### A list of tricks to help you remember the amino acids

<table>
<thead>
<tr>
<th>Structures</th>
<th>Names (letter code)</th>
<th>Side chain features/description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Aliphatic" /></td>
<td>Glycine (G) hydrogen for R, most simple, optically inactive</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Aliphatic" /></td>
<td>Alanine (A) methyl for R, a simple functional group to start just like “A” (in alanine) starts the alphabet</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Aliphatic" /></td>
<td>Valine (V) simple again, but shaped like the “V” in its name</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Aliphatic" /></td>
<td>Leucine (L) valine extended by one methylene</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Aliphatic" /></td>
<td>Isoleucine (I) lopsided valine....?</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Sulfur-containing" /></td>
<td>Methionine (M) special - starts every protein, 3 carbons with a thioether; methyl-blocked sulphhydryl...?</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Sulfur-containing" /></td>
<td>Cysteine (C) “sulphhydryl alanine,” reactive, can form disulfides</td>
<td></td>
</tr>
</tbody>
</table>

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Phenylalanine (F) alanine with a phenol group which you KNOW is aromatic, the “Y” in phenyl can remind you which 3 amino acids with names beginning with T (the “T”s) are aromatics

Tyrosine (Y) hydroxylated phenylalanine, one of 3 “T”s that has “Y” in its name so it is an aromatic

Tryptophan (W) one of 3 “T”s with a “Y” so it is aromatic, will “tryp” you up because it is hard to remember, has a 3 carbon start to N (or indole ring on methylene)

Serine (S) "hydroxyl alanine"

Threonine (T) one of 3 “T”s, without “Y” so aliphatic (also its symbol is the first letter of its name like the other aliphatics), its “threo” parts are methyl, hydroxyl, and hydrogen on a single C
Acidic - negative charges

\[
\text{Aspartate (D) } \quad \text{“carboxyl alanine” with acidic nature noted by suffix “ate”, the alphabetical ordering of the first letter of their names correlates with an increase in length of side chain}
\]

\[
\text{Glutamate (E) } \quad \text{aspartate plus one methylene, G is after A}
\]

Basic - positive charges

\[
\text{Arginine (R) } \quad \text{3 carbon chain linked to a C full of only N’s (no H’s & C has 4 bonds) through an N}
\]

\[
\text{Lysine (K) } \quad \text{3 carbon chain plus one methylene to amino, it lies (“Lys”) about the 3 carbon trend}
\]

\[
\text{Histidine (H) } \quad \text{3 carbons to N and loop back through C ‘n’ N}
\]

Amide derivatives of acids - loose OH for NH\textsubscript{2} to loose charge

\[
\text{Asparagine (N) } \quad \text{amide derivative of aspartate}
\]

\[
\text{Glutamine (Q) } \quad \text{amide derivative of glutamate}
\]

For 3-D visualization, see: http://chemistry.gsu.edu/glactone/PDB/Amino_Acids/aa.html
For RasMol download, see: http://www.umass.edu/microbio/rasmol/

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