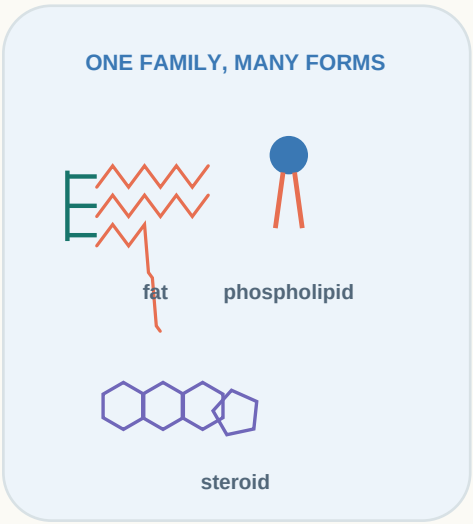
AP BIOLOGY | UNIT 1

TOPIC 1.5

Lipids

Mostly nonpolar molecules build energy-rich fats, flexible membranes, and signaling molecules.



THE CORE CAUSAL CHAIN

NONPOLAR C-H
many hydrocarbon bonds

→

HYDROPHOBIC
avoids water

→

STRUCTURE
fats, bilayers, rings

→

FUNCTION
storage or signaling

BY THE END, YOU SHOULD BE ABLE TO...

1. Explain why many lipids are hydrophobic.
2. Compare saturated and unsaturated fatty acids.
3. Connect lipid structures to energy storage, membranes, and signaling.

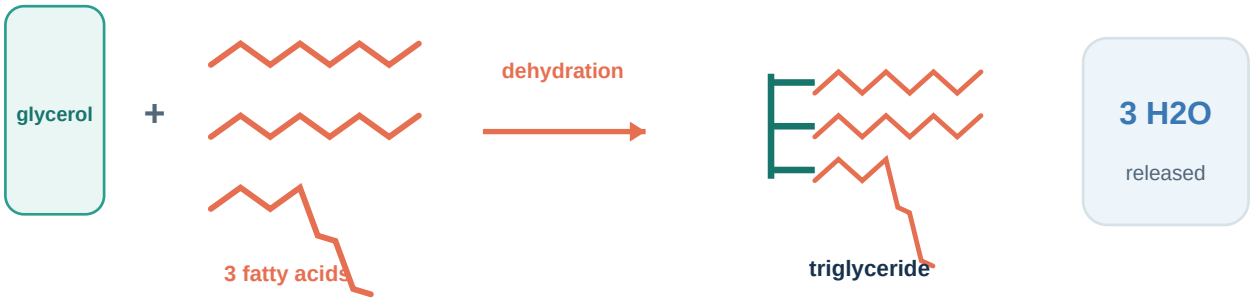
BIG IDEA

A lipid's nonpolar regions and overall shape determine how it behaves in water and what job it can perform in a cell.

1 Fatty acids and triglycerides

A triglyceride contains one glycerol joined to three fatty acids and is suited for long-term energy storage.

BUILDING A TRIGLYCERIDE



SATURATED VS. UNSATURATED

SATURATED



No carbon-carbon double bonds. Straighter chains can pack tightly.

UNSATURATED



One or more cis double bonds create bends that reduce tight packing.

WHY FATS STORE ENERGY

C-H BONDS

Many reduced carbon-hydrogen bonds hold chemical energy.

HYDROPHOBIC

Fats can be stored without attracting surrounding water.

LONG TERM

Triglycerides are compact stores of usable chemical energy.

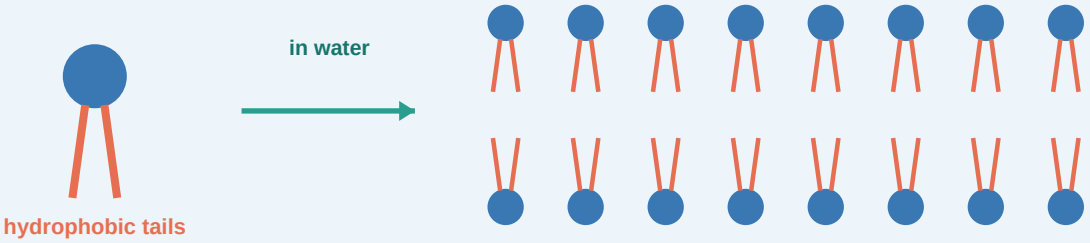
AP SCOPE NOTE

Focus on saturation, chain shape, packing, and function. You do not need to memorize every carbon position in a fatty acid.

2 Phospholipids and steroids

Amphipathic phospholipids self-arrange into bilayers; four fused carbon rings identify steroids.

AMPHIPATHIC PHOSPHOLIPID



heads contact water; tails cluster inward

STRUCTURE SUPPORTS FUNCTION

PHOSPHOLIPIDS



Polar heads and nonpolar tails form the basic fabric of cell and organelle membranes.

STEROIDS



Four fused carbon rings form molecules such as cholesterol and steroid hormones.

QUICK COMPARISON

TRIGLYCERIDE	PHOSPHOLIPID	STEROID
long-term energy	membrane bilayer	membranes or signals

COMMON ERROR

Lipids are not true polymers made from one repeating monomer. They are grouped together because they are mostly hydrophobic.