

**ANSC/NUTR 618**  
**Lipids and Lipid Metabolism**  
**Fatty Acid Nomenclature**

**I. Nomenclature Systems**

A. Delta system

1. Numbers from the carboxyl end (standard biochemical technique) to the first unsaturated carbon.

2. *Example:*  $\alpha$ -Linolenic acid -- 18:3  $\Delta^{9,12,15}$

methyl carbon

#1 carbon



B. "N minus" system

1. Numbers from the terminal methyl carbon to the first unsaturated carbon, "subtracts" those carbons, and places these numbers in parentheses.

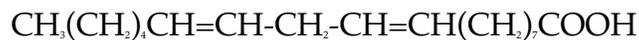
2. *Examples:*  $\alpha$ -Linolenic acid – 18:3 (*n*-3)

#3 from methyl carbon



Linoleic acid – 18:2 (*n*-6)

#6 from methyl carbon



3. Fatty acid rules

- a. All double bonds produced by eukaryotes (plants and animals) are in the *cis*-configuration.
- b. All double bonds produced by eukaryotes and three carbons apart (i.e., 1,4-dienes).
- c. All *trans*-double bonds are produced by isomerization of *cis*-double bonds.

(1) By chemical hydrogenation

(2) By ruminal hydrogenation

d. All conjugated double bonds (i.e., two carbons apart) are produced by isomerization of *cis*-double bonds. This causes movement of the double bond from a 1,4-diene to a 1,3-diene.

### C. Omega system

1. Numbers from the terminal methyl carbon to the first unsaturated carbon.
2. *Example*:  $\alpha$ -Linolenic acid -- 18:3  $\omega$ 3.
3. Position of other double bonds deduced by 1,4-diene rule.

## II. Derivation of Trivial Names

### A. Latin

1. Capro = goat. So, capric = anything smelling like goats (eventually used to indicate a group of fatty acids).
2. Palm = from the *Palmaceae* (palm oil) family
3. Olea = olive. So, oleum = oil
4. Linum = flax. So, linoleum (or linoleic) = flax oil, which is high in both 18:2 and 18:3.
5. Laurel = bay leaf (in Spanish; *Laurus nobilius*). So laural = oil from bay leaf, which is high in lauric acid.
6. *Myristica fragans* = nutmeg, which is high in myristic acid.

### B. Greek

1. Stear = animal fat.
2. No other common Greek names for fatty acids.

### C. Chinese characters

1. Abura (oil) (Japanese)

油

2. Shibo (animal fat) (Japanese)

脂肪