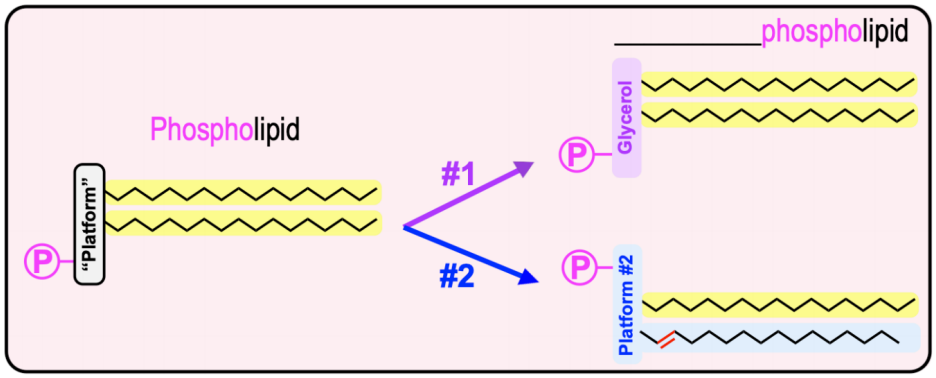
CONCEPT: GLYCEROPHOSPHOLIPIDS

Phospholipids

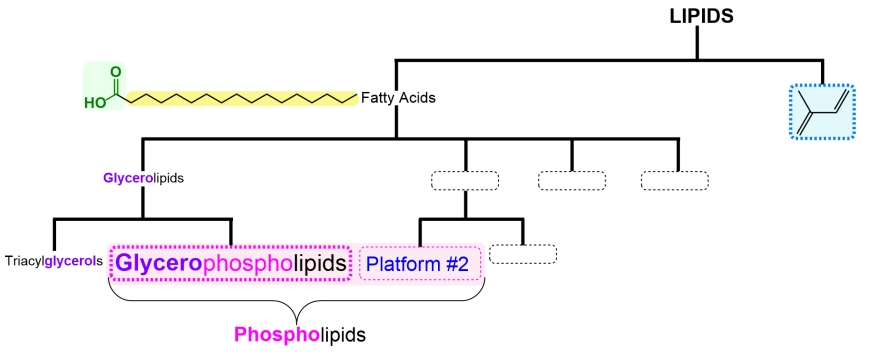
- _____*lipids*: a large class of *lipids* that contain ≥ 1 *phosphate*.
  - □ Major component of *ALL* cell _____.
  - □ Contain at least one fatty acid linked to a *phosphorylated* "_____."
  - □ If the *phosphorylated* "*platform*" is a _____ molecule, then it is a **glycerophospholipid**.

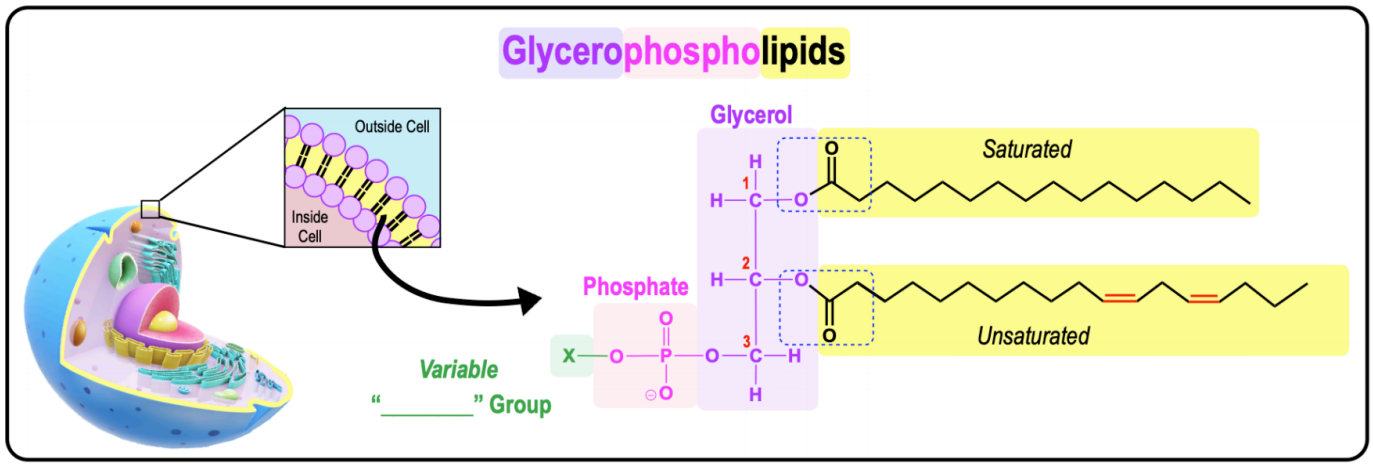


Glycerophospholipids

- _____-*phospho-lipids* (or *Phosphoglycerides*): lipids with a *glycerol-3-phosphate* attached to _____ fatty acids.
  - □ A *phosphodiester linkage* can attach other *variable head groups* (-**X**) that are *usually* _____.
  - □ This makes glycerophospholipids _____ & suitable for biological _____.

EXAMPLE: Glycerophospholipids/Phosphoglycerides/Phosphoacylglycerols.

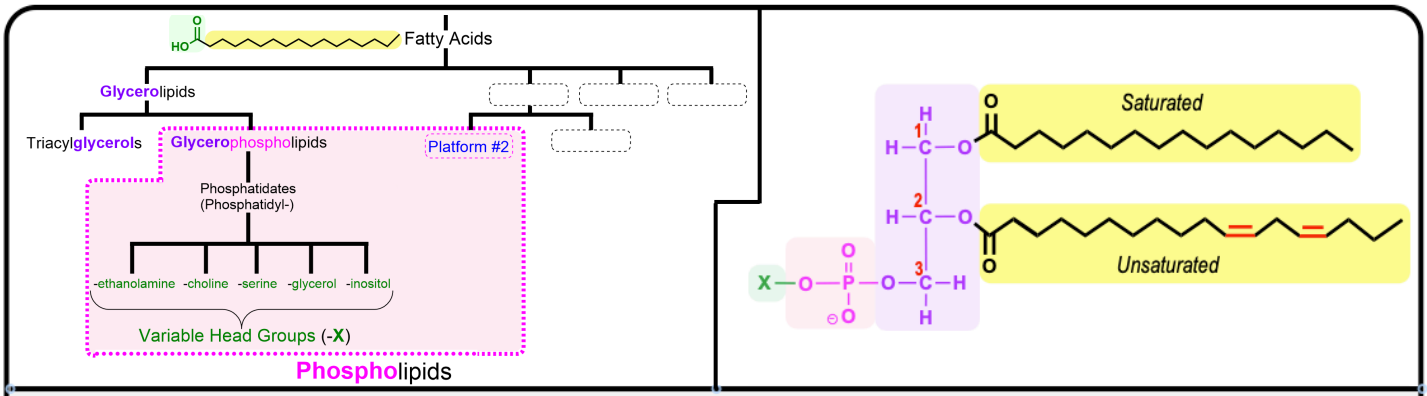




CONCEPT: GLYCEROPHOSPHOLIPIDS

Classes of Glycerophospholipids

- Glycerophospholipids are _____ according to their *variable head group* (-**X**).
  - □ Different *variable head groups* dictate structure & _____ of the glycerophospholipid.
  - □ Fatty acid chain *length* & *degree of saturation* can also _____ among molecules in each class.



Glycerophospholipid Class	Variable Head Group (—X)
Phosphatidate	Deprotonated $^{\ominus}O—$
Phosphatidic acid	Acidic Form H—O—
Phosphatidylethanolamine	Ethanolamine $H_3N^{\oplus}$
★ Phosphatidylcholine	Choline H_3C, H_3C, CH_3
Phosphatidylserine	Serine $H_3N^{\oplus}$, $^{\ominus}OOC$
Phosphatidylglycerol	Glycerol HO, H, OH
Phosphatidylinositol	*myo*-Inositol OH, OH, OH, OH, OH
Diphosphatidylglycerol (Cardiolipin)	Phosphatidylglycerol R^1, R^2

CONCEPT: GLYCEROPHOSPHOLIPIDS

PRACTICE: A certain glycerophospholipid is made of glycerol, two fatty acids, and ethanolamine. What components does the carboxylic ester linkage connect?

a) Phosphate and ethanolamine.
b) Glycerol and fatty acids.
c) Fatty acids and phosphate.
d) Glycerol and ethanolamine.
e) There are no ester linkages is the glycerophospholipid.

PRACTICE: Phosphatidate is a glycerophospholipid formed from:

a) Glycerol-3-phosphate and two fatty acid chains.
b) Glycerol-3-phosphate and two free fatty acids.
c) Glycerol and two fatty acid chains.
d) Pyruvate and triacylglycerol.

PRACTICE: Which of the following is not a common headgroup of glycerophospholipids?

a) Ethanolamine.
b) Choline.
c) Serine.
d) Threonine.
e) Hydrogen atom.

PRACTICE: Which of the following is a major component of a cell's plasma membrane?

a) Triglyceride.
b) Phosphatidylcholine.
c) Waxes.
d) Eicosanoids.
e) Lipid Vitamins.

PRACTICE: What is the name of the glycerophospholipid shown below?

a) Phosphatidylglycerol.
b) Phosphatidylethanolamine.
c) Phosphatidate.
d) Phosphatidylserine.
e) Phosphatidic Acid.