SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr M.G.R Medical University, Chennai

DEPARTMENT OF CARDIO PULMONARY PERFUSION CARE

TECHNOLOGY

COURSE NAME: BIOCHEMISTRY

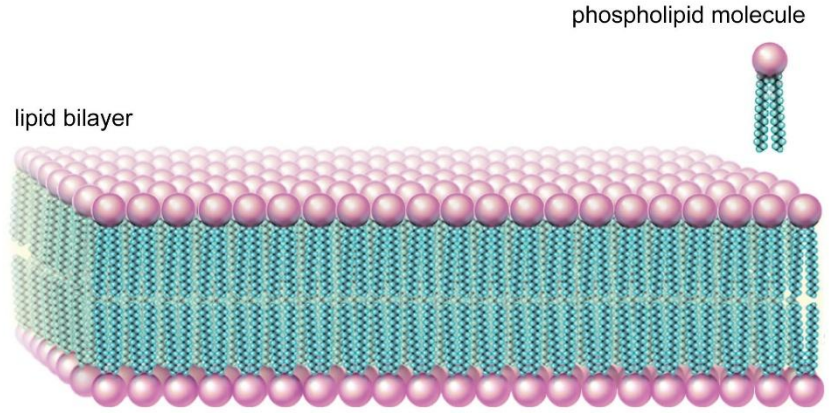
UNIT : 2

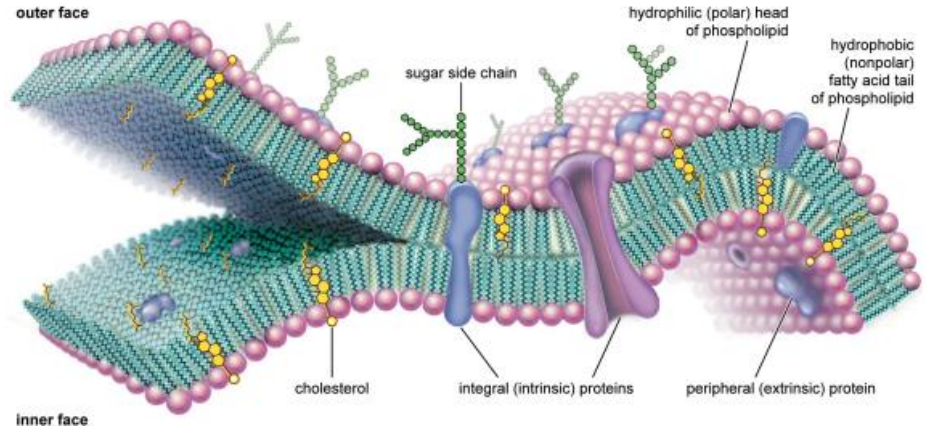
TOPIC : LIPIDS

FACULTY NAME: MITHRA V

LIPIDS (DEFINE)

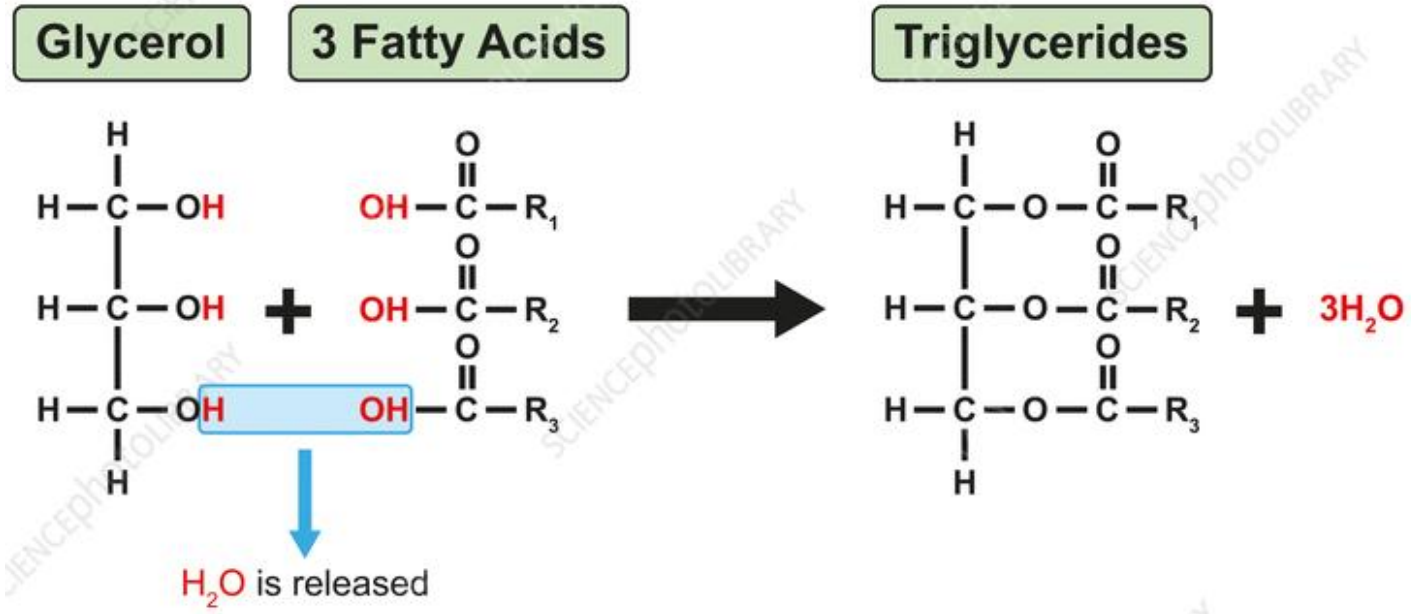
- Heterogeneous organic compounds
- Esters or amides of fatty acids
- Insoluble in water, soluble in non-polar solvents
- Classified as Simple, Complex and Derived
- **Functions of Lipids**
- Structural component of cell membranes
- Energy storage
- Insulation & organ protection
- Hormones & signaling molecules





SIMPLE LIPIDS

- Triglycerides (fats & oils)
  - 1 glycerol + 3 fatty acids
  - Solid = fats, liquid = oils
- **Key Components of Triglycerides**
- Glycerol: 3-carbon alcohol, sweet, viscous, non-toxic
- Fatty acids: Long chain, -CH_3 at one end, -COOH at other

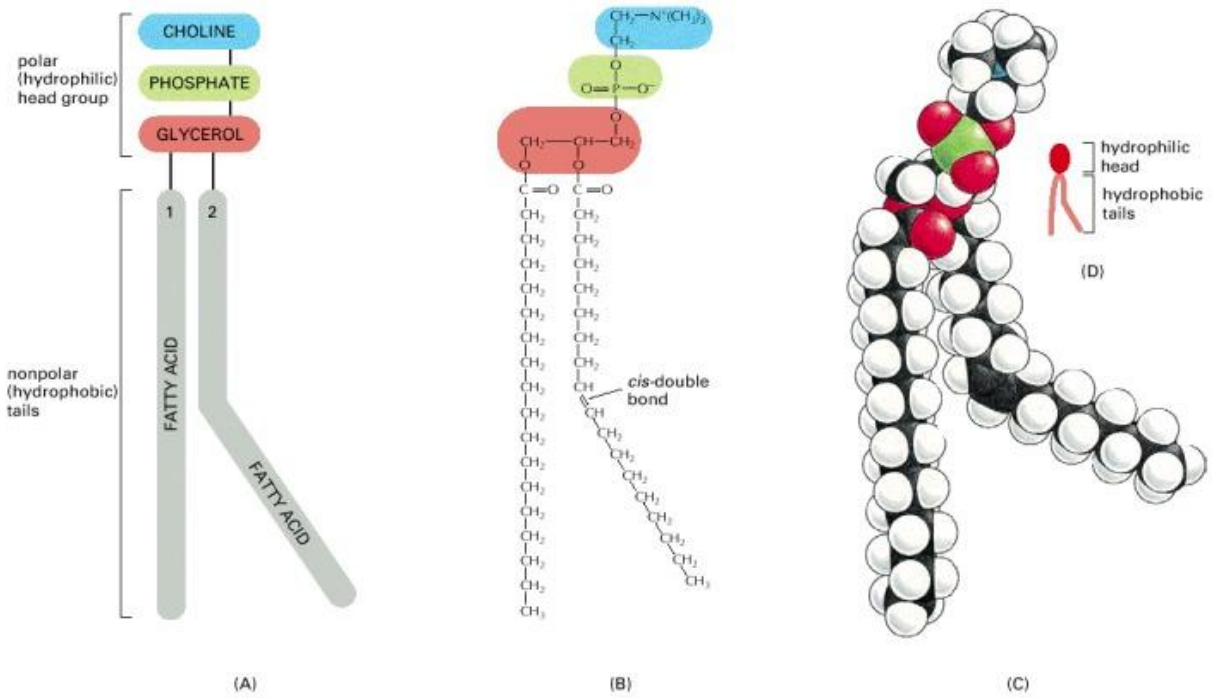


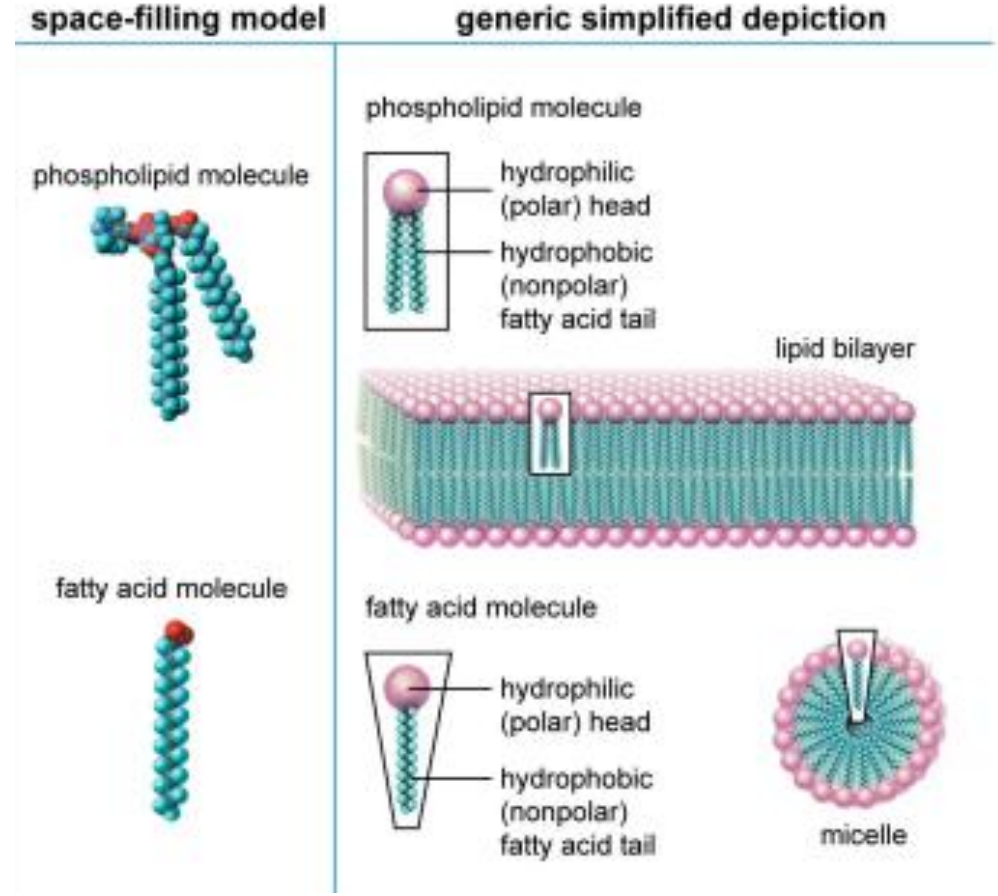
- Waxes
  - Fatty acid + long-chain alcohol
  - Examples: beeswax, carnauba wax, spermaceti

COMPLEX LIPIDS

- **Phospholipids (Phosphatides)**
- Hydrophilic head (phosphate + glycerol) + 2 hydrophobic tails (fatty acids)
  - Glycerophospholipids (glycerol-based)
  - Sphingophospholipids (sphingosine-based → form ceramide)
- **Glycolipids**
- Lipid + Carbohydrate (glycosidic bond)
- **Roles:** Cell recognition, blood group determination, membrane stability, immunity
- Types: Cerebrosides, Gangliosides

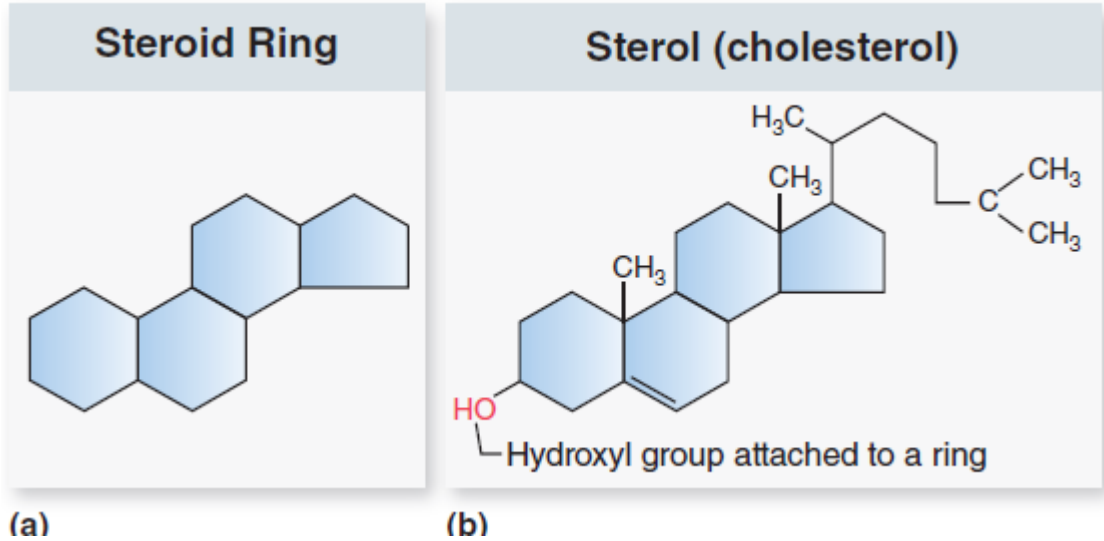
COMPLEX LIPIDS





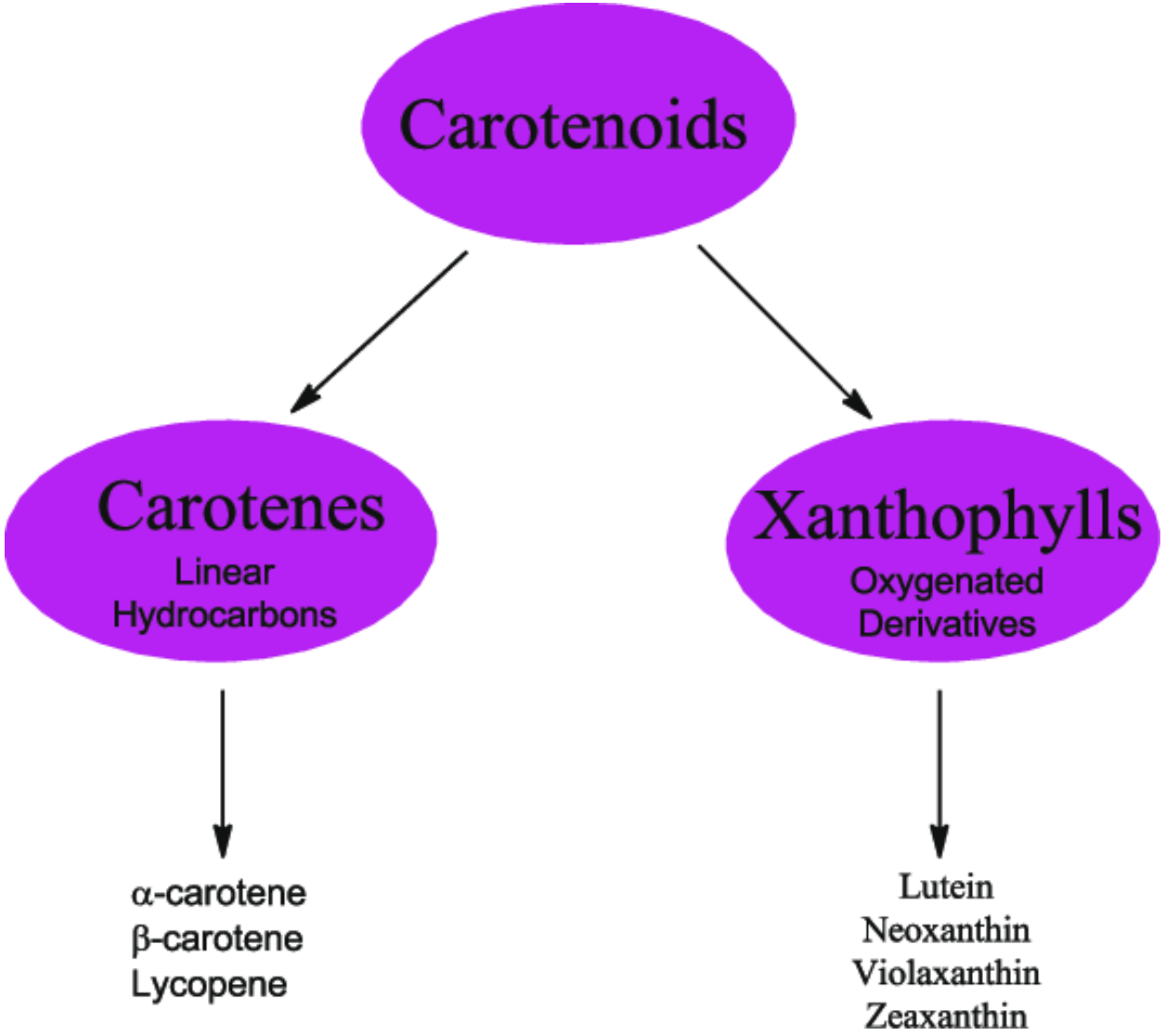
DERIVED LIPIDS

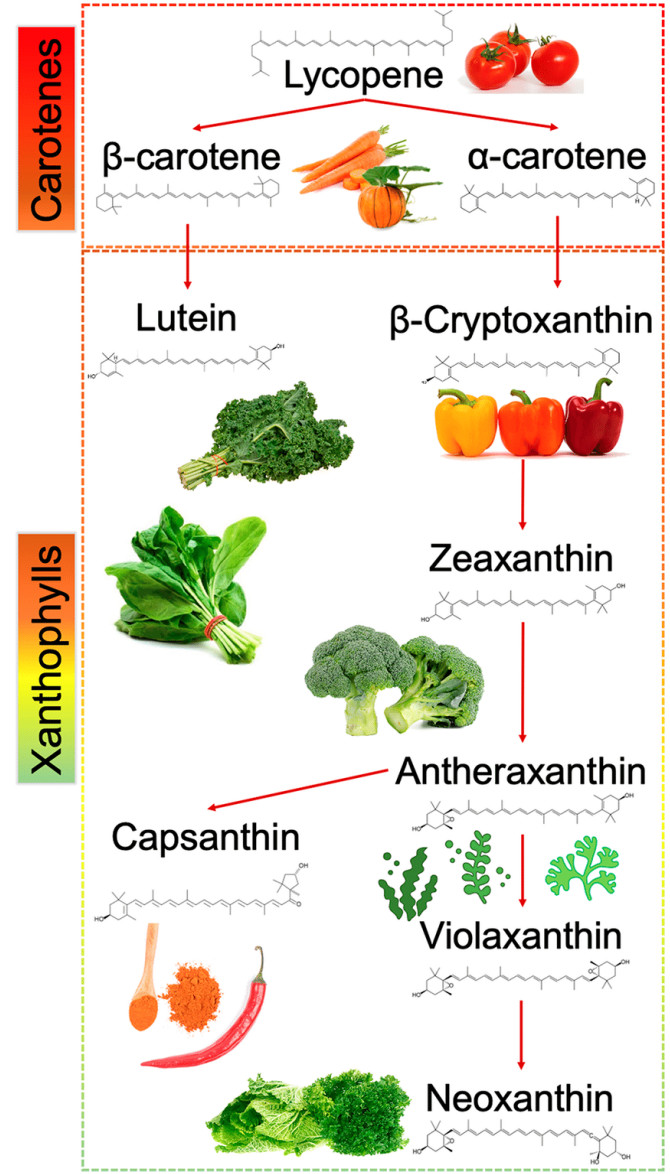
- Fatty acids, steroids, fatty aldehydes, ketone bodies, lipid-soluble vitamins, and hormones.
- **Steroids & Sterols**
- Fused ring structure, hydrophobic (insoluble in water)
- **Examples:** cholesterol, phytosterols, ergosterol
- Regulate membrane fluidity, some act as hormones
- Plant sterols ↓ cholesterol absorption



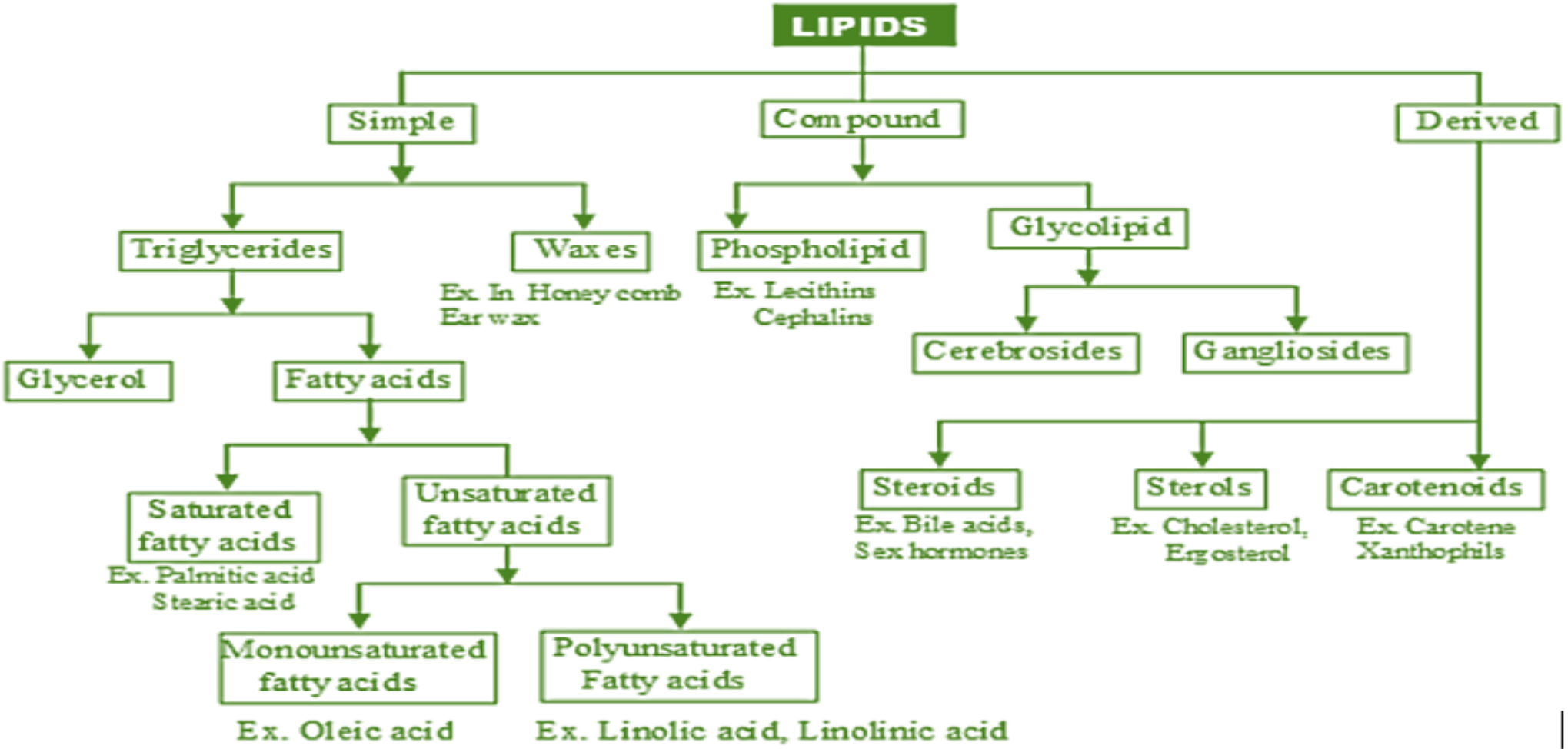
CAROTENOIDS AND XANTHOPHYLLS

- Carotenoids (pigments) - give the color to many fruits and vegetables.
- Carotenes (only C & H): α-carotene, β-carotene, lycopene
- Xanthophylls (contain O): crucial role in photosynthesis, absorbing and releasing light energy
- Eg: Lutein, Zeaxanthin, Fucoxanthin
- Antioxidant & Anti-inflammatory properties
- Others: Fatty aldehydes, ketone bodies, lipid-soluble vitamins, hormones


Carotenoids
Carotenes
Linear
Hydrocarbons
Xanthophylls
Oxygenated
Derivatives
α-carotene
β-carotene
Lycopene
Lutein
Neoxanthin
Violaxanthin
Zeaxanthin


Carotenes
Xanthophylls
Lycopene
β-carotene
α-carotene
Lutein
β-Cryptoxanthin
Zeaxanthin
Antheraxanthin
Capsanthin
Violaxanthin
Neoxanthin

LIPIDS – CLASSIFICATION SUMMARY



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- https://lipidmaps.org/index.php/resources/education/classification
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THANK YOU