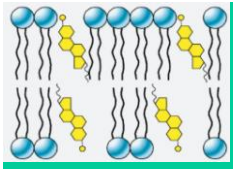
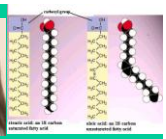
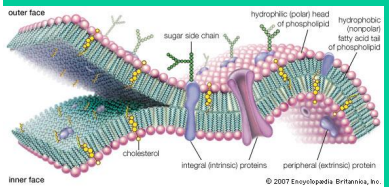
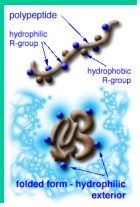




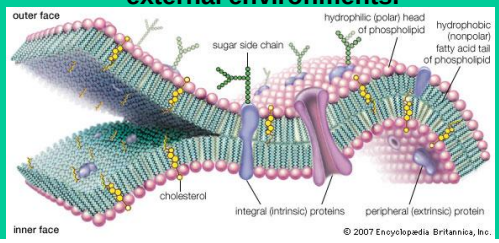
2.4 Plasma Membranes





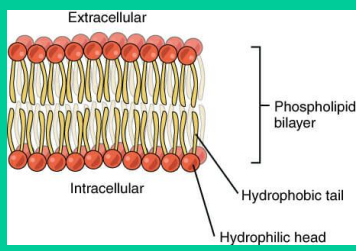
ENDURING UNDERSTANDING

ENE-2 Cells have membranes that allow them to establish and maintain internal environments that are different from their external environments.



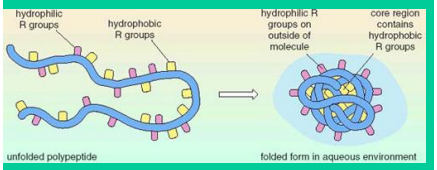
ENE-2.A Describe the roles of each of the components of the cell membrane in maintaining the internal environment of the cell

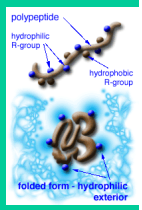
- Hydrophilic phosphate regions of the phospholipids are oriented toward the aqueous external or internal environments
- Hydrophobic fatty acid regions face each other within the interior of the membrane



ENE-2.A Describe the roles of each of the components of the cell membrane in maintaining the internal environment of the cell

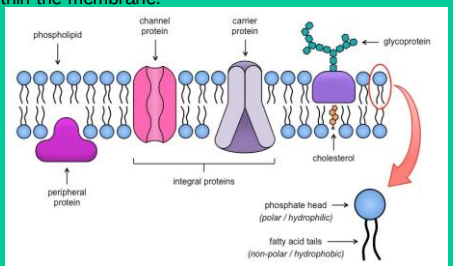
- Embedded proteins can be hydrophilic, with charged and polar side groups, or hydrophobic, with nonpolar side groups





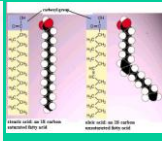
ENE-2.B Describe the Fluid Mosaic Model of cell membranes

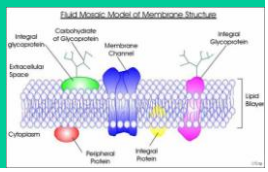
- Cell membranes consist of a structural framework of phospholipid molecules that is embedded with proteins, steroids (such as cholesterol in eukaryotes), glycoproteins, and glycolipids that can flow around the surface of the cell within the membrane.



ENE-2.B Describe the Fluid Mosaic Model of cell membranes

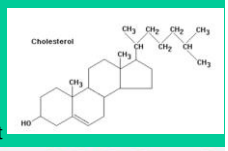
- Lipids make Membrane Fluid
  - Consistency of olive oil.
  - More unsaturated fatty acid residues = more fluid (kinks keep molecules spread out).
  - Phospholipid molecules move sideways at a rate of about 2 µ/sec (the length of a prokaryotic cell)
  - Phospholipids rarely flip-flop from one layer to the other.
  - Fluidity keeps cells pliable.

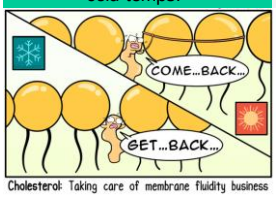


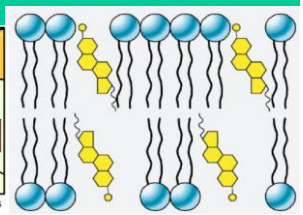


ENE-2.B Describe the Fluid Mosaic Model of cell membranes

- Cholesterol
  - Found in animal plasma membranes
  - Makes membrane less fluid at warm temps.
  - Makes membrane more fluid at cold temps.

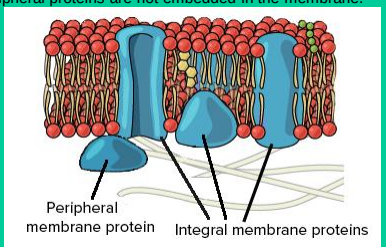






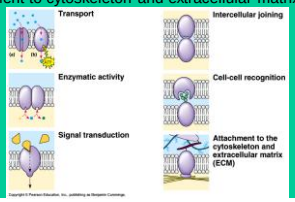
ENE-2.B Describe the Fluid Mosaic Model of cell membranes

- Orientation of Proteins
  - Integral Proteins
    1. Transmembrane extend through both sides of a cell membrane.
    2. Unilateral reach only partway across the membrane.
  - Peripheral proteins are not embedded in the membrane.



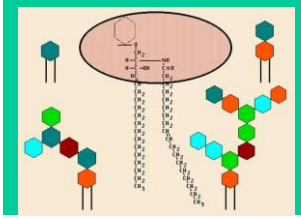
ENE-2.B Describe the Fluid Mosaic Model of cell membranes

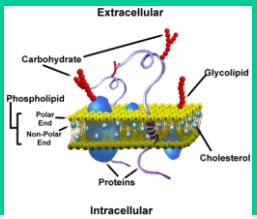
- Function of Membrane Proteins
  - Transport Proteins
  - Enzymes
  - Receptor Protiens- attachment sites for chemical messengers (hormones).
  - Intercellular junctions
  - Cell to cell recognition
  - Attachment to cytoskeleton and extracellular matrix(EMC)



ENE-2.B Describe the Fluid Mosaic Model of cell membranes

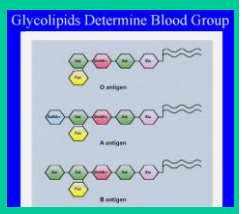
- Glycoproteins and Glycolipids
  - Hydrophilic head is a variety of sugar
  - Cells develop their own carbohydrate chains
  - Chains vary by number of sugars and branching
  - Allows tissues and cells of embryos to sort themselves out.
  - Functions in Cell-Cell recognition





ENE-2.B Describe the Fluid Mosaic Model of cell membranes

- Immune system rejection of transplanted tissues is due to recognition of unique glycolipids and glycoproteins
- Blood types are due to unique glycolipids on the membranes of red blood cells.



ENE-2.B Describe the Fluid Mosaic Model of cell membranes

- Singer and Nicolson (1972) described the Fluid mosaic model.
  - Embedded proteins are scattered throughout membrane in irregular pattern.
  - Proteins vary among membranes.
  - Electron micrographs of freeze-fractured membrane supports fluid-mosaic model.