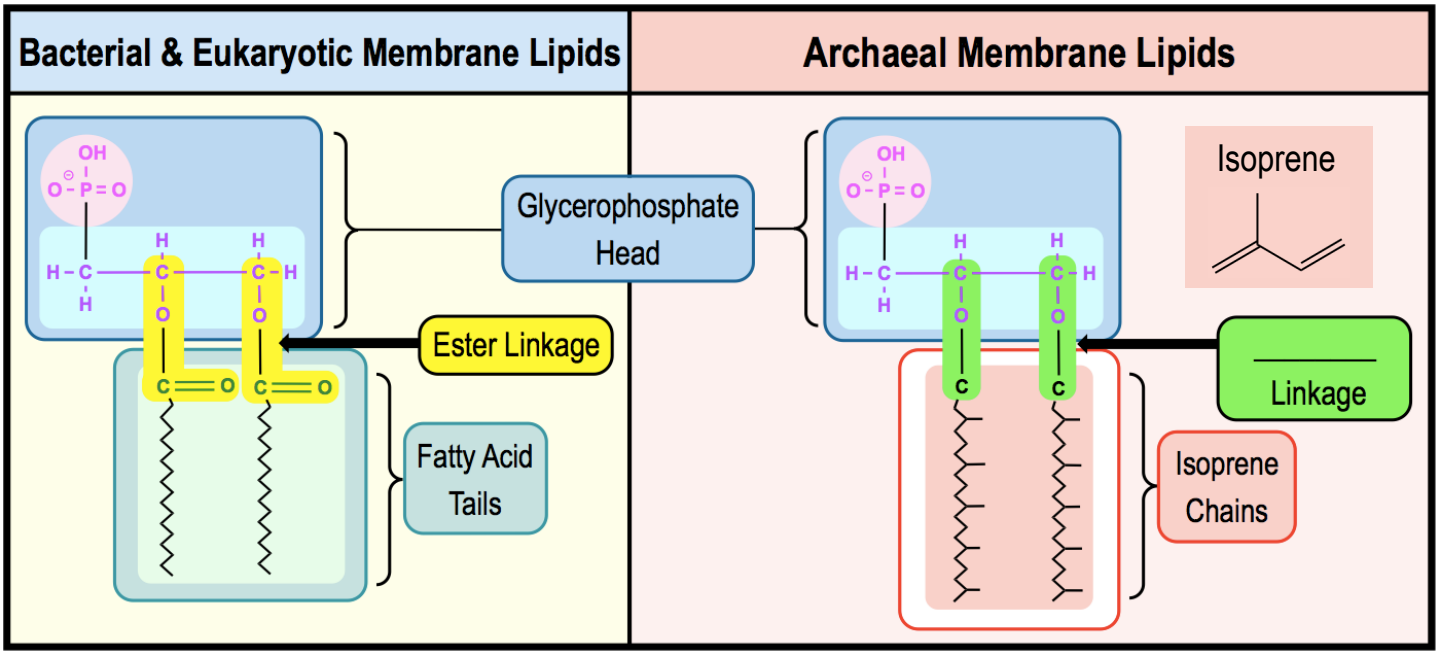
CONCEPT: ARCHAEAL CELL MEMBRANES

●Archaeal membrane lipids differ from bacterial & eukaryotic membrane lipids in 2 significant ways:

1) Hydrophobic tails are repeating _____ lipids (5-carbon hydrocarbons), NOT fatty acids.

2) An _____ linkage connects the Hydrophobic tails & glycerophosphate head group.

□ Ethers are _____ resistant to heat & chemical toxins than ester linkages (ex. *extremophiles*).



PRACTICE: Cell membranes composed of glycerol-ether lipids biosynthesized from isoprene units are characteristic of:

a) Bacteria.
b) Eukayrotes.
c) Archaea.
d) Protists.

PRACTICE: Which of the following statements is FALSE?

a) The hydrophobic tails of archaeal membranes are repeating isoprene units.
b) The glycerophosphate head & fatty acid tail of bacterial membranes are linked by an ester linkage.
c) The glycerophosphate head & fatty acid tail of eukaryotic membranes are linked by an ether linkage.
d) The glycerophosphate head & fatty acid tail of archaeal membranes are linked by an ether linkage.
e) The hydrophobic tails of bacterial membranes are long fatty acid chains.

CONCEPT: ARCHAEAL CELL MEMBRANES

Types of Archaeal Membrane Lipids

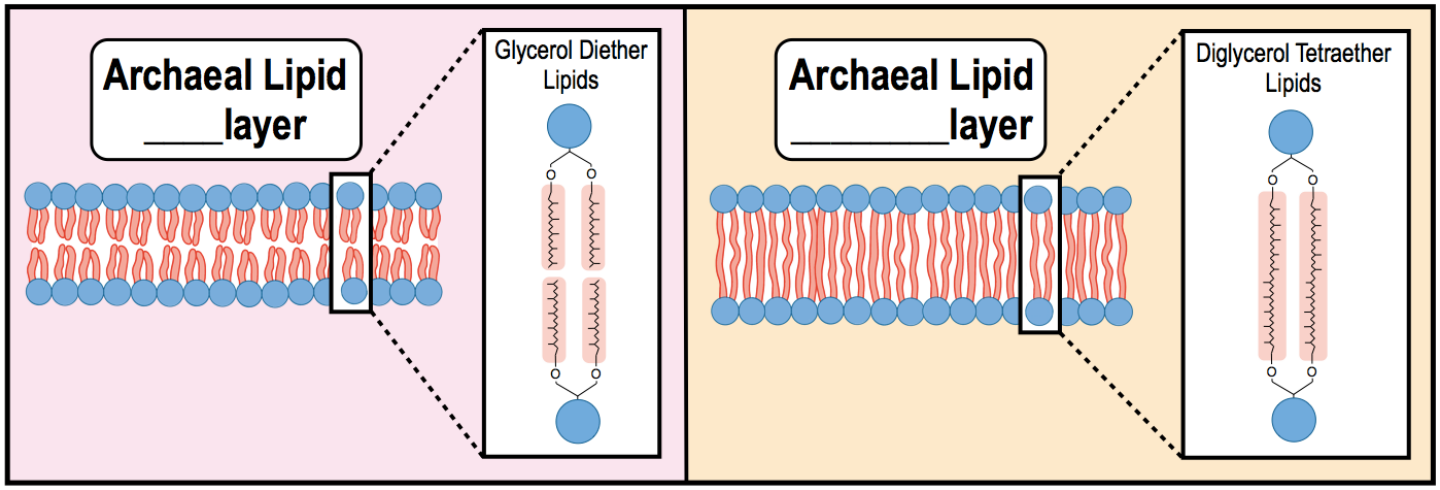
●*Recall:* Archaeal membrane lipids are made of repeating units of *isoprene* lipids.

●Archaeal membrane lipids can form *bi*-layers or _____-layers, depending on the lipid type.

- □ **Bilayers:** ____ hydrocarbons attached to a _____ head group formed by *glycerol diether lipids.*
- □ **Monolayers:** ____ long hydrocarbons connect _____ head groups formed by *diglycerol tetraether lipids.*

●Forms _____-layers in *extremely hot* temperatures which *increases* the membrane rigidity to protect the cell .

EXAMPLE: Bilayers and monolayers of Archaeal cell membranes.



PRACTICE: Thermophilic archaea may have tetraether lipids that:

a) Form bilayer membranes.
b) Form monolayer membranes.
c) Bind to and protect their DNA.
d) Form more stable tri-layer membranes.

PRACTICE: Which of the following statements is true?

a) Eukaryotic cell membranes form monolayer in extremely hot temperatures.
b) Archaeal cell membranes contain cholesterol making them more rigid than eukaryotic cells.
c) Archaeal cells membranes can form bilayers or monolayers.
d) Bacterial cell membranes contain cholesterol making them more rigid than eukaryotic cells.
e) Bacterial cell membranes can form bilayers or monolayers.