

CELL BIOLOGY LAB

Plasma Membrane

Pre-lab Resources
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The Plasma Membrane

- Also called:
 - *Cell membrane*
 - *Plasmalemma*
- Functions:
 1. *Physical isolation*
 2. *Regulation of exchange with the environment*
 3. *Sensitivity*
 4. *Cell-to-cell communication, adhesion, and structural support*

Fluid Mosaic Model

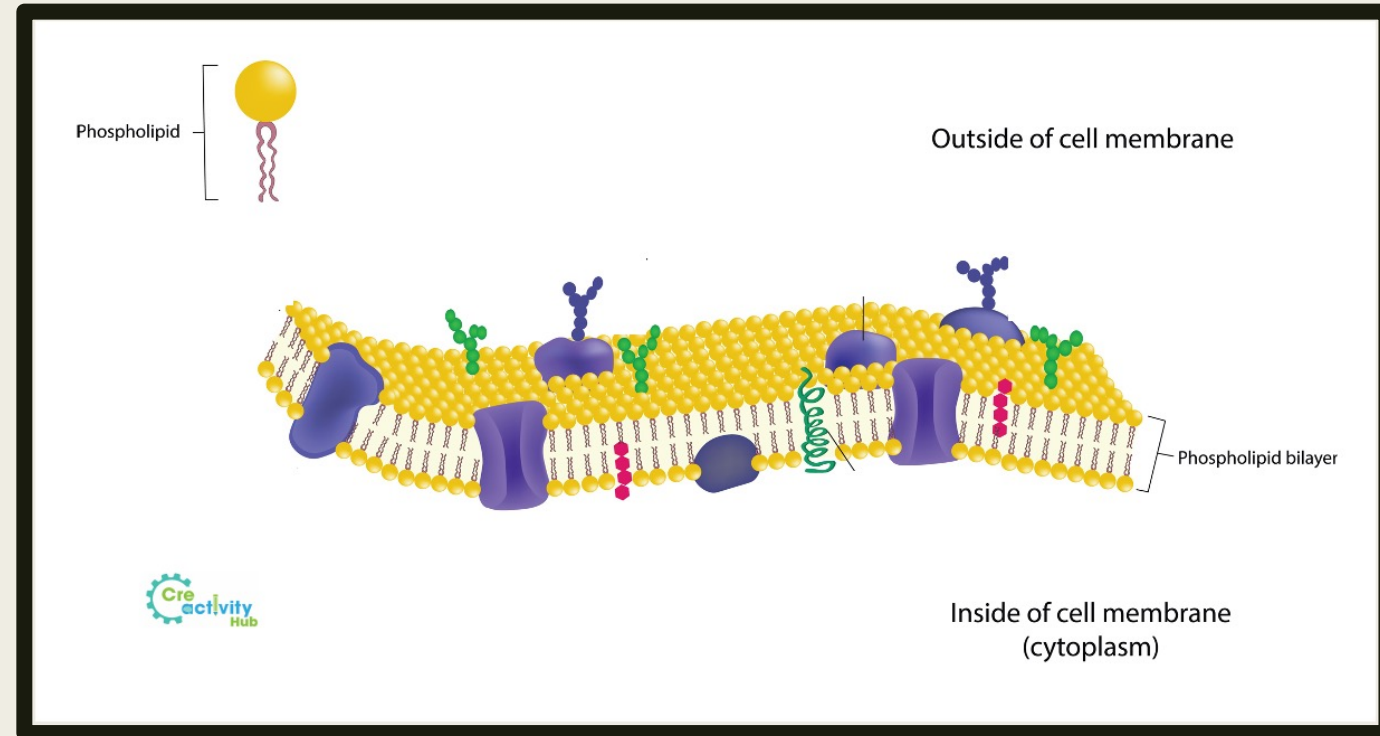
- Describes the structure of the cell membrane as:

- *Dynamic*
 - *Flexible*
 - *With diverse components*
 - Phospholipids
 - Proteins
 - Cholesterol
- } Move freely

Phospholipid Bilayer

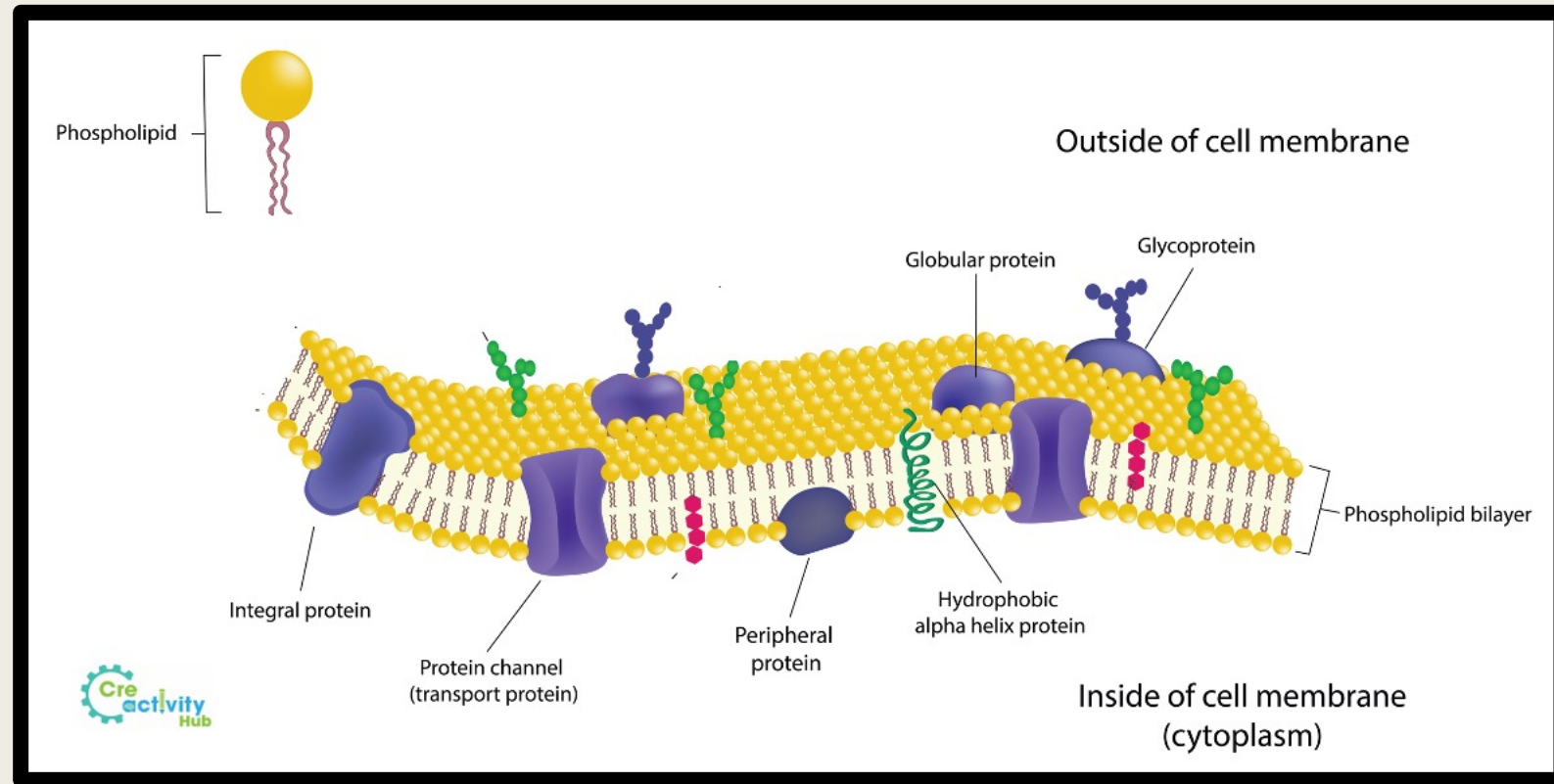
- Made of two layers of phospholipids
- Phospholipid
 - *Head*
 - Hydrophilic
 - Polar
 - *Tail*
 - Hydrophobic
 - Non-polar

Amphipathic

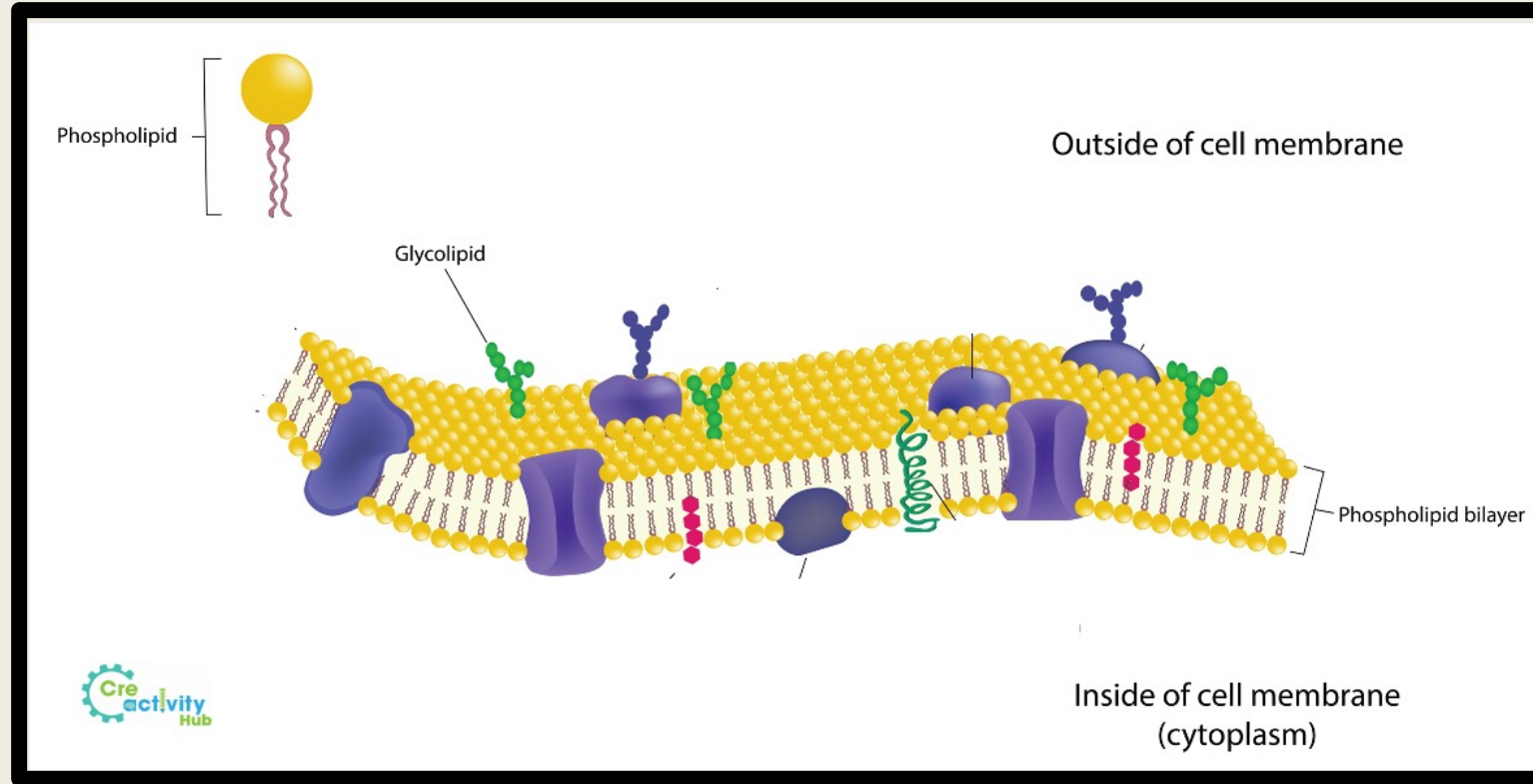


Proteins

1. Peripheral proteins
2. Integral proteins (transmembrane)



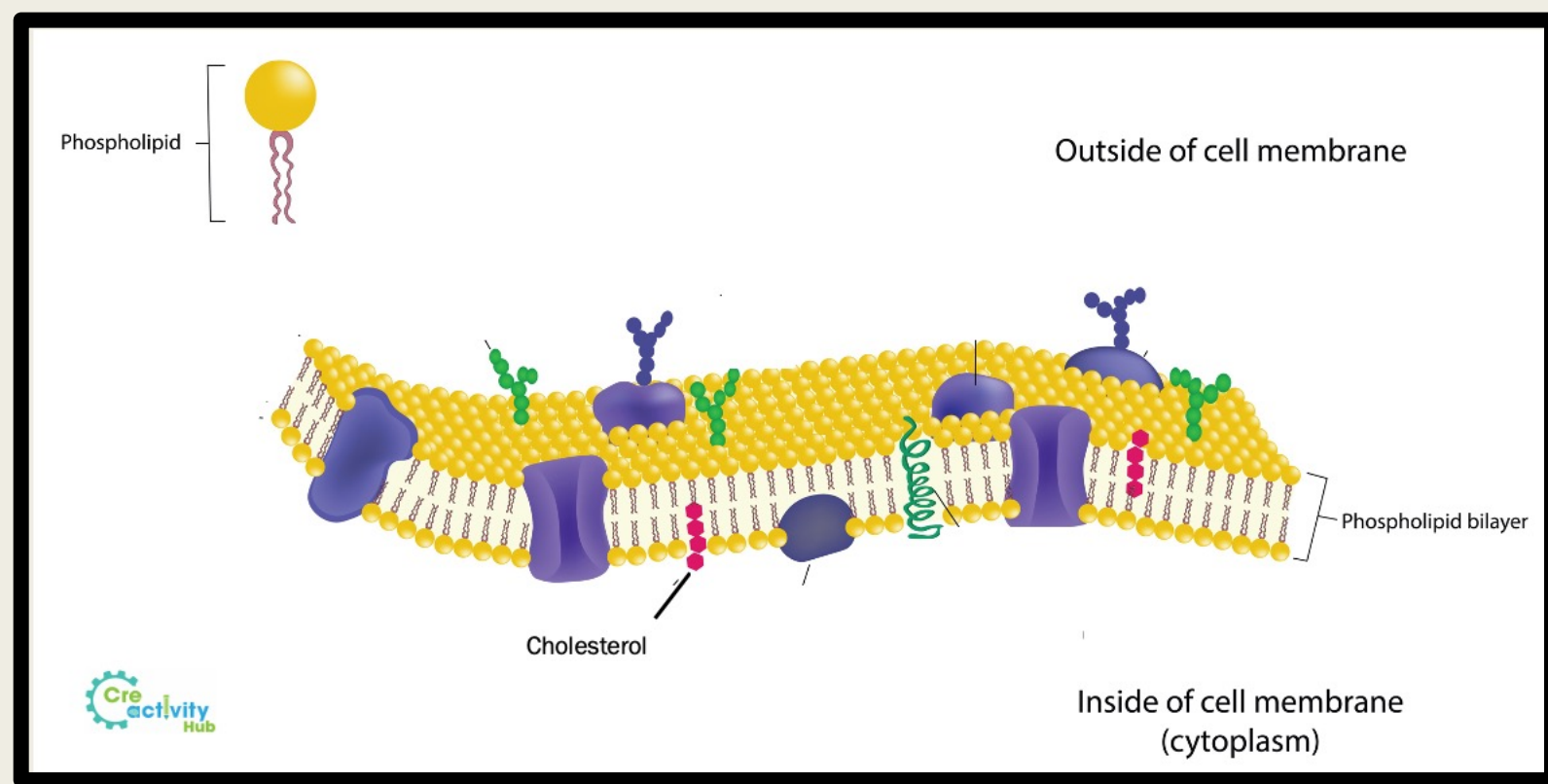
Glycolipids



- Lipids with a carbohydrate attached to them
- Function:
 - *Maintain stability of cell membrane*
 - *Facilitate cellular recognition*
 - Immune response
 - Cell connections – tissue formation

Sterols

- Cholesterol
- Function:
 - *Stabilize the membrane structure*
 - *Regulate membrane:*
 - Fluidity
 - Permeability
 - Rigidity
 - *Membrane remodeling*
 - Endocytosis



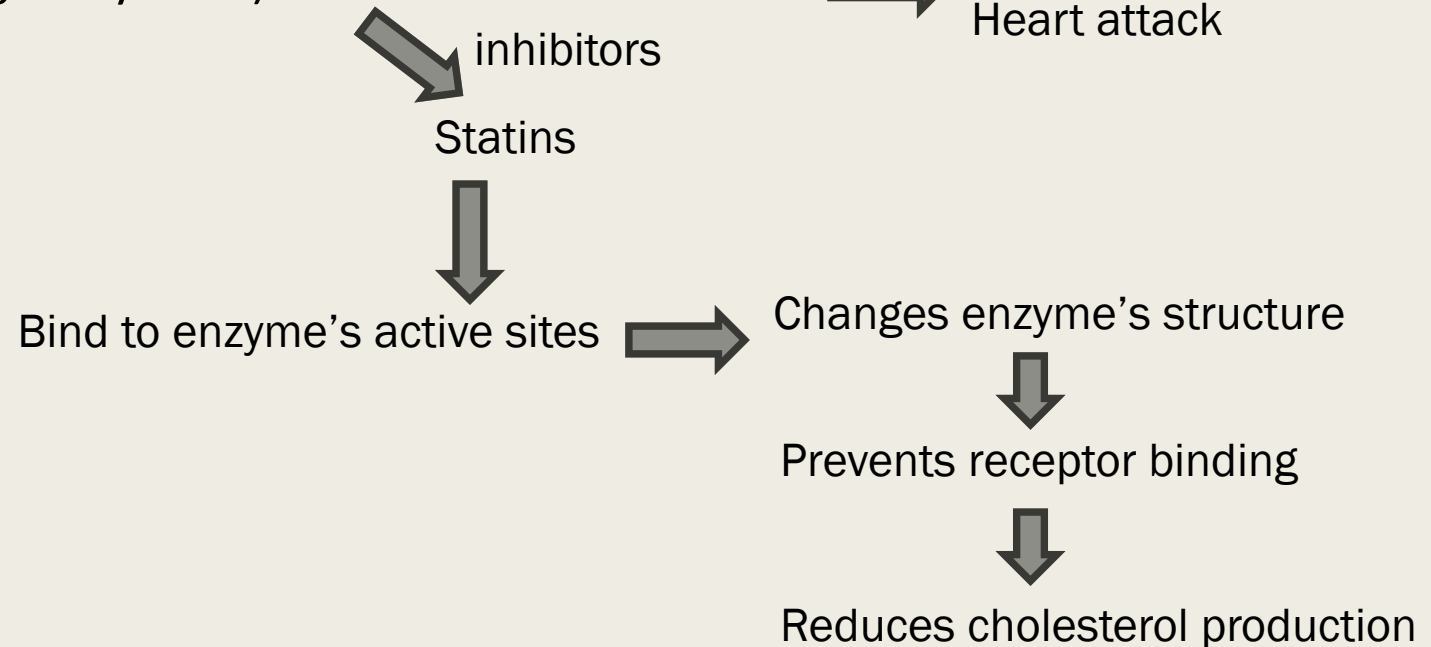
Cholesterol Synthesis

- Cholesterol levels

- *Dietary intake*
- *Biosynthesis*

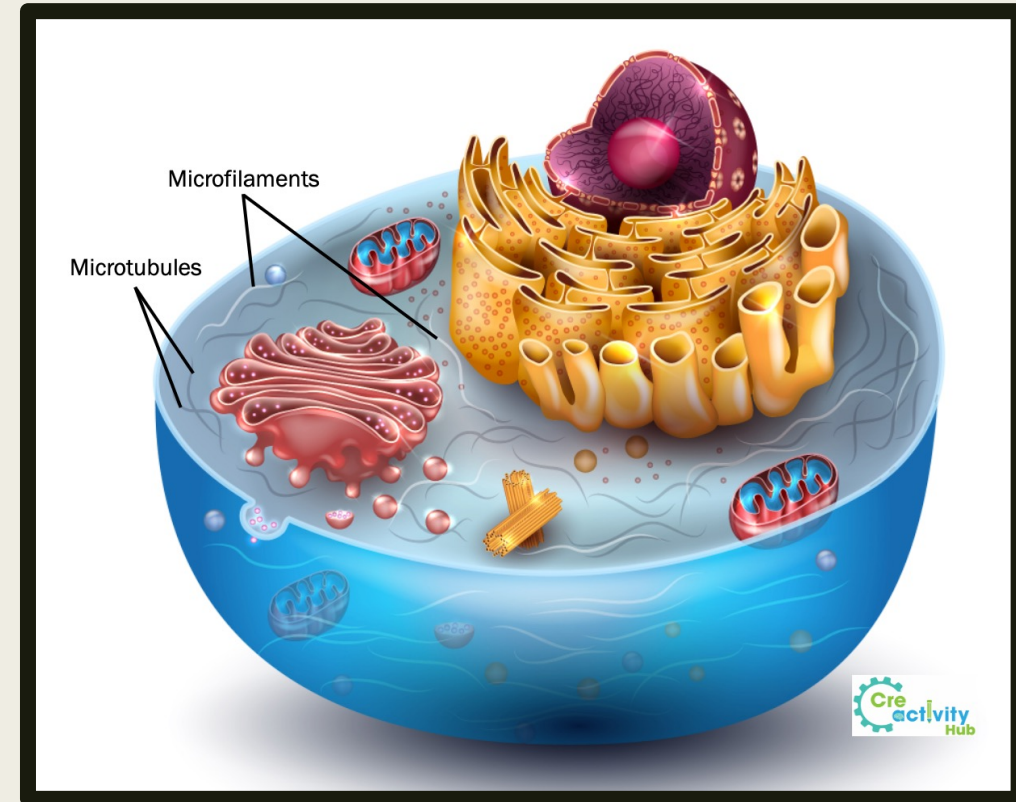
- Enzyme

- *HMG-CoA* (3-hydroxy- 3-methylglutaryl-CoA) reductase → cholesterol → Blood vessels blockage
Heart attack



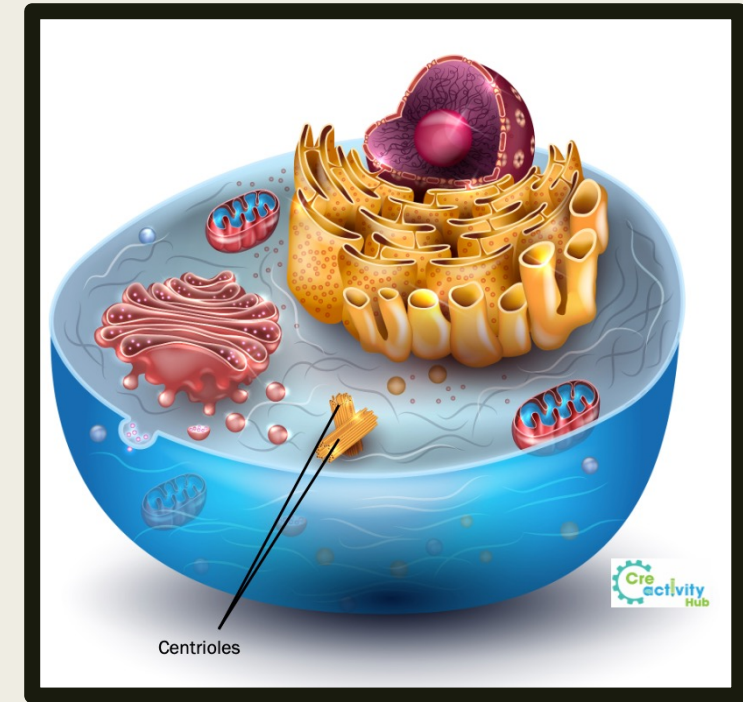
Cytoskeleton

- Microfilaments
 - Slender strands
 - Made of protein (actin)
 - Functions:
 - Anchor proteins of the plasma membrane
 - Actin might interact with other proteins (myosin)
- Microtubules
 - Thin, hollow tubes
 - Made of protein (tubulin)
 - Functions:
 - Forms the main components of the cytoskeleton
 - Allow cell movement or shape change
 - Help to move organelles within the cell
 - Help during cell division
 - Form structural components of organelles:
 - Centrioles
 - Cilia
 - Flagella



Centrioles

- Cylindrical structures composed of microtubules
- Location
 - *Centrosome*
 - Clear region of cytoplasm that contains this pair of centrioles
- Function:
 - *Organize microtubules to move the chromosomes during cell division*



Cilia and Flagella

■ Cilia

- *Also made of nine groups of microtubules*
- *Beat rhythmically to move fluids or secretion across the cell surface.*

■ Flagella

- *Present in some bacteria*
- *Sperm – only human cell that has flagellum*
- *Helps cell to move or propel itself*

