



## Plasma Membrane

### ENE-2.A.1

**Phospholipids have both hydrophilic and hydrophobic regions. The hydrophilic phosphate regions of the phospholipids are oriented toward the aqueous external or internal environments, while the hydrophobic fatty acid regions face each other within the interior of the membrane.**



## Plasma Membrane

### ENE-2.A.2

Embedded proteins can be hydrophilic, with charged and polar side groups, or hydrophobic, with nonpolar side groups.



## Plasma Membrane

### ENE-2.B.1

Cell membranes consist of a structural framework of phospholipid molecules that is embedded with proteins, steroids (such as cholesterol in eukaryotes), glycoproteins, and glycolipids that can flow around the surface of the cell within the membrane.



**What is the main component of the cell membrane?**

- A. Carbohydrates**
- B. Nucleic Acids**
- C. Phospholipids**
- D. Proteins**

**What is the main component of the cell membrane?**

**C. Phospholipids**



**The plasma membrane is made up of phospholipids with proteins. The main component is the phospholipids.**

# AP BIO INSTA-REVIEW

TOPIC

# 2.4



**Describe the orientation of the phospholipids to make the membrane**

# AP BIO INSTA-REVIEW

TOPIC

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**Describe the orientation of the phospholipids to make the membrane**

**Phospholipids have a nonpolar region (fatty acid tails) and a polar region (phosphate head).**

**The fatty acid tails were associate with one another to “hide” from the aqueous environment. So, the membrane will double layer the sandwich the nonpolar region to the interior with the polar region to the exterior facing the extracellular and cytoplasmic sides of the membrane.**

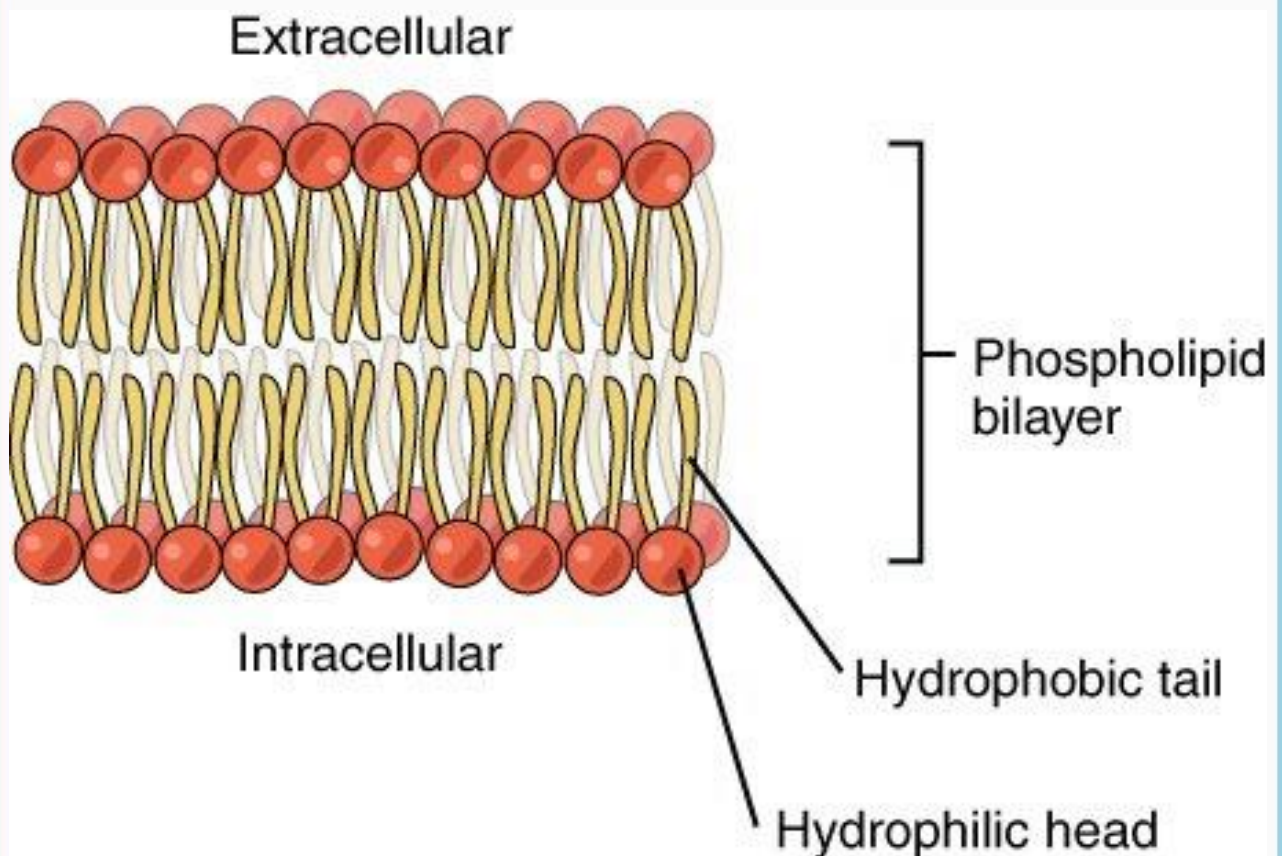
# AP BIO INSTA-REVIEW

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**Describe the orientation of the phospholipids to make the membrane**





# AP BIO INSTA-REVIEW

TOPIC

# 2.4



**Describe the folding of a transmembrane protein.**

# AP BIO INSTA-REVIEW

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**Describe the folding of a transmembrane protein.**



**If the protein is transmembrane, it means that it goes through the membrane (aka through the nonpolar region). This means that the membrane protein must have the hydrophobic region facing outwards and hydrophilic region facing inwards.**

**This provides a region for hydrophilic substances to pass through the membrane (channel protein)**



**What other lipid is found in the membrane?**

- A. Cholesterol**
- B. Cortisol**
- C. Estrogen**
- D. Testosterone**

**What other lipid is found in the membrane?**

**A. Cholesterol**



**Cholesterol is a steroid. It will sit in the fatty acid tail region to act as a buffer for the membrane. If it gets too warm, cholesterol will inhibit the phospholipids from getting too apart. If it gets too cold, cholesterol will inhibit the phospholipids from getting too close together.**

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**What is the function of cholesterol in the plasma membrane?**



**What is the function of cholesterol in the plasma membrane?**

**Cholesterol associates with the nonpolar region (fatty acid tails). This acts as a temperature buffer to maintain the fluidity of the membrane.**

**If it gets too hot, molecules move faster which causes the plasma membrane to have big gaps (reason why you heat shocked your bacteria in the transformation experiment).**

**The cholesterol helps to keep the membrane together when its hot.**

**If it gets too cold, molecules slow down and compress. The cholesterol inhibits the membrane from compressing so much that it becomes a solid.**



**What two macromolecules make up most of the membrane?**

- A. Carbohydrates & Nucleic Acids**
- B. Nucleic Acids & Phospholipids**
- C. Phospholipids & Proteins**
- D. Proteins & Carbohydrates**

**C. Phospholipids &  
Proteins**



**The plasma membrane is made up of phospholipids with proteins embedded in the membrane.**



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**What steroid helps to maintain membrane fluidity?**

**What steroid helps to maintain membrane fluidity?**



## **Cholesterol**

**It binds to the fatty acid tails to inhibit compaction in cold conditions or spacing in warm conditions. This helps to maintain fluidity of the membrane.**



## How are phospholipids oriented in the membrane?

- A. Single layer, fatty acids to interior of cell, phosphate heads to exterior of the cell.
- B. Single layer, phosphate heads to interior of cell and fatty acids to exterior of the cell
- C. Double layer, fatty acid tails to interior of membrane and phosphate groups of exterior of membrane
- D. Double layer, phosphate heads to interior of membrane and fatty acid tails to exterior of membrane

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**How are phospholipids oriented in the membrane?**

**C. Double layer, fatty acid tails to interior of membrane and phosphate groups of exterior of membrane**



**The phosphate group is charged leading to hydrophilic properties. The fatty acid chains are composed of hydrocarbons leading to hydrophobic properties. Due to this differing polarity, the plasma membrane is a double layer of phospholipids with the phosphate heads facing the exterior of the membrane while the fatty acid tails will face each other.**



**What types of materials can easily pass through the membrane?**

- A. Large, Nonpolar**
- B. Large, Polar**
- C. Small, Nonpolar**
- D. Small, Polar**

**What types of materials can easily pass through the membrane?**

**C. Small, Nonpolar**



**Due to the plasma membrane being nonpolar, the nonpolar materials can dissolved and pass through the membrane by simple diffusion. The small component allows it to fit between the phospholipids to pass through the membrane.**

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**If a membrane protein has a polar R group, where is it found?**

- A. Peripheral protein in the phosphate head region**
- B. Peripheral protein in the fatty acid region**
- C. Transmembrane protein through both phosphate head and fatty acid**

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**If a membrane protein has a polar R group, where is it found?**



**A. Peripheral protein in the phosphate head region**

**Polar R groups means that the R group is hydrophilic. This means “water loving”. The protein will fold and remain in the hydrophilic region (phosphate head region)**



# AP BIO INSTA-REVIEW

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**What are glycolipids and glycoproteins and what is the function?**

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**Glycolipids are short carbohydrate polymers attached to lipids.**

**Glycoproteins are short carbohydrate polymers attached to proteins.**

**Both function in cell-to-cell recognition.**

**What are glycolipids and glycoproteins and what is the function?**



### **Example:**

**A blood type has the A glycoproteins on their membrane, B blood type has B glycoproteins on their membrane, AB blood type has both the A and B glycoproteins on their membrane, and O blood type has neither A nor B glycoproteins on their membrane.**