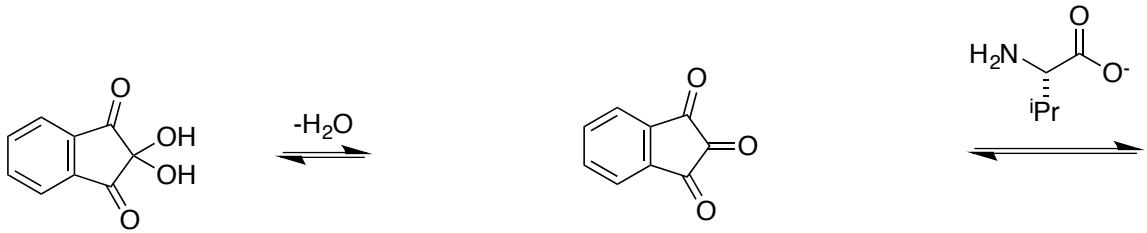


*proline*).

*amine*

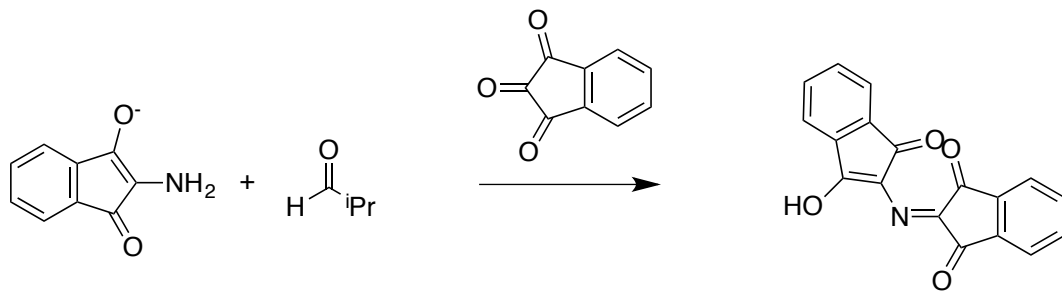
Proline *does not*





*imine*

*imine enolate*



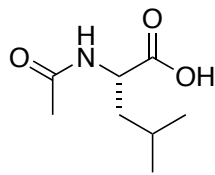
*amine*

*purple*

*purple*  
*can be* quantified by UV.

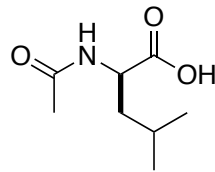
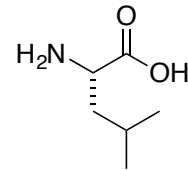
*and* to quantitate

*perfect*

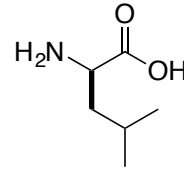


*(S)-Ac-Leu*

*pig kidney  
aminoacylase*  
→  
*fast*



*pig kidney  
aminoacylase*  
→  
*slow*



is *just under 50 %*.

is *just under 50 %*.

*decreases* with conversion, while that of the starting material *increases*.