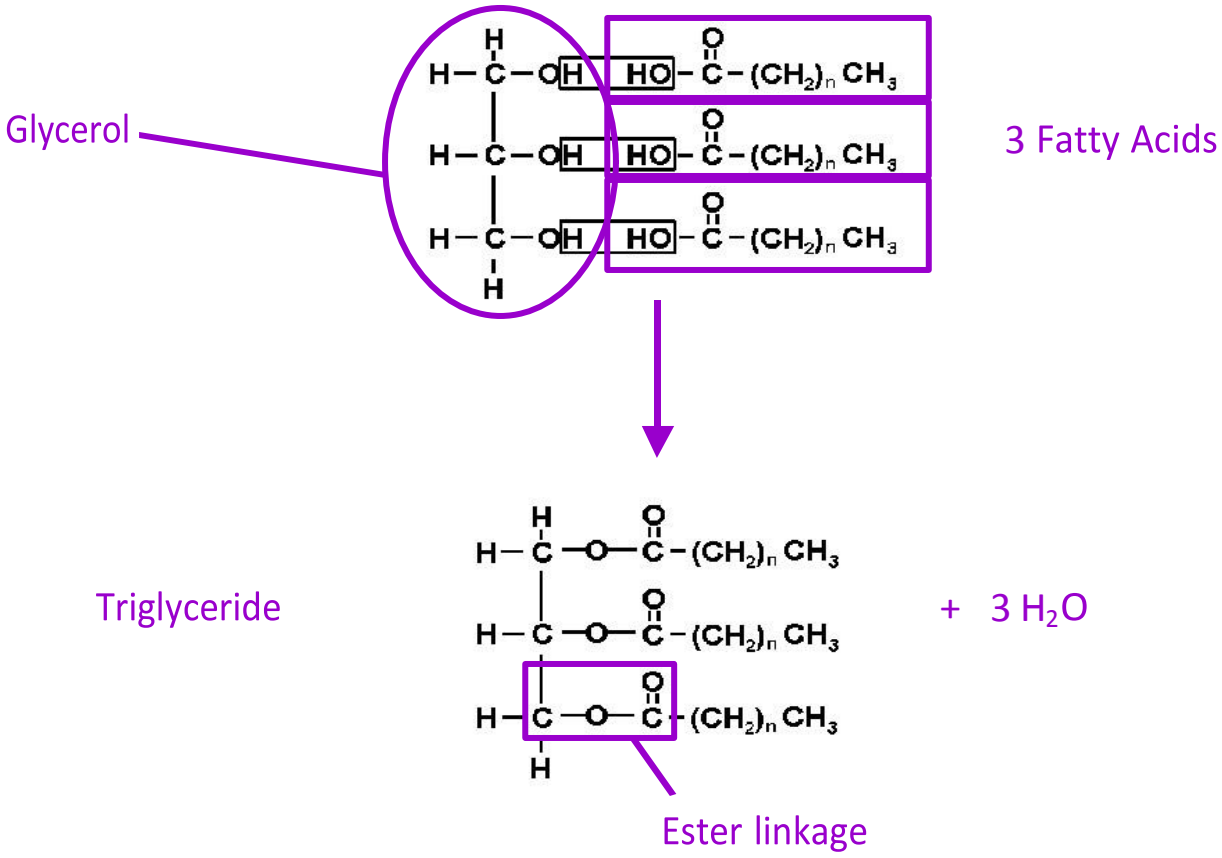
AP BIOLOGY NAME_____
BIOCHEMISTRY
Unit 2 Part 4 ACTIVITY #5 (Chapter 5) DATE_____PERIOD_____

LIPIDS

General Characteristics: Not soluble in water
Mostly hydrocarbon chains
Fats, steroids, phospholipids

Building Blocks:



Fats:

Glycerol + fatty acids

Triglycerides have 3 fatty acids

Fatty acids present may vary

Compact energy source

Cushions vital organs

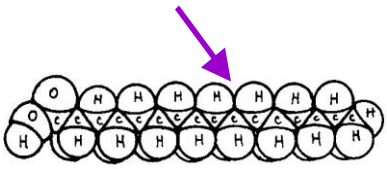
Provides insulation

Saturated:

No double bonds between carbons

Straight chain

Fatty acid



Usually solid at room temperature

Straight chains allow for tight packing

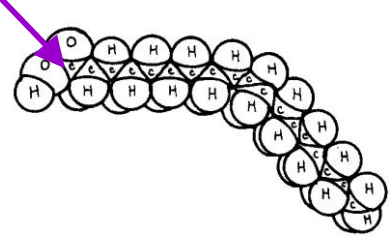
Most animal fats

Unsaturated:

At least 1 double bond between carbons

Hydrocarbon chain is bent

Fatty acid



Usually liquid at room temperature

Bent chain prevents tight packing

Most plant fats

STEROIDS:

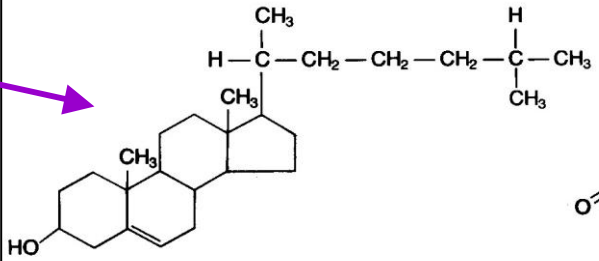
Consist of 4 fused carbon rings

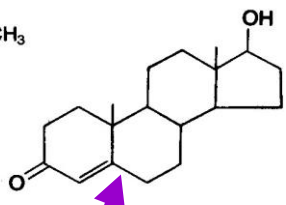
- Three are 6-sided
- One is 5-sided

Attached functional groups vary

Cholesterol

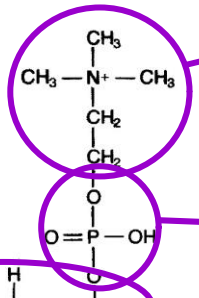
- Precursor of other steroids
- Component of animal cell membranes
- Contributes to artereosclerosis





Testosterone

PHOSPHOLIPIDS :



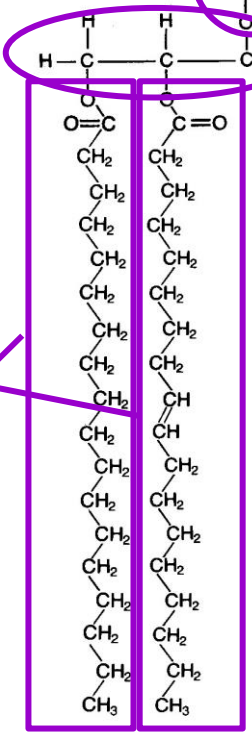
Functional Group

Phosphate Group

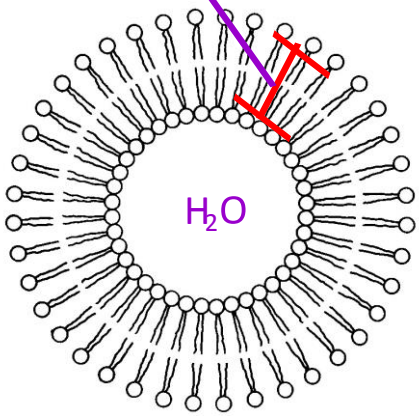
Glycerol

Head
Hydrophilic
Water loving
Polar

2 Fatty acid chains
- Make up Tail of phospholipid
- Hydrophobic
- Water fearing
- Nonpolar



Nonpolar hydrophobic core



H_2O

QUESTIONS:

5.3

1. Lipids include fats, waxes, oils, phospholipids, and steroids. What characteristic do all lipids share?

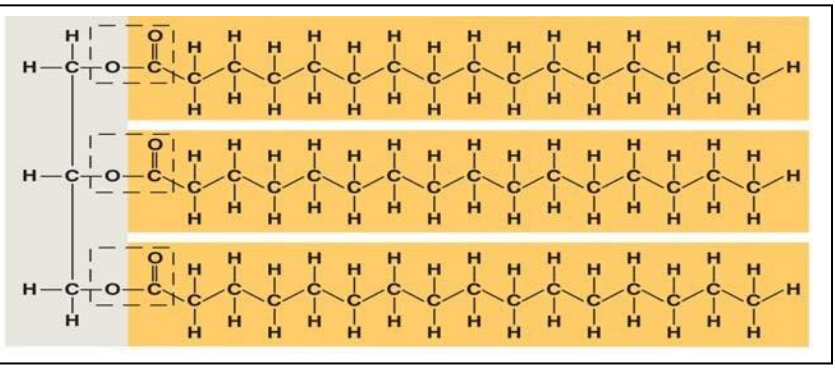
   _____

2. Why are lipids insoluble in water?

_____

_____

3. What are the building blocks of *fats*? Label them on this figure.



4. If a fat (above) is composed of 3 fatty acids and 1 glycerol molecule, how many water molecules will be removed to form it?_____ Again, what is this process called? _____

5. Indicate if each of the following is true of a **F**at, **P**hospholipid, or a **S**teroid.

   _____ Consists of glycerol and three fatty acids

   _____ Energy source

   _____ Cushions and insulates

   _____ Consists of glycerol, 2 fatty acids, and a phosphate group

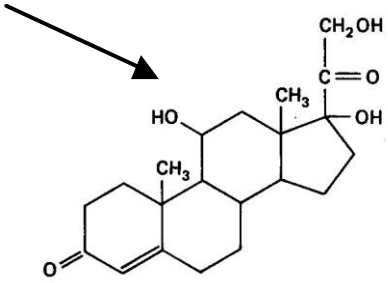
   _____ Triglycerides

_____ Part of the molecule is hydrophilic and the other part is hydrophobic

_____ Major component of cell membranes

_____ Consists of four fused carbon rings – three 6-sided rings and one 5- sided

_____



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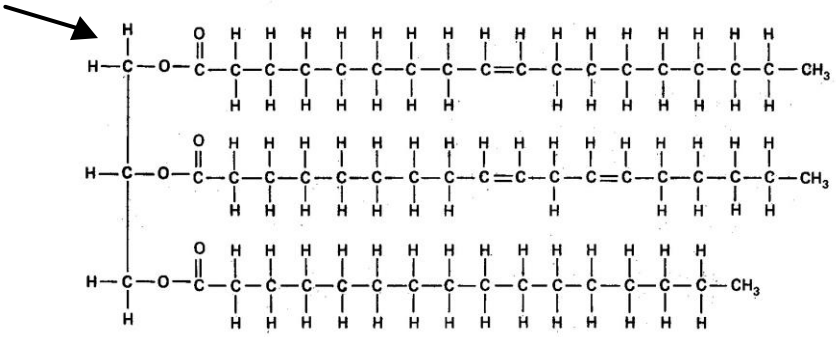

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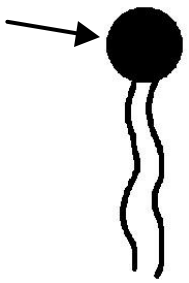


6. List three importance's of cholesterol.

_____

_____

_____

7. Indicate if each of the following is true of **S**aturated or **U**nsaturated fats.

_____ 1 or more double bonds

_____ Usually solid at room temperature

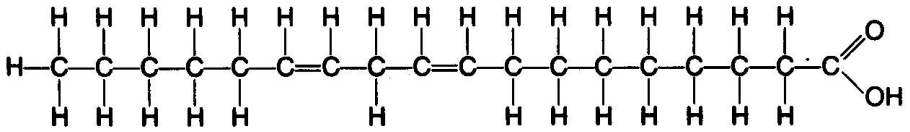
_____ Molecules are tightly packed together

_____ Usually liquid at room temperature

_____ Most plant fats

_____ Most animal fats

_____



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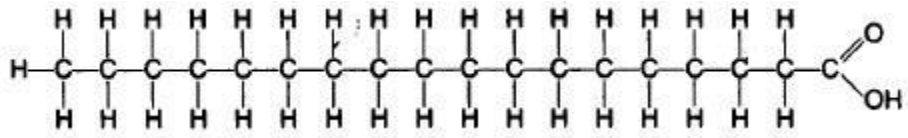


8. Why aren't unsaturated fats solid at room temperature?

_____

_____

_____

9. What is a *trans fat*? Why should you limit them in your diet? _____

_____

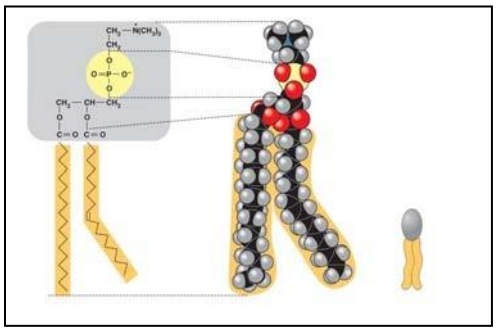
_____

10. List four important functions of fats.

_____ _____

_____ _____

11. Here is a figure that shows the structure of a phospholipid. Label the sketch to show the phosphate *group*, the *glycerol*, and the *fatty acid chains*. Also indicate the region that is *hydrophobic* and the region that is *hydrophilic*.



12. Why is the "tail" hydrophobic?

_____

a Why are they located toward the interior of cell membrane?

_____

_____

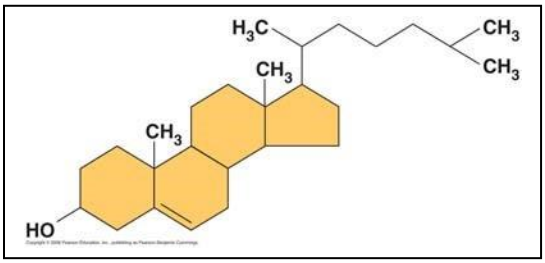
_____

13. Which of the two fatty acid chains in the figure with question 11 is unsaturated? Label it.

A. How do you know it is unsaturated? _____

_____

14. Some people refer to this structure as three hexagons and a doghouse. What is it?



15. What are other examples of steroids?

_____

_____

_____

End of Chapter Synthesis and Evaluation Problems

Do problem 3 and check your answer in the back of the text.

3._____

Study guide/ISN (20 points)

In you study guide book, review pages 39-40. In you ISN, do the following: Title the page **Chapter 5 Lipids Must Knows!** In one color copy down the must knows 2 and 3 on page 38 focusing on lipids only. Put your answers underneath each must know in a different color; a brief description, diagram, model, or mnemonic device that will help you study for the unit test and more importantly the AP test in May

Bozeman Science/Podcasts/AP Biology/ISN (see syllabus for format) **(20 points)**

1. Bozeman Lipids (Big Idea 4 Systems)