There are three naming systems used for fatty acids:

1. Delta nomenclature
2. Omega nomenclature
3. Common names

The omega nomenclature and common names are used more in the field of nutrition than the delta nomenclature when describing specific fatty acids.

1. Delta Nomenclature

For delta nomenclature you need to know 3 things:

1. Number of carbons in the fatty acid
2. Number of double bonds
3. Number of carbons from the carboxylic acid (alpha) end to the first carbon in the double bond(s)

Let's consider the example in the figure below.

Figure 2.331 Delta Nomenclature

1. Number of carbons in the fatty acid = 18
2. Number of double bonds = 1
3. Number of carbons from the carboxylic acid end to the first carbon in the double bond = 9

This is then written as shown in Figure 2.331.

2. Omega Nomenclature
The omega nomenclature is almost exactly the same as the delta nomenclature, the only difference being that carbons are counted from the methyl (omega) end instead of the carboxylic acid end and the omega symbol is used instead of the delta symbol.

For omega nomenclature you need to know 3 things:

1. Number of carbons in the fatty acid
2. Number of double bonds
3. Number of carbons from the methyl end (aka Omega end) to the first carbon in the double bond closest to the methyl end

We will again consider the same fatty acid.

![Diagram of fatty acid with numbers and labels](image)

Figure 2.332 Omega Nomenclature

1. Number of carbons in the fatty acid = 18
2. Number of double bonds = 1
3. Number of carbons from the methyl (aka omega) end to the first carbon in the double bond closest to the methyl end = 9

If it is a saturated fatty acid, then the omega nomenclature is not added to the end of the name. If it is an 18 carbon saturated fatty acid, then it would be named 18:0.

This is written as shown in figure 2.332. Instead of an omega prefix, the prefix n- (i.e. n-3) is also commonly used.

**Check Yourself**
Name this fatty acid using the omega system.\(^1\)
3. Common Names

The common names of fatty acids are something that, for the most part, have to be learned/memorized. The common name of the fatty acid we have been naming in this section is oleic acid.

However, it can also be called oleate. The only difference is that, instead of a carboxylic acid on the end of the fatty acid, it has been ionized to form a salt (shown below). This is what the -ate ending indicates and the two names are used interchangeably.

The table below gives the common names and food sources of some common fatty acids.
Table 2.331 Common names of fatty acids

<table>
<thead>
<tr>
<th>Omega Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:0</td>
<td>Butyric Acid</td>
</tr>
<tr>
<td>12:0</td>
<td>Lauric Acid</td>
</tr>
<tr>
<td>14:0</td>
<td>Myristic Acid</td>
</tr>
<tr>
<td>16:0</td>
<td>Palmitic acid</td>
</tr>
<tr>
<td>18:0</td>
<td>Stearic Acid</td>
</tr>
<tr>
<td>20:0</td>
<td>Arachidic Acid</td>
</tr>
<tr>
<td>24:0</td>
<td>Lignoceric Acid</td>
</tr>
<tr>
<td>18:1 (n-9)</td>
<td>Oleic Acid</td>
</tr>
<tr>
<td>18:2 (n-6)</td>
<td>Linoleic Acid</td>
</tr>
<tr>
<td>18:3 (n-3)</td>
<td>Alpha-linolenic Acid</td>
</tr>
<tr>
<td>20:4 (n-6)</td>
<td>Arachidonic Acid</td>
</tr>
<tr>
<td>20:5 (n-3)</td>
<td>Eicosapentanoic Acid</td>
</tr>
<tr>
<td>22:6 (n-3)</td>
<td>Docosahexanoic Acid</td>
</tr>
</tbody>
</table>

The NutritionData link below can help you identify foods that are high in a specific fatty acid.

Web Link

NutritionData: Fatty Acids

**Food Sources of Fatty Acids**

After going through this wide array of fatty acids, you may be wondering where they are found in nature. The figure below shows the fatty acid composition of certain oils and oil-based foods. As you can see, most foods contain a mixture of fatty acids. Stick margarine is the only product in the figure that contains an appreciable amount of trans fatty acids. Corn, walnut, and soybean are rich sources of n-6 polyunsaturated fatty acids, while flax seed is fairly unique among plants in that it is a good source of n-3 polyunsaturated fatty acids. Canola and olive oil are rich sources of monounsaturated fatty acids. Lard, palm oil, butter and coconut oil all contain a significant amount of saturated fatty acids.
Check Yourself

Your usual after-class snack is a heaping spoonful of peanut butter. Using the USDA Nutrient Database, enter "Peanut butter, chunk style, without salt" into the search box and hit Enter. How many grams of saturated, monounsaturated, and polyunsaturated fat does a snack of 2g contain?

References & Links
3. www.nutritiondata.com

Links