

LIPIDS

rvdsd 27 Sept 95, 1 Oct 01, 7 Oct 02, 1 Oct 04, 5 Oct 05, 28sept07, 6Oct08, 2Oct09, 1Oct10, 3Oct11
 BKH: 63-73, 5th: 66-72, BKH 6th: 66-70, 7th: 66-71

LIPIDS: **biological hydrocarbons:** functional definition: cell extract soluble in chloroform or ether
 six types: **fatty acids** sphingolipids
 (p 67) **triglycerides** **steroids**
phospholipids terpenes

FATTY ACIDS (FA):

possess an even number of carbons because built from two carbon unit additions (acetyl CoA)
 saturated versus unsaturated, monounsaturated or polyunsaturated. (p. 68)
cis versus *trans*: *cis* natural, heat rotates to more stable *trans* (*trans* associated with heart disease).
Trans packs more evenly, solid at lower temp.

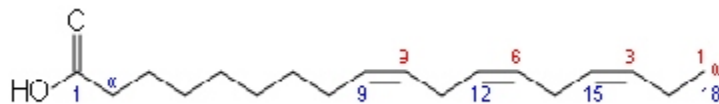
Desaturase in N Atlantic fish converts sat'd to unsat'd, softens membranes. (Cold H₂O fish is heart healthier)

most common FA C-16 palmitate if saturated, palmitoleate if monounsat'd
 C-18 stearate if sat'd, oleate if monounsat'd

Omega 3 fatty acids (ω-3) : unsat'd at methyl end:

ω-3 fatty acids include essential fatty acids. Lower blood triglycerides, inhibit clotting. (linolenic acid:

<http://www.pdb.org/pdb/explore/jmol.do?structureId=2BYO&bionumber=1>



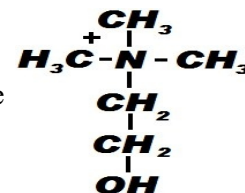
TRIGLYCERIDES:

glycerol esterified to three fatty acids (p 67)
 store energy fats store 2x density of energy than carbohydrates
 unsaturated prevents tight packing

PHOSPHOLIPIDS:

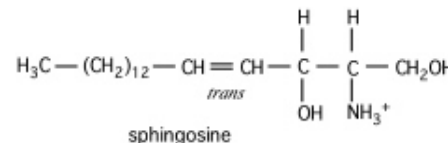
amphipathic 40% of molecules in membranes
 phosphoglycerides basic components phosphatidic acid
 p 69: esterified to serine, ethanolamine, inositol

choline: trimethylethanolamine



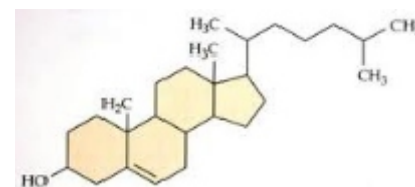
SPHINGOLIPIDS: (p 67)

long chain R-OH, NH₂ at C-2, based on sphingosine (18 carbon, ethylene at C-4)
 sphinx: enigmatic monster that strangled (also squeezed, bind tight)
 forms amide bonds at N with FA, forming **ceramide**.
 #1-OH can bond with variety of R groups
 forming among others, **sphingomyelins**,
 (40% of membranes in **myelin sheath**)



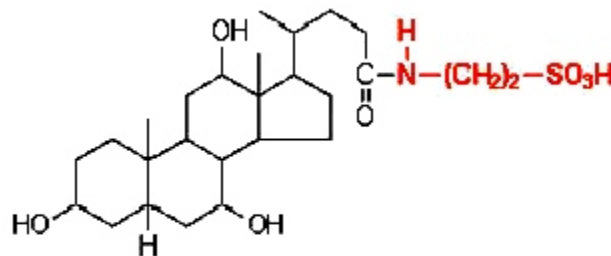
STEROIDS: (p 70)

cholesterol backbone, substituted at diff points
 Cholesterol is only steroid found in membranes (p67).
 Also serve as hormones and bile acids, precursor to vitamin D (7 dehydrocholesterol)

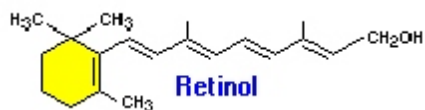
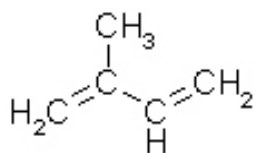


TERPENES:

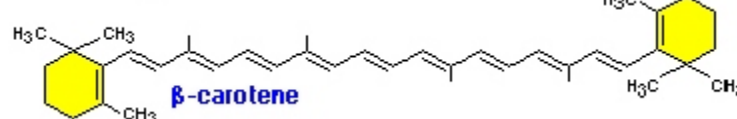
synthesized from 5 isoprene monomer: CH₂=C(CH₃)-CH=CH₂:
 Vit A
 carotenes (photosynthesis)
 quinones
 coenzyme Q (electron transport chain)
 etc.



Taurocholic acid



Retinol



β-carotene