Cellular Biology

10. Membrane Structure

- The Lipid Bilayer
- Membrane Proteins

11. Transport Across Membrane

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12. Intracellular Transport

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13. Vesicular Trafficking, Secretion, & Endocytosis

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14. Energy Conversion: Mitochondria and Chloroplasts

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15. Cellular Communication

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16. The Cytoskeleton

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17. The Cell Cycle

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18. Apoptosis

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19. Cell Interactions

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20. Cancer

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22. Stem Cells and Tissue Renewal

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24. The Innate and Adaptive Immune System

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Chapter 10: The Cell Membrane

1. The Lipid Bilayer
2. Membrane Proteins

The Lipid Bilayer

Phosphoglycerides, Sphingolipids, and Sterols Are the Major Lipids in Cell Membranes

- **Plasma membrane**: the part of the cell that separates the exterior and the interior of a cell with a semipermeable lipid bilayer. The plasma membrane regulates import and export of materials for the cell and includes various proteins that interact with other cells.
- **Lipid bilayer**:
- **Amphiphilic**
- **Hydrophobic**
- **Hydrophilic**
- **Phospholipids**
- **Phosphoglycerides**
- **Cholesterol**

The Lipid Bilayer Is a Two-dimensional Fluid

- **Liposomes**

Despite Their Fluidity, Lipid Bilayers Can Form Domains of Different Compositions

- **Lipid raft**

Lipid Droplets Are Surrounded by a Phospholipid Monolayer

- **Lipid droplets**

The Asymmetry of the Lipid Bilayer Is Functionally Important

-

Glycolipids Are Found on the Surface of All Eukaryotic Plasma Membranes

- Glycolipids
- Gangliosides

Membrane Proteins

Membrane Proteins Can Be Associated with the Lipid Bilayer in Various Ways

- Transmembrane protein
- Glycosylphosphatidylinositol (GPI) anchor
- Membrane-associated proteins

Lipid Anchors Control the Membrane Localization of Some Signaling Proteins

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In Most Transmembrane Proteins, the Polypeptide Chain Crosses the Lipid Bilayer in an α-Helical Conformation

- Single pass transmembrane proteins
- Multi-pass transmembrane proteins

Transmembrane α Helices Often Interact with One Another

-

Some β Barrels Form Large Channels

- Lumen

Many Membrane Proteins Are Glycosylated

- Carbohydrate layer
- Lectins

Membrane Proteins Can Be Solubilized and Purified in Detergents

- Detergents

Bacteriorhodopsin Is a Light-driven Proton H^+ Pump That Traverses the Lipid Bilayer as Seven α Helices

- **Bacteriorhodopsin**

Some β Barrels Form Large ChannelsThe Cortical Cytoskeleton Gives Membranes Mechanical Strength and Restricts Membrane Protein Diffusion

- **Spectrin**
- **Cortex**

Membrane-bending Proteins Deform Bilayers

- **Membrane bending proteins**