PHOSPHOLIPIDS.

✓ 8 marks

Glycerol + FA + phosphoric acid. + Nitrogenous base {sometimes}

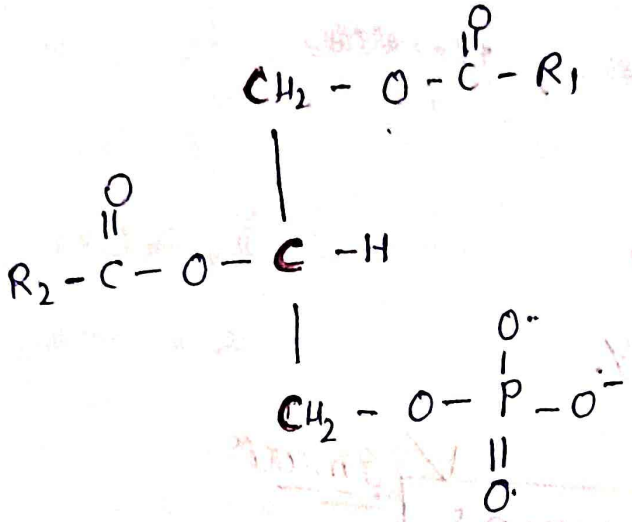
Phosphatidates.

- derivatives of phosphatidic acid.

phosphatidic acid.

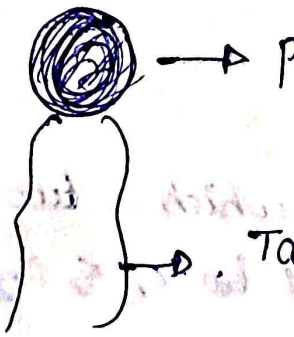
- Simplest phospholipid.
- made of 1 glycerol to which two fatty acids residues are esterified two C_1 & C_2.

L- phosphatidic acid.



amphipathic nature of phospholipids.

- contain both hydrophobic and hydrophilic portions in the molecule - amphipathic.
- they form membranes, micelles, liposomes, emulsions.

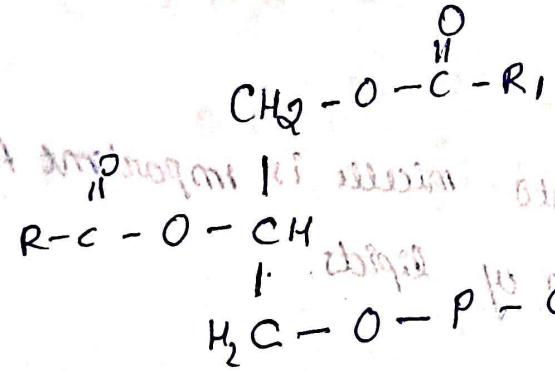


eg: lecithin.

- polar 'head'

- glycerol + phosphoric acid + choline [nitrogenous base]

- No polar - 'tail' - hydrocarbon chain of F.A.



Lecithin.

Micellar formation.

- when the amphipathic lipids are mixed in water, their hydrophobic parts keep away from water, forming molecular aggregates called micelle.

- aggregation of bile salts into micelle is important for digestion and absorption of lipids.

Biomembranes.

- lipid bilayer is formed by orienting the polar heads to the outer sphase on either side & non polar tails to the interior.
- only FA with more than 6C atoms form monolayer.

Liposomes.

- a lipid bilayer will close on itself under appropriate condition to form liposomes.
- microscopic spherical vesicles
- prepared by sonication of mixtures of phospholipids and cholesterol.

Impt.

Str of micelle, liposome, phospholipid bilayer } asked in charts in practical examination. {20 marks}

act as carriers of drugs, enzymes, genes and proteins to target tissues.

Impt application in chemo cancer therapy, gene therapy, antimicrobial therapy, vaccines etc.

Emulsions.

- produced when non polar lipids are mixed with water {triacyl glycerol}.
- Stabilized by emulsifying agent.

✓ 4mark

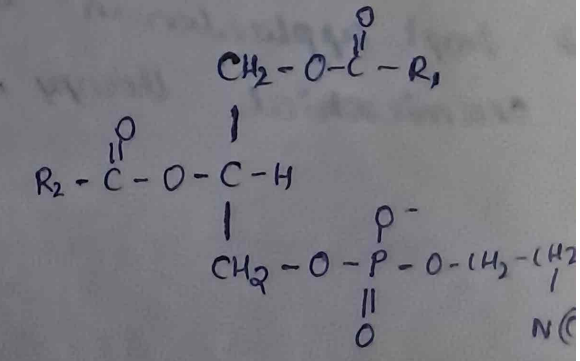
✓ phosphatidyl choline {lecithin}.

- derived from lecithos {egg yolks}.
- Nitrogen containing glycerophosphatides.

Structure.

phosphatidic acid + choline.

- Usually PUFA is attached to the beta carbon of phosphatidic acid.
- Nitrogenous base - choline.



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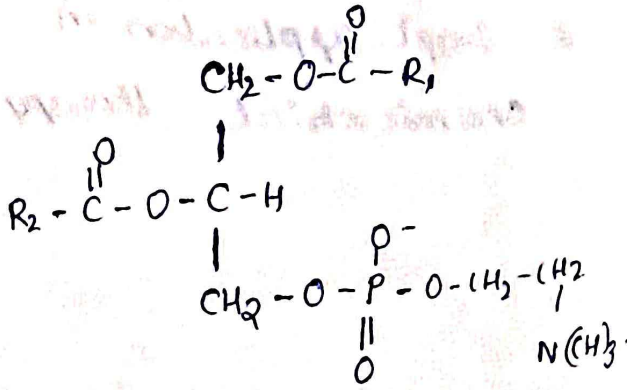

Functions.

(Continuation of lecithin (4 marks))

1) act as lung surfactants

- produced by epithelial cells.
- It decreases surface tension of the aqueous layer of lung and prevents collapse of lung alveoli.

- Constituent of surfactants are dipalmitoyl lecithin, phosphatidyl glycerol, cholesterol, surfactant, proteins ABC. ★

2) Lecithin - sphingomyelin ratio is an index of fetal lung maturity

A ratio of 2 indicate full lung maturity.

3) Important component of biomembranes.

Respiratory distress syndrome. (RDS)

- Due to defect in biosynthesis of dipalmitoyl lecithin, main pulmonary surfactant.
- Leads to neonatal morbidity.