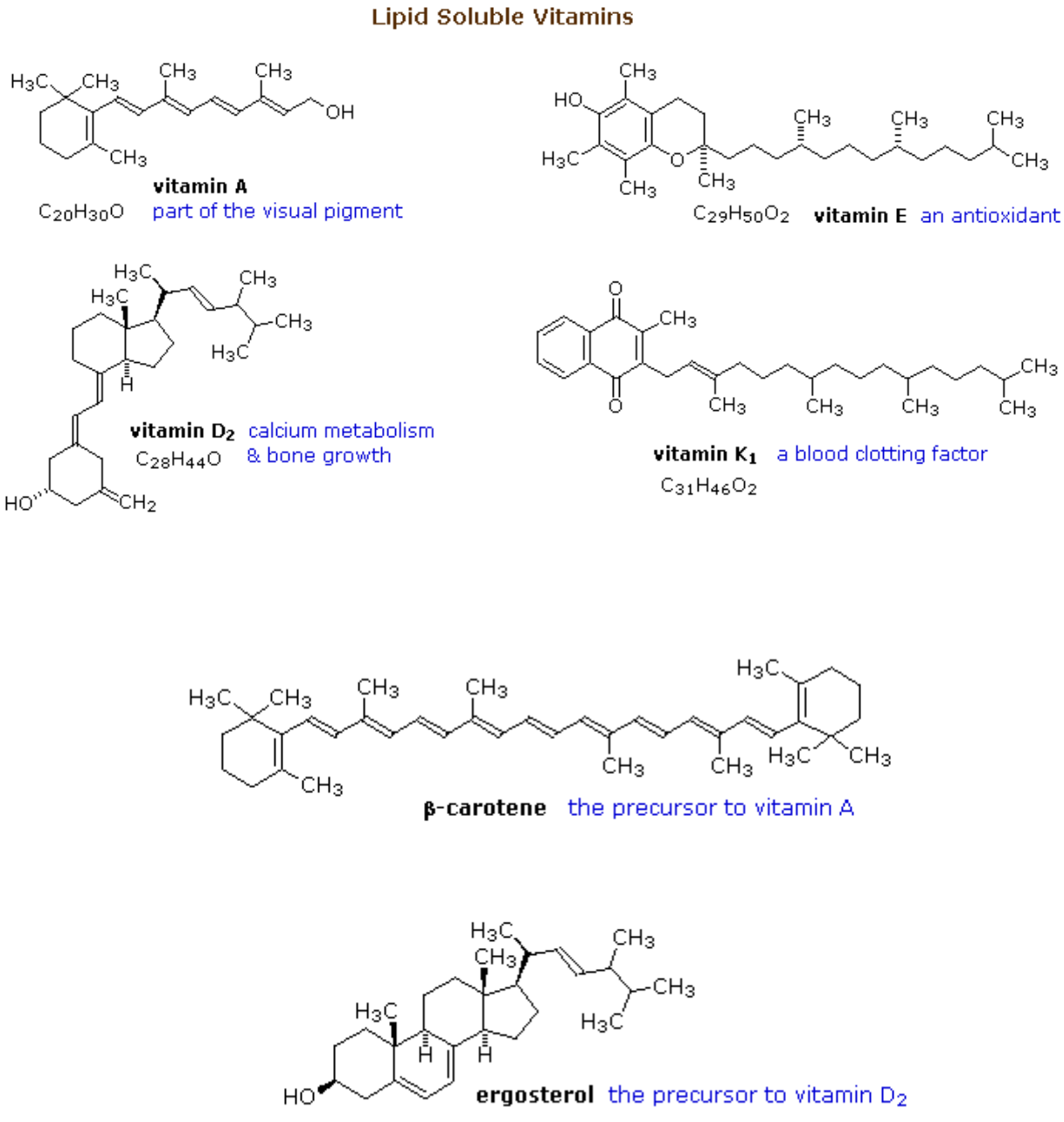
2.6 Fette und Lipide

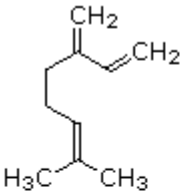
Stoffklassen

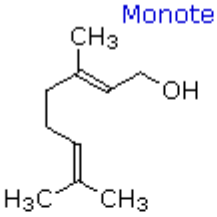
A. nicht hydrolysierbar

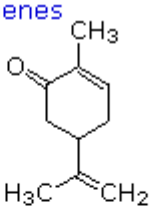
- Langkettige Alkane, Carotinoide, Vitamine
- Terpene, Steroide
- Fettalkohole >C10
- Fettsäuren >C10

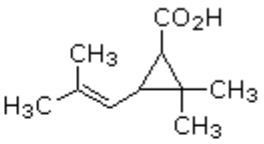


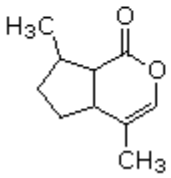
Monoterpenes

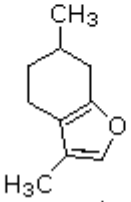

myrcene

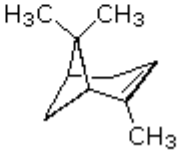

geraniol

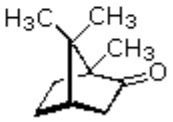

carvone


chrysanthemic acid

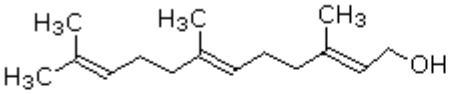

nepetalactone

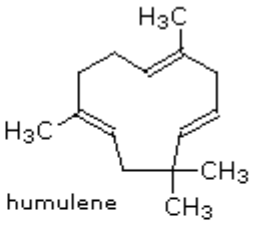

menthofuran

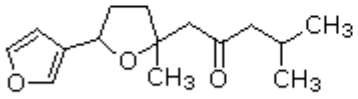

α-pinene

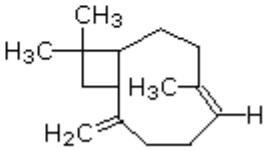

camphor

Sesquiterpenes

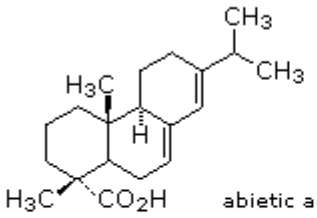

farnesol

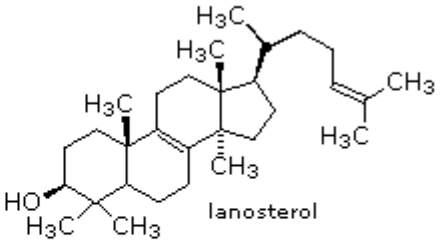

humulene

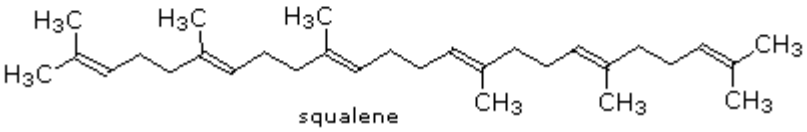

ngaione

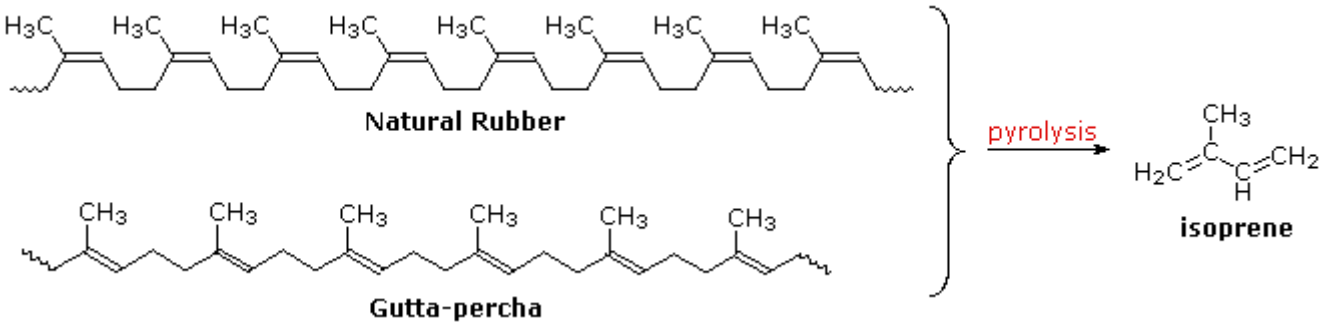

caryophyllene

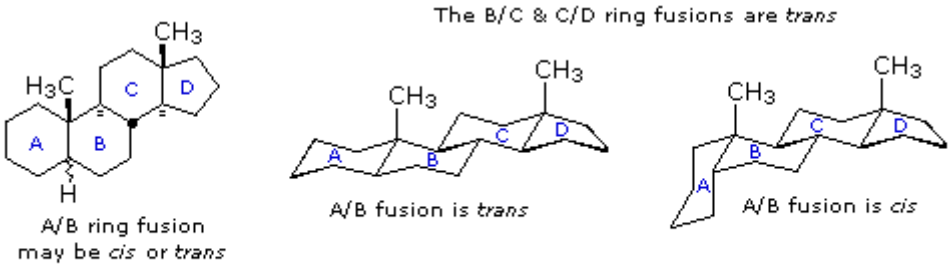
Diterpenes & Triterpenes


abietic acid

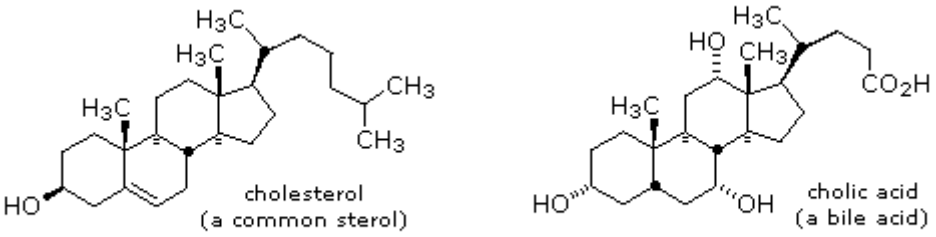

lanosterol


squalene

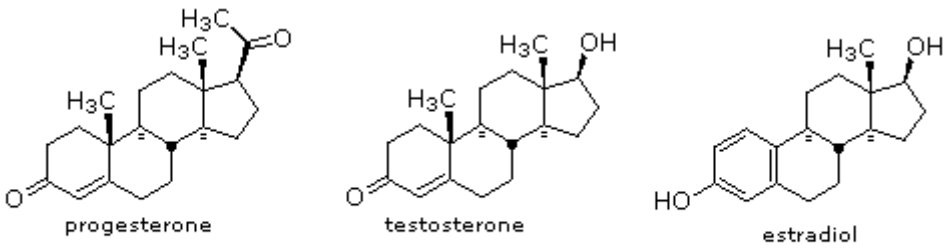




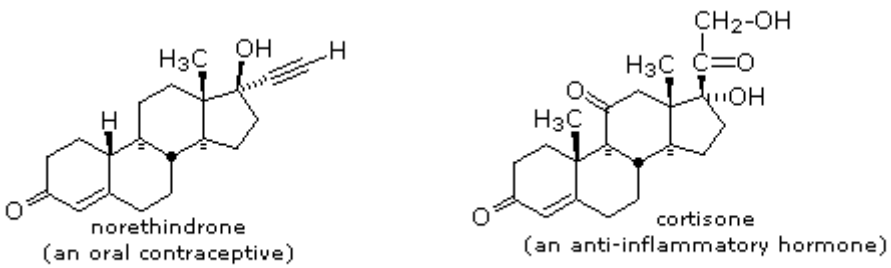
Common Steroid Conformations



Typical Animal Steroids



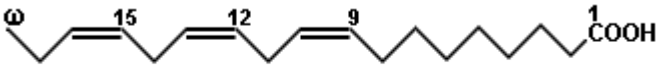
Steroid Sex Hormones



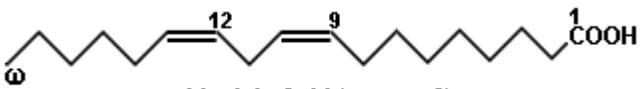
Medicinally Useful Steroids

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



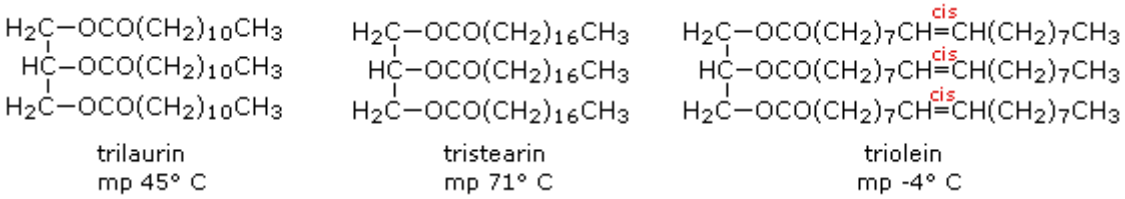
Alpha-Linolenic Acid (omega-3)



Linoleic Acid (omega-6)

B. hydrolysierbar

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



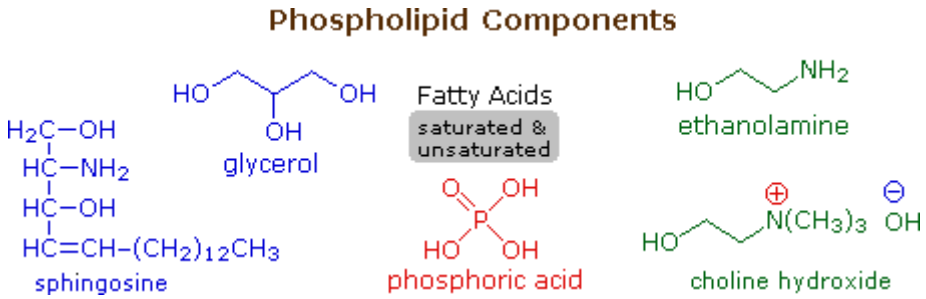
spermaceti: $CH_3(CH_2)_{14}CO_2$-$(CH_2)_{15}CH_3$

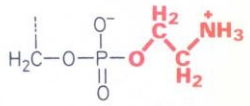
beeswax: $CH_3(CH_2)_{24}CO_2$-$(CH_2)_{29}CH_3$

carnuba wax: $CH_3(CH_2)_{30}CO_2$-$(CH_2)_{33}CH_3$

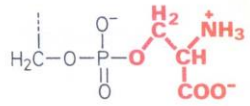
C. Phospholipide

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

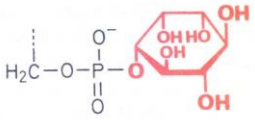




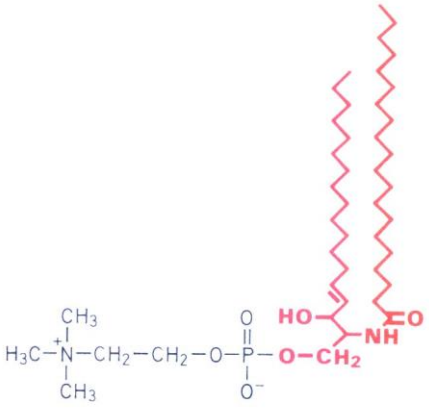
Phosphatidylethanolamin



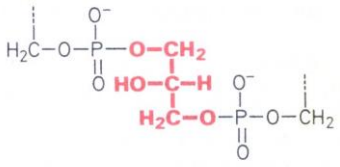
Phosphatidylserin



Phosphatidylinositol

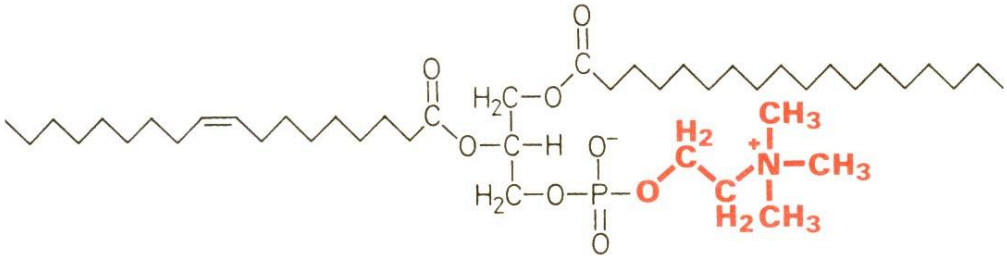


Sphingomyelin

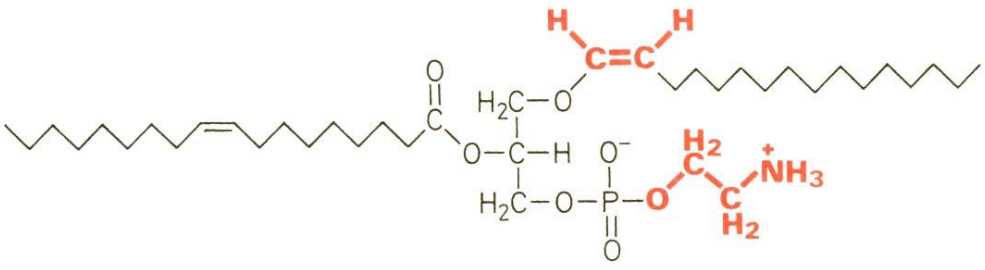


Bisphosphatidylglycerol
(Cardiolipin)

„PK“



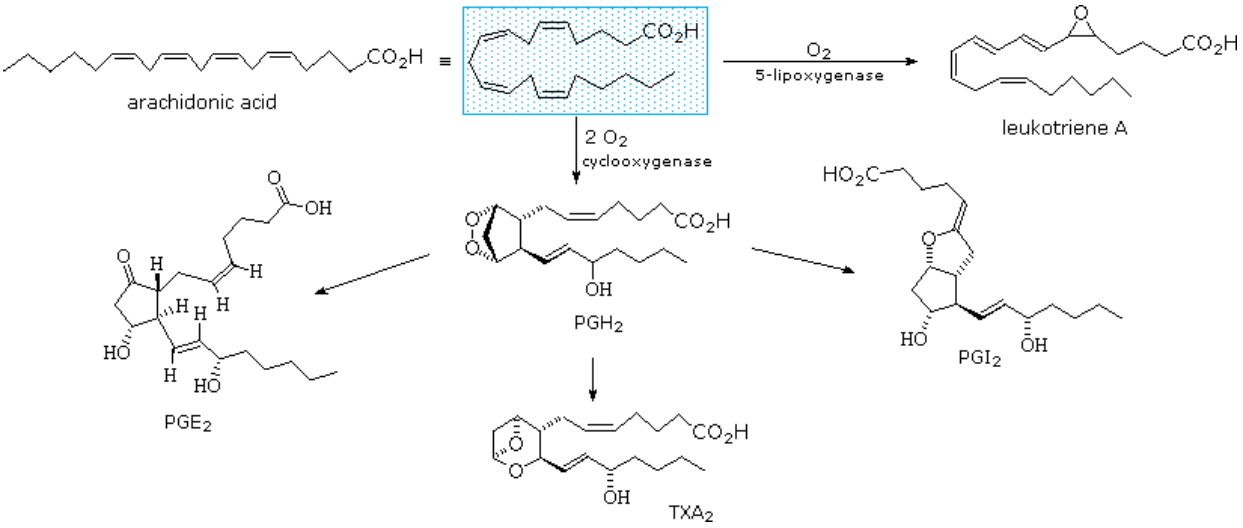
Phosphatidylcholin (Lecithin)



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

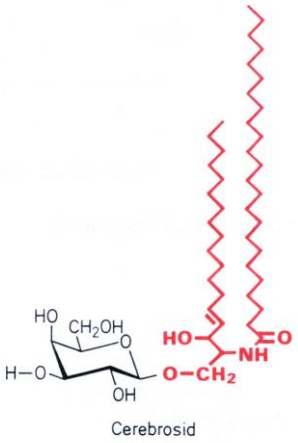
„PK“

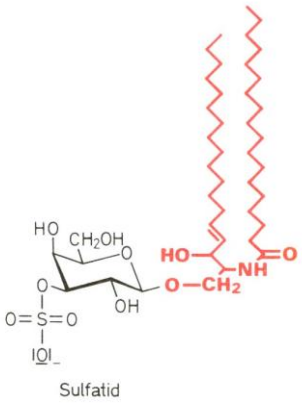
D. Prostaglandine, Tromboxane, Leukotriene



E. Glycolipide

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





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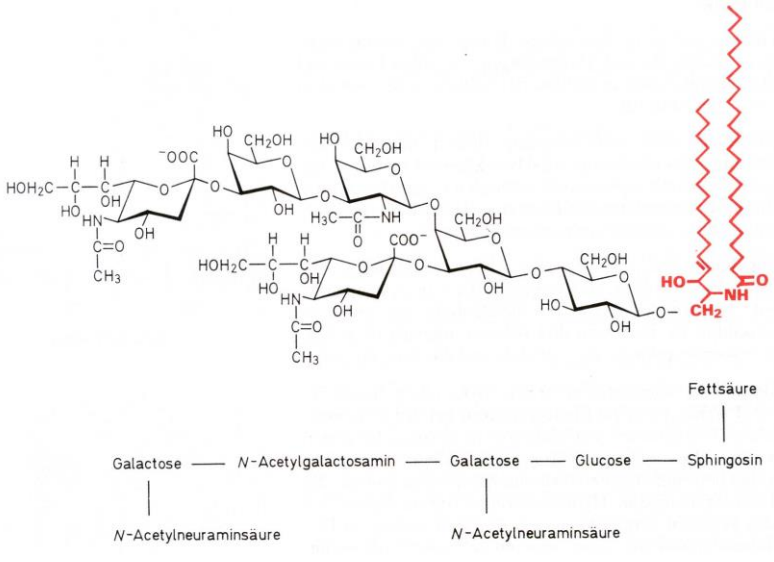
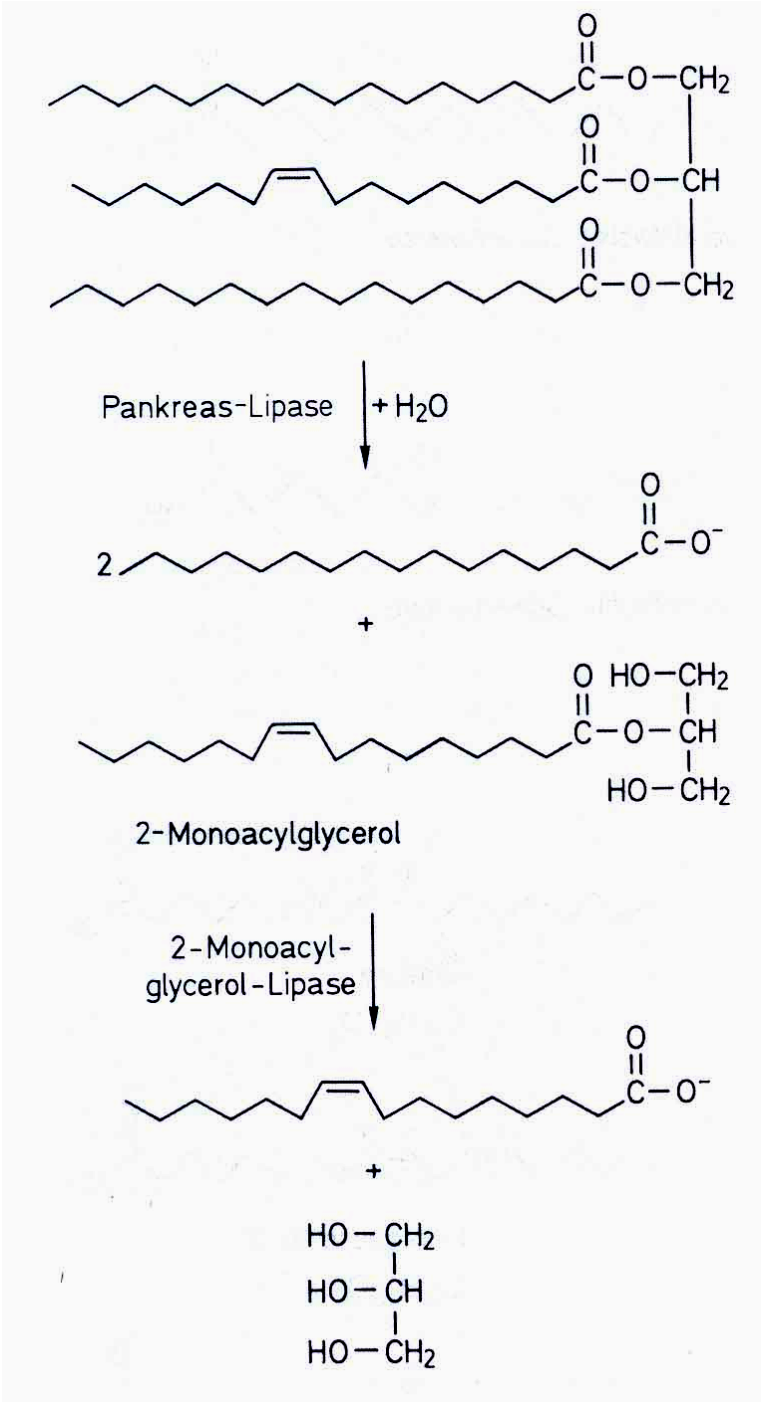
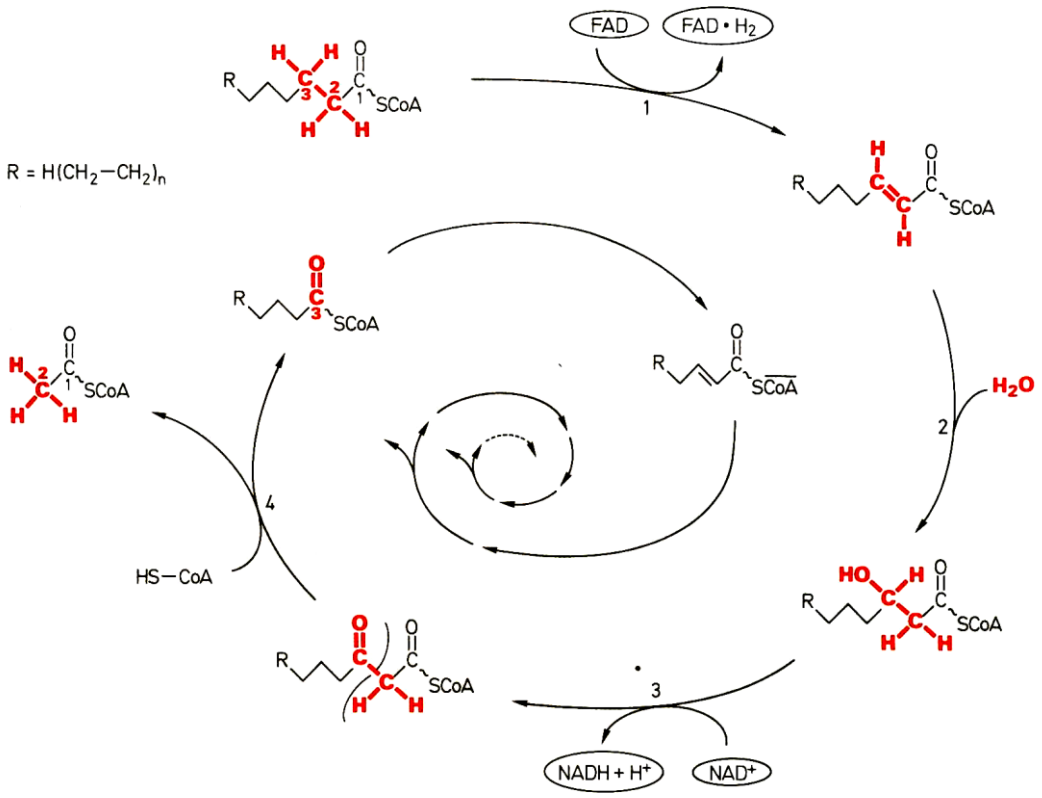


„PK“

2.6.1 Aufbau und Abbau von Fetten und Lipiden

- Abbau: Hydrolyse, ß-Oxidation

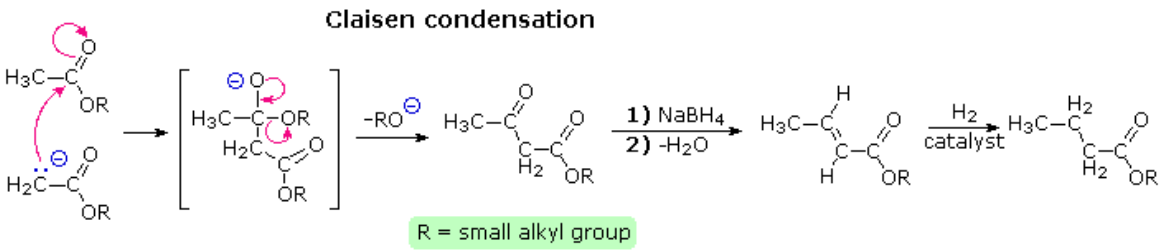


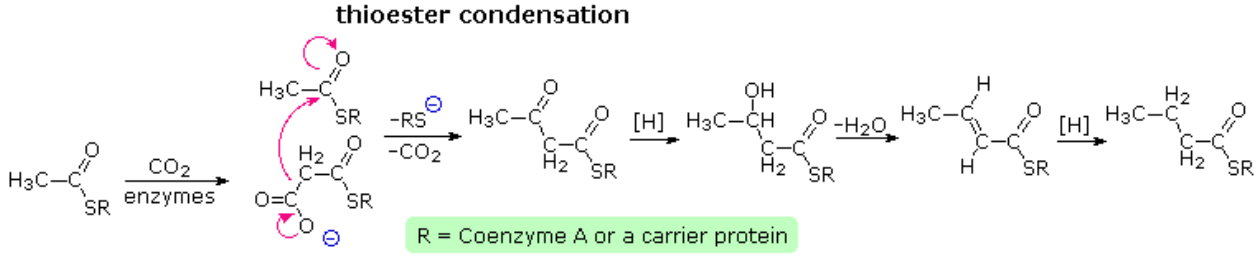


„PK“

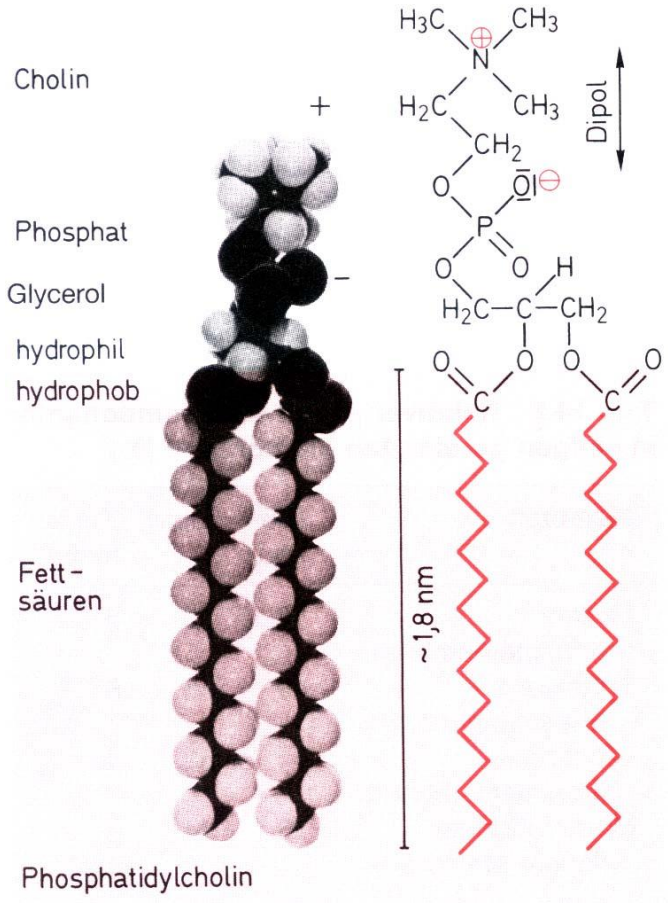
- Synthese von Lipiden (mehrere Wege)

Vergleich (Laborsynthese / Biosynthese)





2.6.2 Phospholipide, Glycolipide, Membranen



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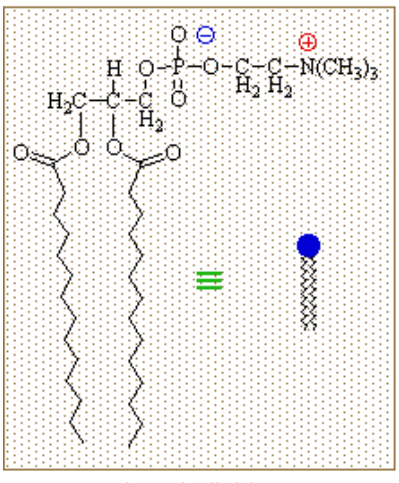
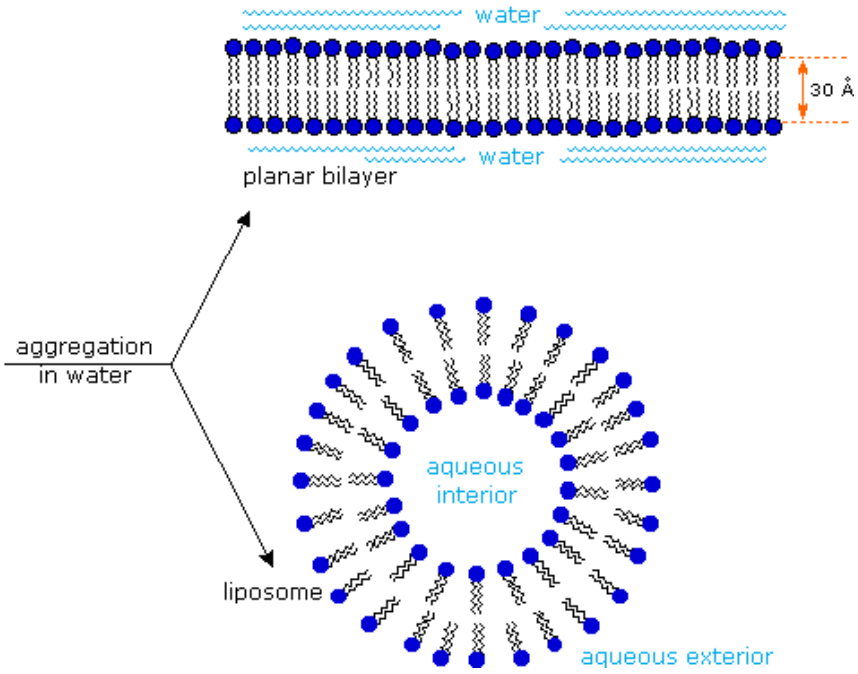
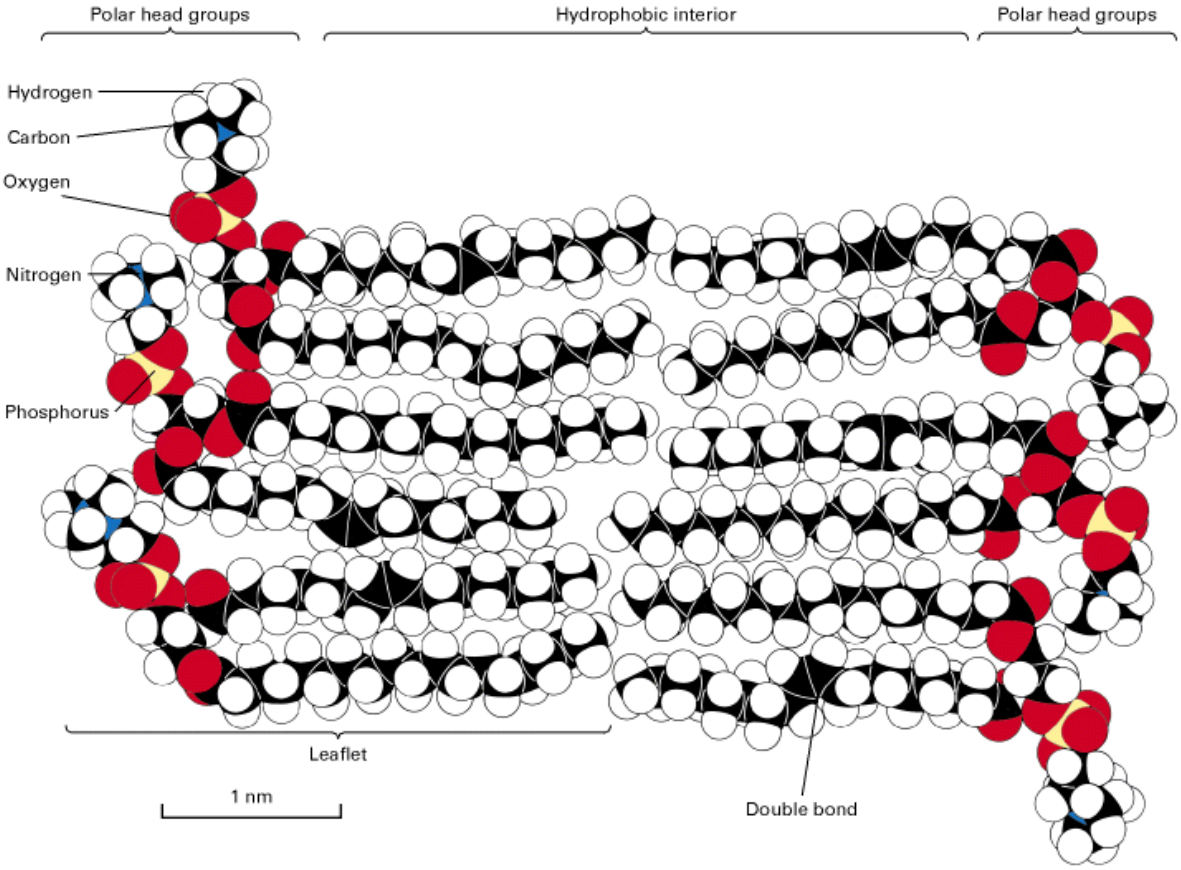
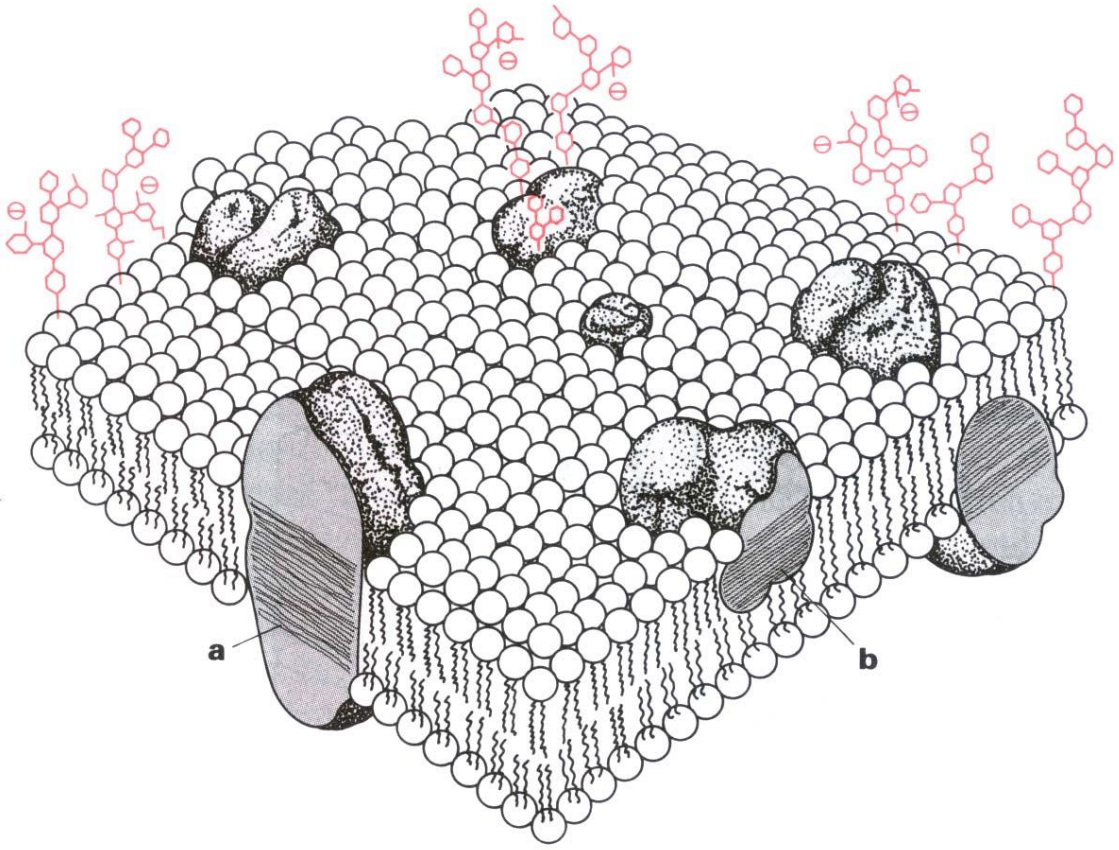





Polar head groups
Hydrophobic interior
Polar head groups
Hydrogen
Carbon
Oxygen
Nitrogen
Phosphorus
Leaflet
1 nm
Double bond


a
b

„PK“

2.6.3 Isoprenoidlipide, Steroide, Carotinoide

Biosynthese