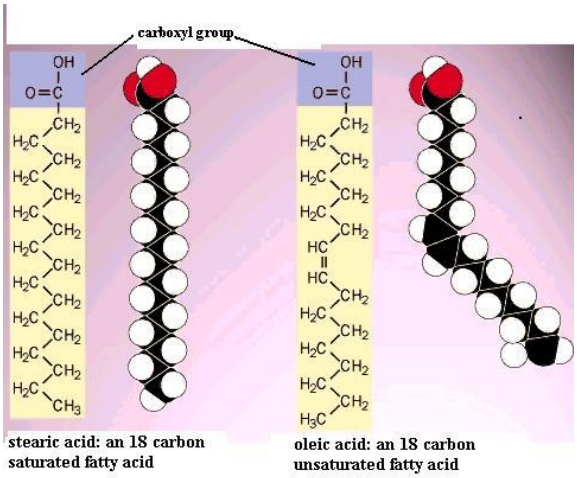
LIPIDS

revised 14 Sept 2016
Ouellette: p 493, Campbell 5th p 65-, 6th: 68-71, 7th: 74-76, Sadava: 54-55, Campbell 9th 74-77
Campbell 10th: 72-75

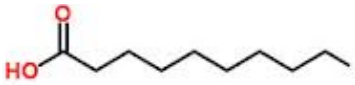
lipid (fat), 2 definitions: **functional**: **chloroform-soluble** fraction of tissues
LEARN: **biochemical:** **biological hydrocarbons**
I.e., they are biochemical compounds soluble in *non-polar* organic solvents

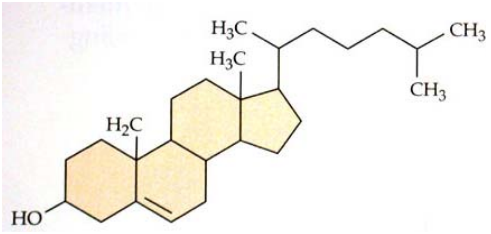


CLASSIFICATION OF LIPIDS:

SIMPLE (not hydrolyzable with base)	**COMPLEX** (hydrolyzable with base)
fatty acids	**triglycerides**
steroids	**phosphoglycerides**
terpenes	waxes
prostaglandins	sphingophospholipids
glycosphingolipids	

SIMPLE LIPIDS: (page 75) Ex: C-10 Fatty Acid:

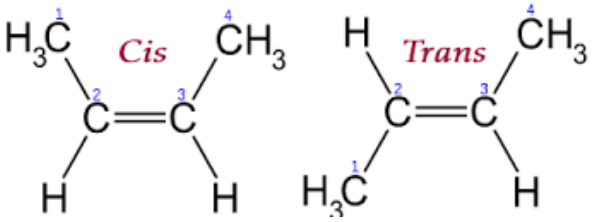




FATTY ACIDS: LEARN: long chain **carboxylic acids**, have an ***even number*** of Cs.
melting point is determined by length, and saturation, or **degree of saturation** (page 75)
LEARN: unsaturated fats may be in one of two configurations: ***cis*** or ***trans***

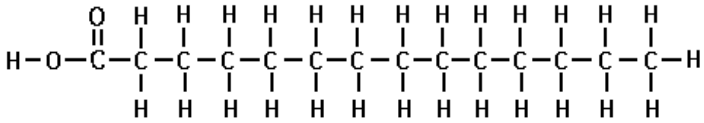
cis	"on the same side"	unstable, forces kink in chain
trans	"across"	stable, straight chain.

heat and hydrogenation convert ***cis*** **to** ***trans*****:**
http://www.youtube.com/watch?v=r6v21W8zRIw
(Go to from 37 to 115 seconds in video for *cis* to *trans* configuration change)



unsaturated fats are oxidizable by oxygen = **epoxides, carcinogenic**

LEARN: oxidized unsaturated fatty acids = rancid = carcinogenic
also can **polymerize to form plastics and varnish**
Sensitivity to heat and oxygen of polyunsaturated fats


Myristic Acid

Fatty acid	#Cs:	sat'd MP	name	unsat'd MP:
Lauric	12	44 C		
Myristic	14	54		
Palmitic	16	63	palmitoleic	-0.5
Stearic	18	70	oleic (1 ene)	13.4
	18		Linoleic (2 enes)	-5
	18		Linolenic (3 enes)	-11
Arachidic	20	76.5	**Arachidonic** (4 enes)	-49.4

Unsaturated: Oleic , Linoleic, Linolenic. Arachidonic is the precursor of prostaglandins.
hydrogenation causes fat to be solid at room temp. Used commercially to prevent oil separation while sitting on shelf (Crisco, Jif Peanut Btr)

Fish oils high in unsat'd, smell fishy when
(Oxidation favored by light and divalent cations)

omega 3 fatty acids: unsaturated at the distant end of the HC chain between 3 and 4: good for heart, helps fibrin breakdown.