

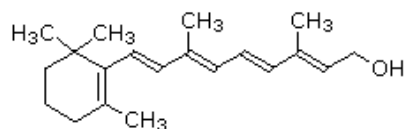
2.6 Fette und Lipide

Stoffklassen

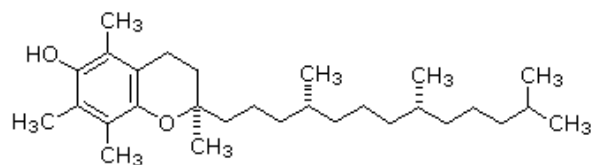
A. nicht hydrolysierbar

- Langkettige Alkane, Carotinoide, Vitamine
- Terpene, Steroide
- Fettalkohole >C10
- Fettsäuren >C10

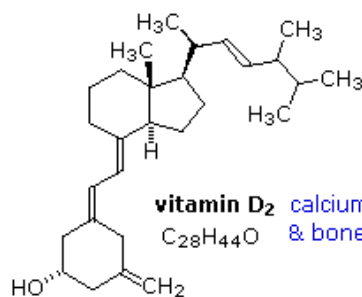
Lipid Soluble Vitamins



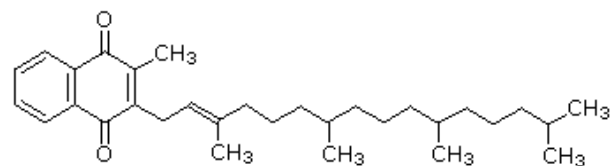
vitamin A
 $C_{20}H_{30}O$ part of the visual pigment



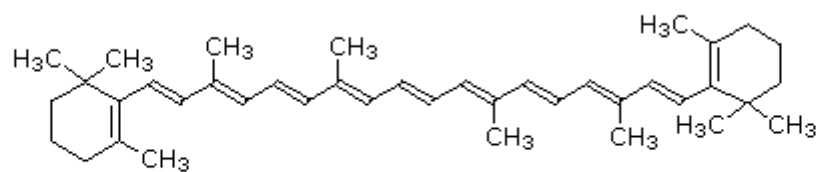
$C_{29}H_{50}O_2$ **vitamin E** an antioxidant



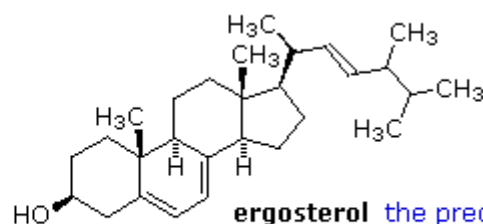
vitamin D₂ calcium metabolism
 & bone growth
 $C_{28}H_{44}O$



vitamin K₁ a blood clotting factor
 $C_{31}H_{46}O_2$

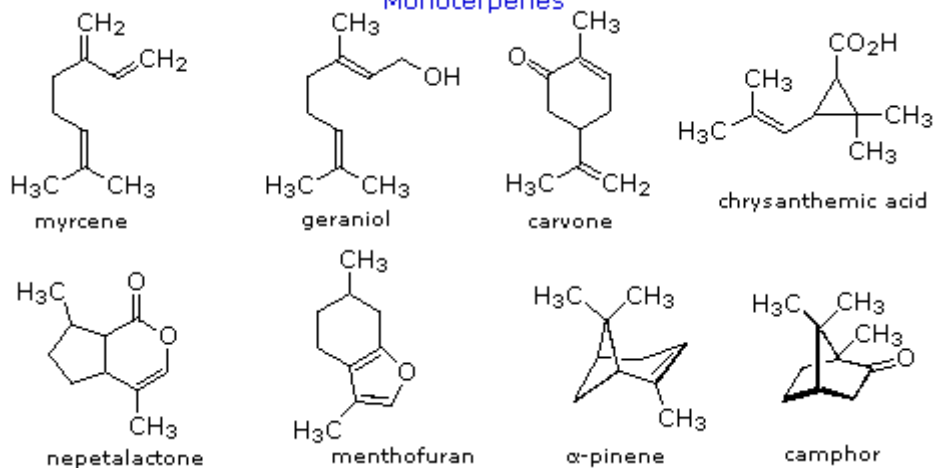


β-carotene the precursor to vitamin A

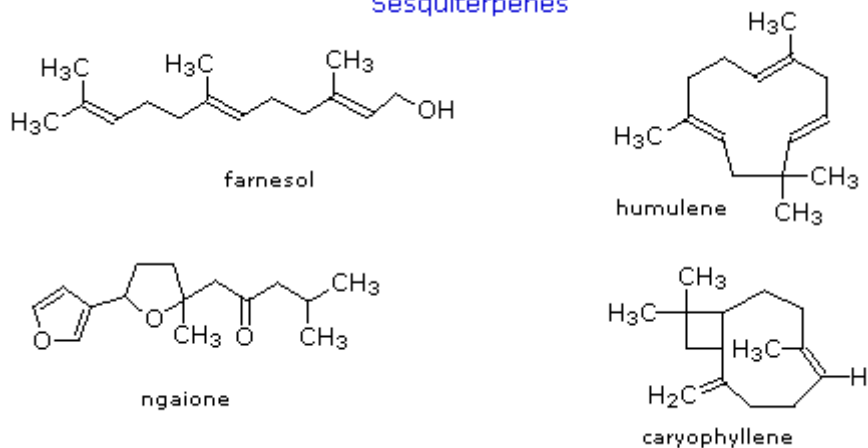


ergosterol the precursor to vitamin D₂

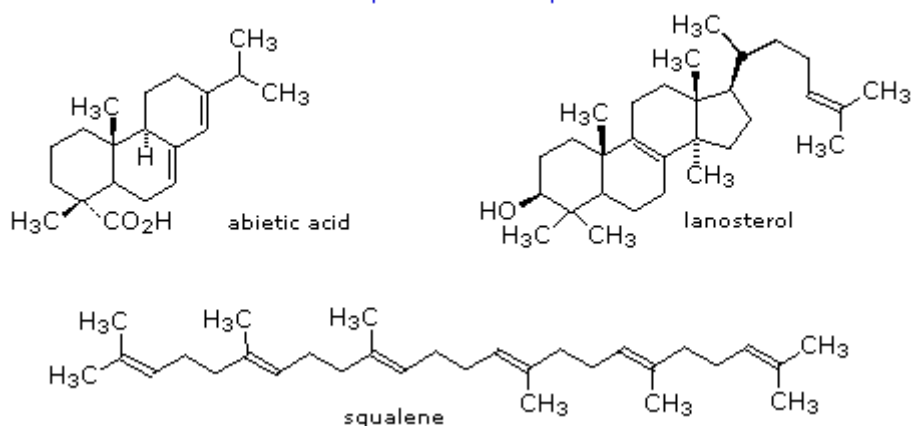
Monoterpenes



Sesquiterpenes

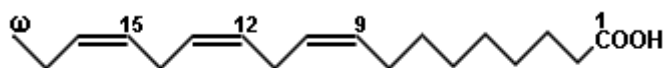


Diterpenes & Triterpenes

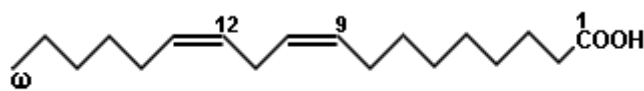


Common Fatty Acids

Chemical Names and Descriptions of some Common Fatty Acids				
Common Name	Carbon Atoms	Double Bonds	Scientific Name	Sources
Butyric acid	4	0	butanoic acid	butterfat
Caproic Acid	6	0	hexanoic acid	butterfat
Caprylic Acid	8	0	octanoic acid	coconut oil
Capric Acid	10	0	decanoic acid	coconut oil
Lauric Acid	12	0	dodecanoic acid	coconut oil
Myristic Acid	14	0	tetradecanoic acid	palm kernel oil
Palmitic Acid	16	0	hexadecanoic acid	palm oil
Palmitoleic Acid	16	1	9-hexadecenoic acid	animal fats
Stearic Acid	18	0	octadecanoic acid	animal fats
Oleic Acid	18	1	9-octadecenoic acid	olive oil
Vaccenic Acid	18	1	11-octadecenoic acid	butterfat
Linoleic Acid	18	2	9,12-octadecadienoic acid	safflower oil
Alpha-Linolenic Acid (ALA)	18	3	9,12,15-octadecatrienoic acid	flaxseed (linseed) oil
Gamma-Linolenic Acid (GLA)	18	3	6,9,12-octadecatrienoic acid	borage oil
Arachidic Acid	20	0	eicosanoic acid	peanut oil, fish oil
Gadoleic Acid	20	1	9-eicosenoic acid	fish oil
Arachidonic Acid (AA)	20	4	5,8,11,14-eicosatetraenoic acid	liver fats
EPA	20	5	5,8,11,14,17-eicosapentaenoic acid	fish oil
Behenic acid	22	0	docosanoic acid	rapeseed oil
Erucic acid	22	1	13-docosenoic acid	rapeseed oil
DHA	22	6	4,7,10,13,16,19-docosahexaenoic acid	fish oil
Lignoceric acid	24	0	tetracosanoic acid	small amounts in most fats



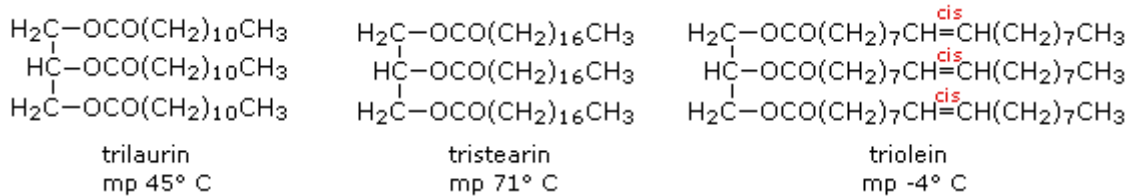
Alpha-Linolenic Acid (omega-3)



Linoleic Acid (omega-6)

B. hydrolysierbar

- Fette (Fettsäure + Glycerin)
- Waxe (Fettsäure + Fettalkohol)
- Sterolester (Fettsäure + Cholesterin s.o.)



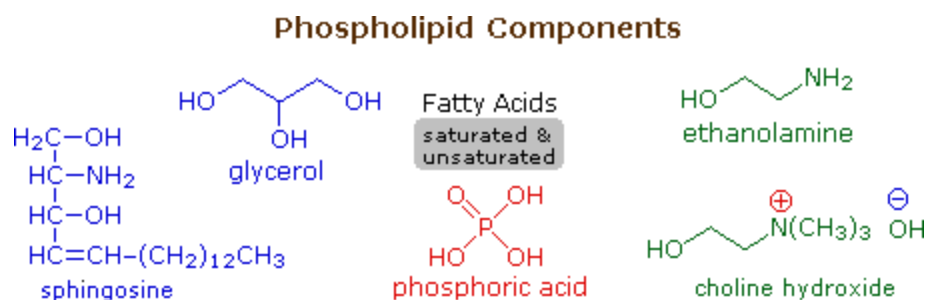
spermaceti: $\text{CH}_3(\text{CH}_2)_{14}\text{CO}_2-(\text{CH}_2)_{15}\text{CH}_3$

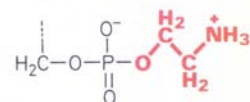
beeswax: $\text{CH}_3(\text{CH}_2)_{24}\text{CO}_2-(\text{CH}_2)_{29}\text{CH}_3$

carnuba wax: $\text{CH}_3(\text{CH}_2)_{30}\text{CO}_2-(\text{CH}_2)_{33}\text{CH}_3$

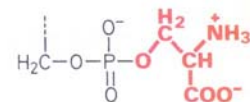
C. Phospholipide

- Phosphatidsäuren (Fettsäure + Glycerin + Phosphat)
- Phosphatide (Fettsäure + Glycerin + Cholin)

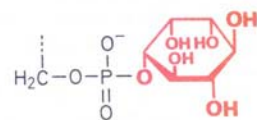




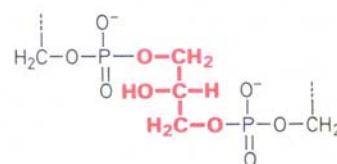
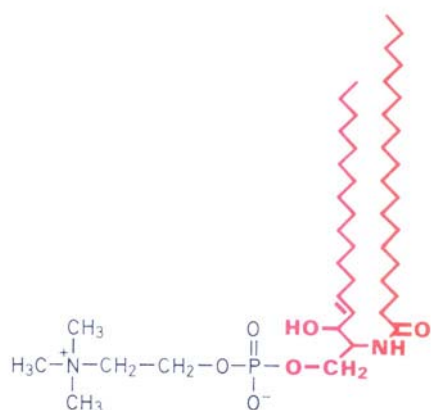
Phosphatidylethanolamin



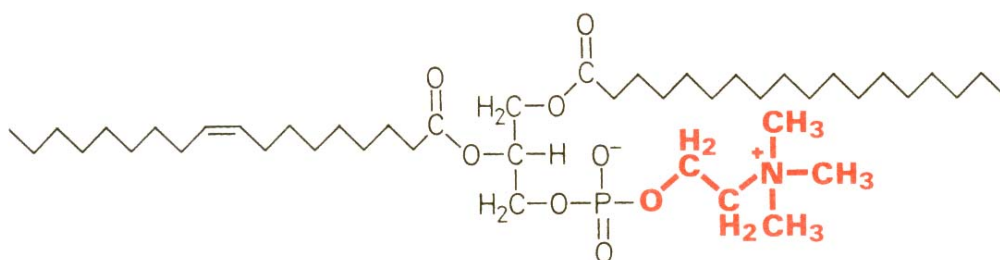
Phosphatidylserin



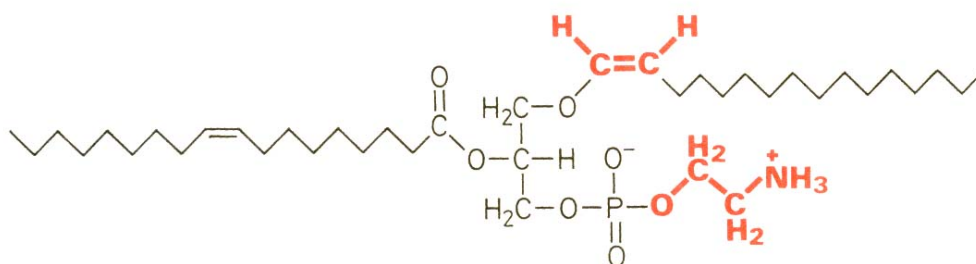
Phosphatidylinositol

Bisphosphatidylglycerol
(Cardiolipin)

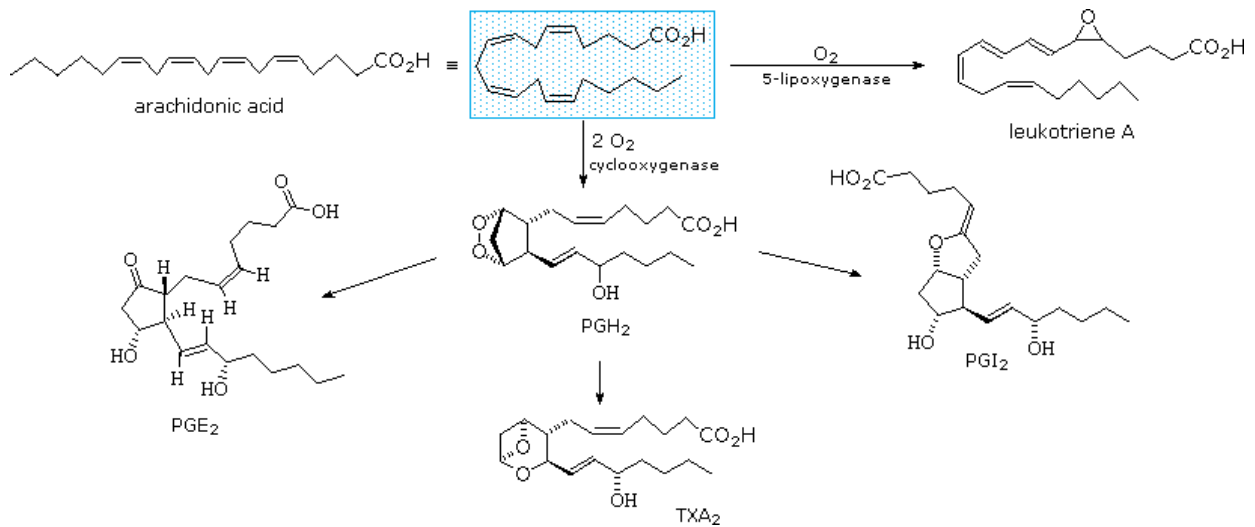
Sphingomyelin



Phosphatidylcholin (Lecithin)

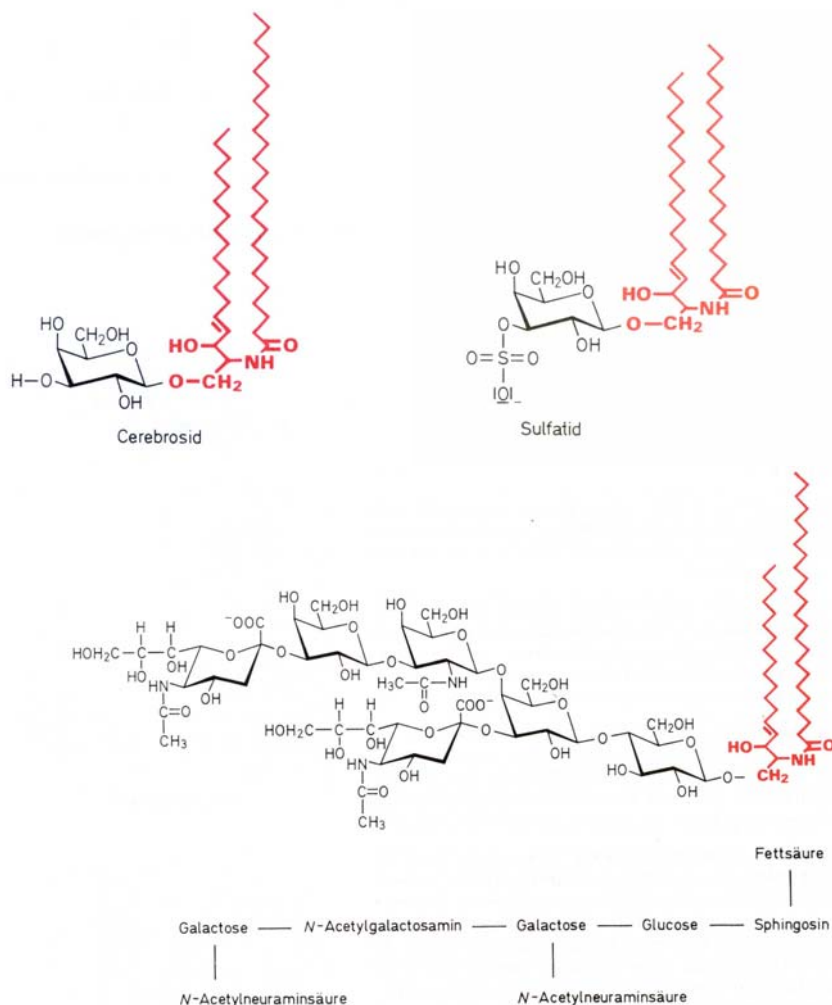
Plasmalogen, Plasmenylethanolamin
[1-(1-Alkenyl)-2-acyl-*sn*-glycerol-3-phospho-ethanolamin]

D. Prostaglandine, Tromboxane, Leukotriene



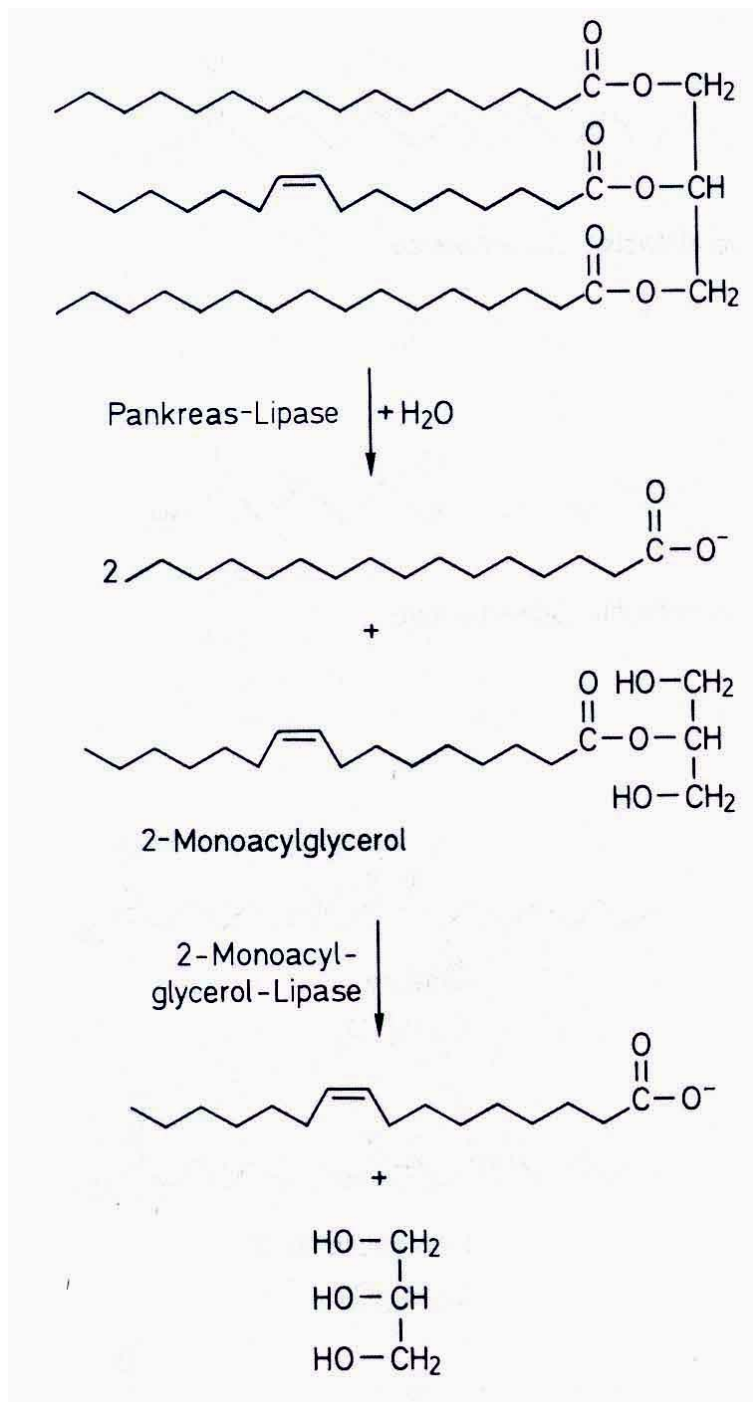
E. Glycolipide

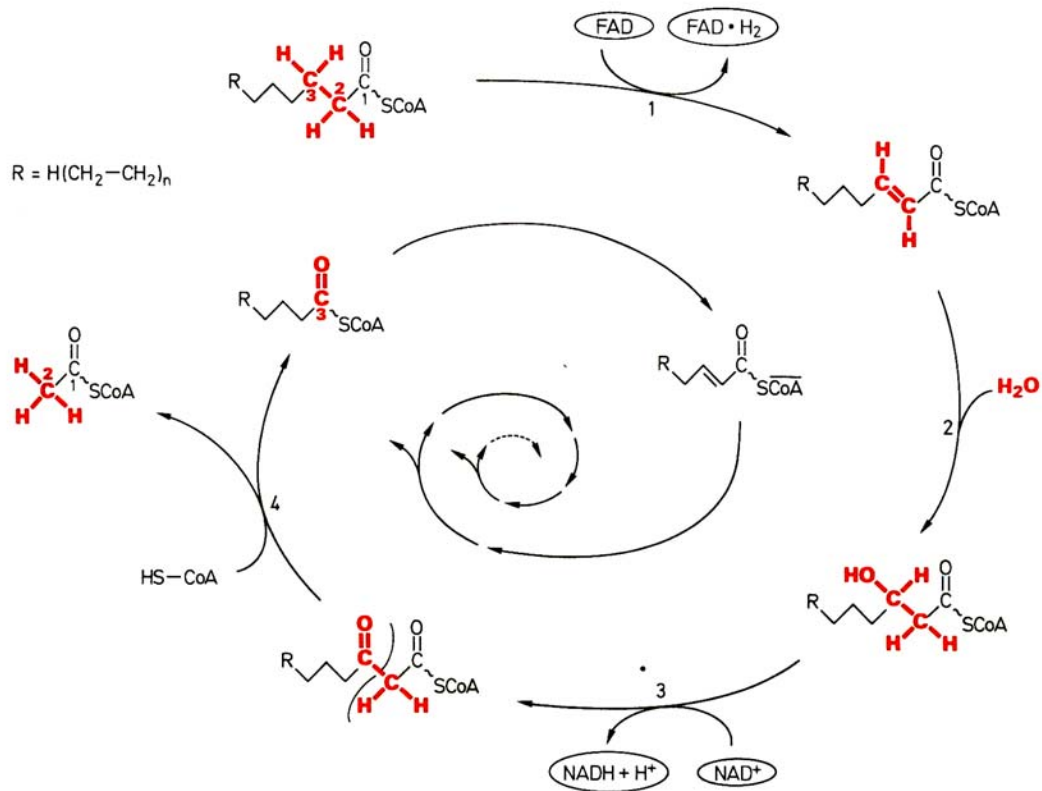
- Cerebroside (Fettsäure + Sphingosin s.o. + Zucker)
- Ganglioside (Fettsäure + Sphingosin s.o. + Zucker + Neuraminsäure)



2.6.1 Aufbau und Abbau von Fetten und Lipiden

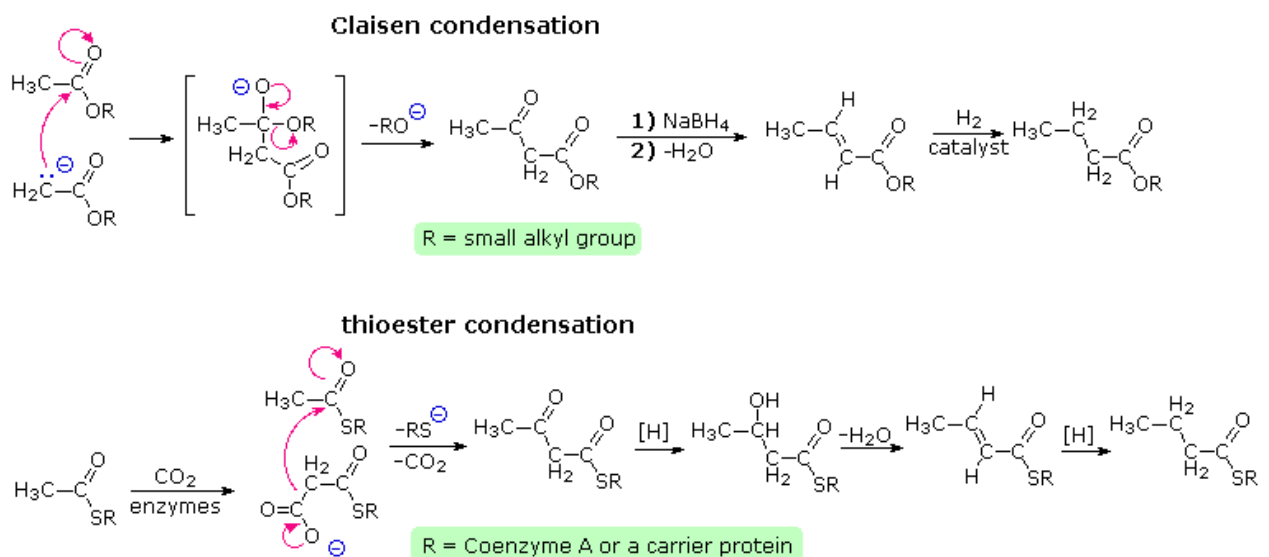
- Abbau: Hydrolyse, β -Oxidation





- Synthese von Lipiden (mehrere Wege)

Vergleich (Laborsynthese / Biosynthese)



2.6.2 Phospholipide, Glycolipide, Membranen

