

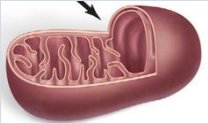



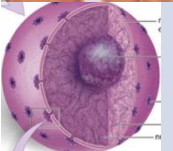
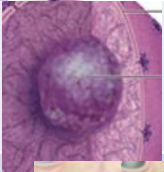
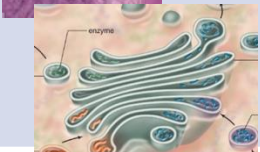
CHAPTER 3: CELL STRUCTURE, FUNCTION & TRANSPORT

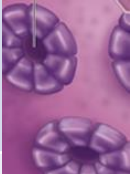
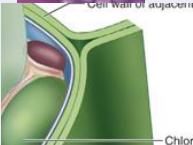
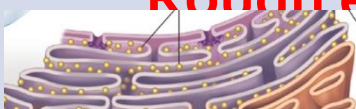




ANSWER SLIDES

Structures, Functions and Organelle
Relationships

Organelle <i>ANSWERS</i>	Plant or Animal	Function
Cell membrane	Both	Regulate transport of molecules in/out of cell
Cell wall	Plant only	Provides structure to plant cell
Cytoplasm	Both	Jelly-like fluid where organelles & molecules move
Vacuole & vesicle	Both	Transports molecules around the cell
Ribosome	Both	Site of protein synthesis; attached to ER
Golgi	Both	Processes, modifies & packages proteins and lipids
Rough ER	Both	Studded with ribosomes & site of protein synthesis
Smooth ER	Both	Site of lipid synthesis & detoxification
Central Vacuole	Plant only	Stores water, starch and other molecules
Chloroplast	Plant only	Site of photosynthesis – converting sunlight & CO ₂ to glucose & O ₂
Mitochondria	Both	Site of cellular respirations – converting glucose & O ₂ to H ₂ O, CO ₂ & ATP energy
Nucleus	Both	Controls all cell functions
Nucleolus	Both	Where rRNA & proteins form the subunits of ribosomes
Nuclear membrane	Both	Surrounds DNA and is continuous with the endoplasmic reticulum
Centrioles	Animal only	Involved in making spindle fibers during cell division & forms basal bodies
Lysosomes	Animal only	Fuse with vesicles, vacuoles & old organelles for intercellular digestion
Microtubules	Both	Forms the cytoskeleton for anchoring & transporting organelles and forms structure cilia & flagella for cell movement (also forms structure of centrioles & basal bodies)
Nuclear pores	Both	Openings in nucleus that allow molecules like proteins & RNA to exit the nucleus

Section 1.1: Cell Organelles

Organelle	Function
 <p>Mitochondrion</p>	$\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{ATP}$
 <p>Chloroplast</p>	$\text{CO}_2 + \text{H}_2\text{O} + \text{ATP} \rightarrow \text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6$
 <p>Lysosomes</p>	Contains hydrolytic enzymes and fuses with vesicles/vacuoles to digest contents
 <p>Smooth endoplasmic reticulum</p>	Produces steroids and detoxifies
 <p>Nucleus</p>	Stores genetic information which determines cell functions
 <p>Nucleolus</p>	rRNA & proteins form the subunits of ribosomes here
 <p>Golgi body</p>	Produces lysosomes

Organelle	Function
 <p>Nuclear pores</p>	<p>Openings allow molecules to enter and exit the nucleus</p>
 <p>Cell wall</p>	<p>Made of cellulose and gives structure to plant</p>
 <p>Rough endoplasmic reticulum</p>	<p>High surface area for producing proteins</p>
 <p>Vesicles</p>	<p>Transports small molecules throughout the cell</p>
 <p>Centrioles</p>	<p>Involved in cell division and forms basal bodies</p>
 <p>(inner membrane of mitochondria)</p>	<p>High surface area for cellular respiration</p>
 <p>Golgi body</p>	<p>Packages and assembles proteins and lipids</p>

Fill in the middle box with an explanation that relate the two organelles

Ribosomes



Proteins produced at the ribosomes are transported to the vesicle for processing and modification and assembly



Golgi Body

nucleolus



The nucleolus produces and stores rRNA and proteins which join together to form the structure of ribosomes



ribosome

lysosome



Lysosomes fuse with incoming vacuoles at hold the bacterium after phagocytosis and digest it



Bacterium in vacuole

microtubules



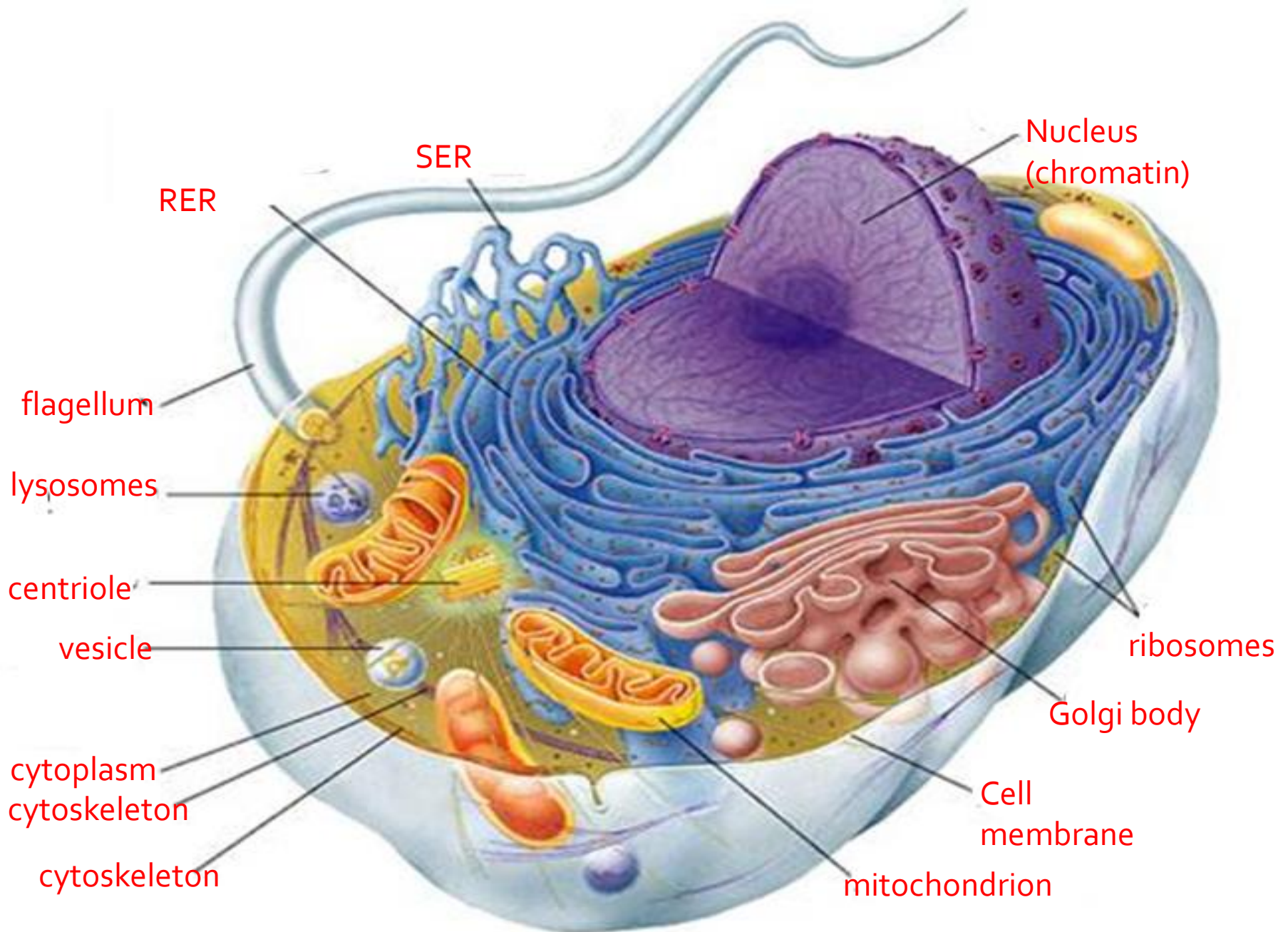
Microtubules form the 9+0 pattern of triplets that make up the structure of centrioles.



centrioles

Fill in the middle box with an explanation that related the two organelles

<p>1.</p>	<p>The cells of the adrenal glands would contain high numbers of which organelle and why? Smooth ER because this is where steroid production occurs; adrenalin is a steroid hormone; therefore lots of SER to produce it in adrenal gland cells.</p>
<p>2.</p>	<p>Describe (briefly) the functions of the cell membrane. Regulate the transport of substances in and out of the cell. To create a cell barrier to protect the cell's contents. For cell recognition and communication.</p>
<p>3.</p>	<p>How do the mitochondria and chloroplast relate? Chloroplasts do photosynthesis which takes CO₂, H₂O and sunlight energy and convert it into O₂, glucose → the O₂ and glucose are then converted by the mitochondria during cellular respiration into CO₂, H₂O and ATP energy for the cell functions.</p>
<p>4.</p>	<p>How do microtubules relate to the cytoskeleton, cilia and flagella? Microtubules form the structure of cytoskeleton, are found in pairs in a 9+2 pattern in cilia and flagella.</p>
<p>5.</p>	<p>What's the difference between the Smooth ER and the Rough ER? SER lacks ribosomes and produced lipids and does detoxification while RER is studded with ribosomes and does protein synthesis.</p>



Nucleus
(chromatin)

SER

RER

flagellum

lysosomes

centriole

vesicle

cytoplasm

cytoskeleton

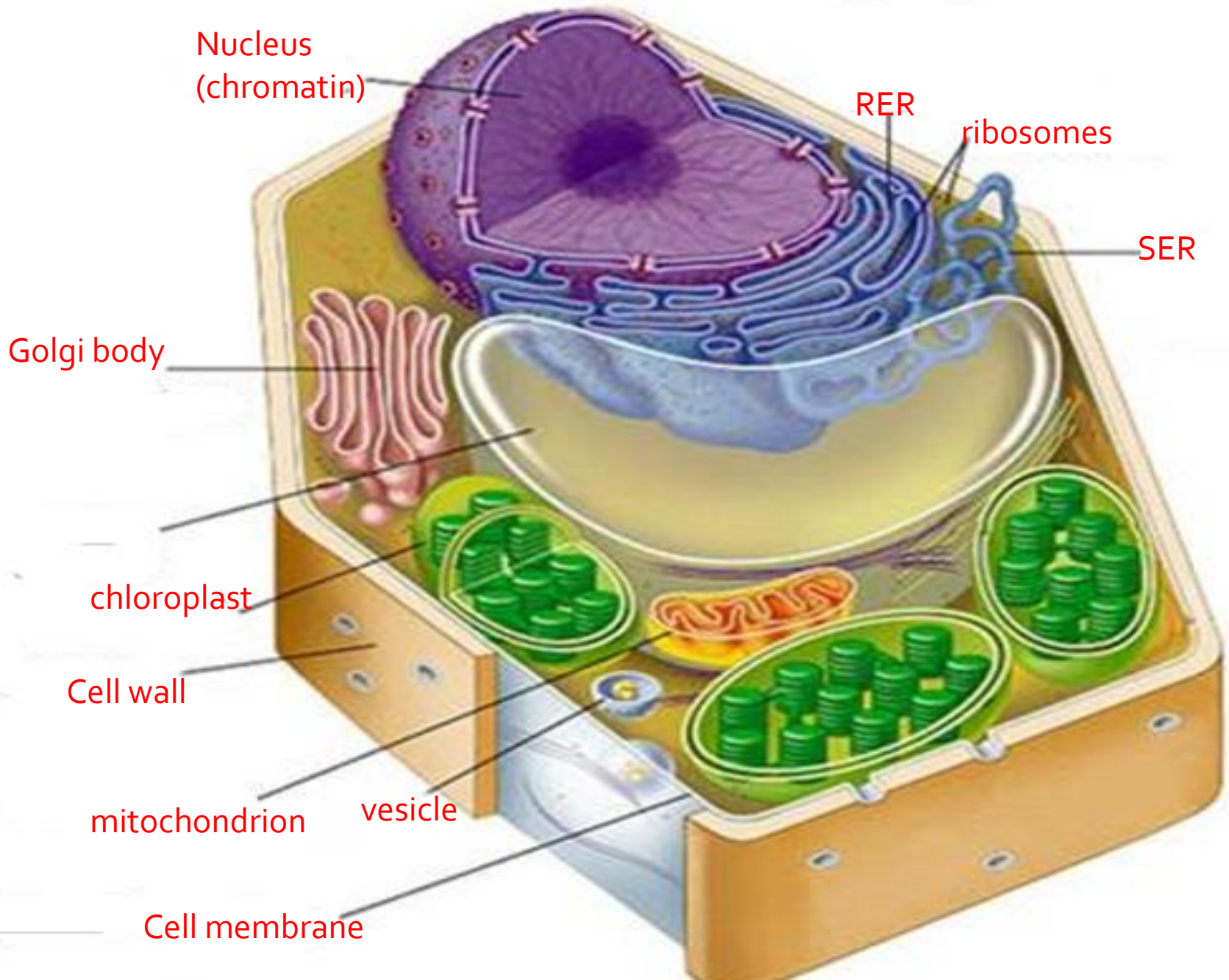
cytoskeleton

ribosomes

Golgi body

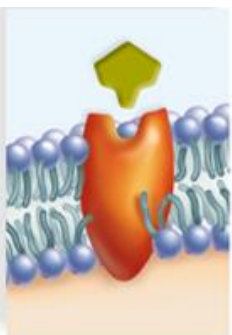
Cell
membrane

mitochondrion

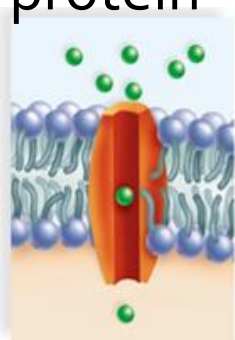


**CHAPTER 3 CONTINUED:
CELL MEMBRANE TRANSPORT
ANSWER SLIDES**

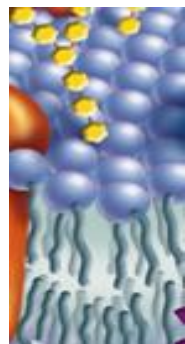
Receptor protein



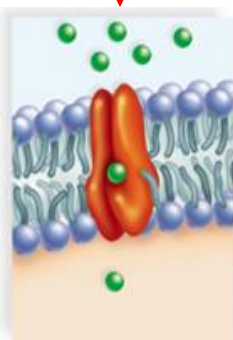
channel protein



glycolipid

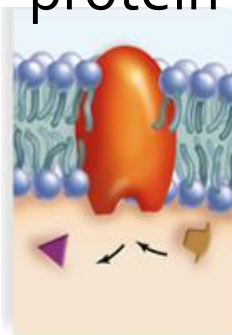


Carrier protein

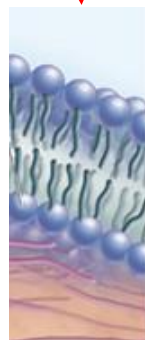


cholesterol

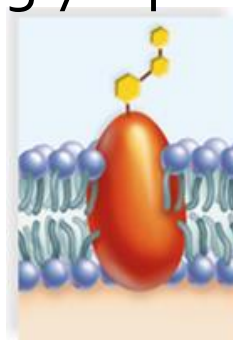
Enzymatic protein



Phospholipid bilayer



glycoprotein



Facilitated or active transport with a carrier

charged molecules and ions



noncharged molecules



macromolecule



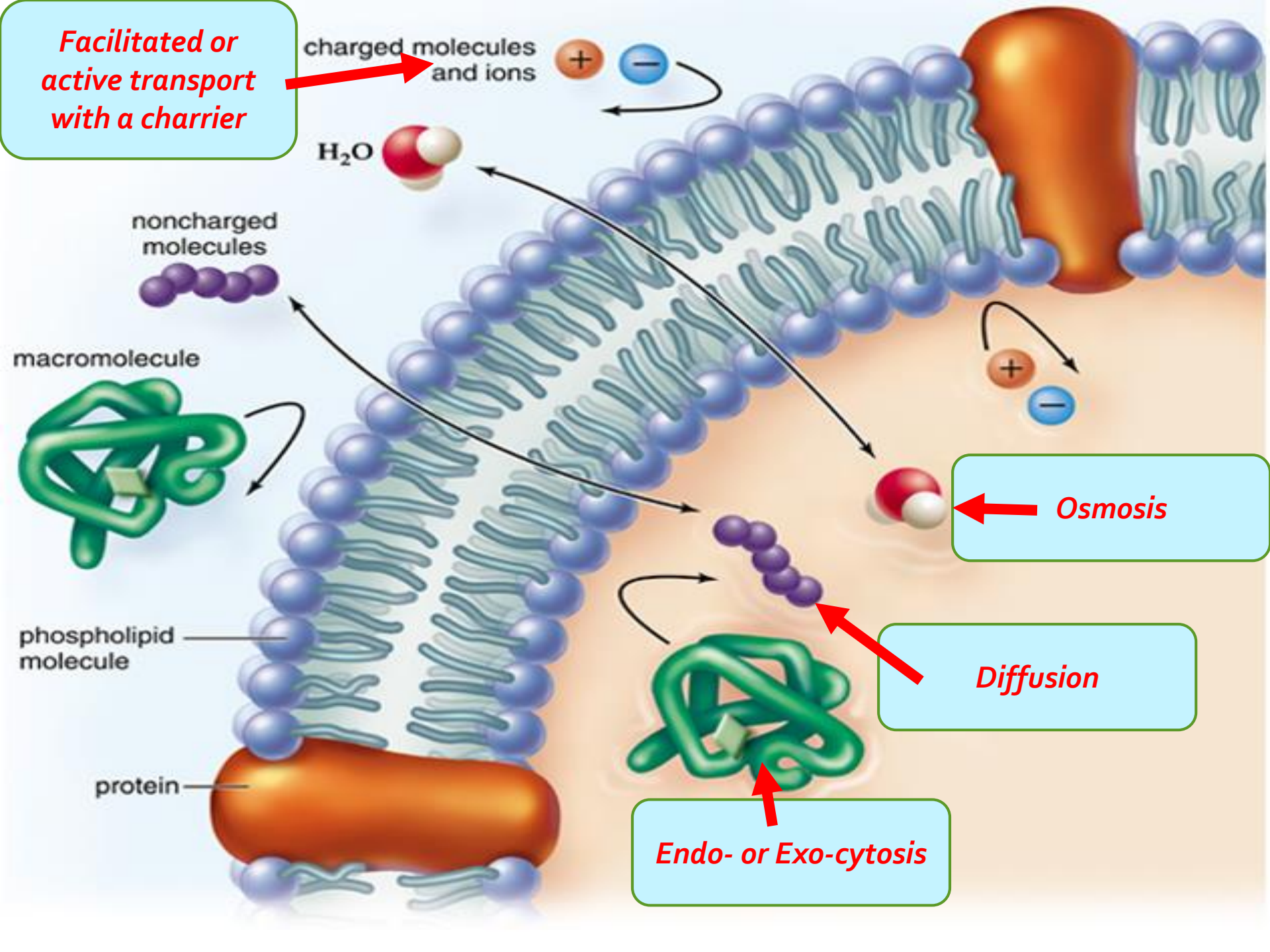
phospholipid molecule

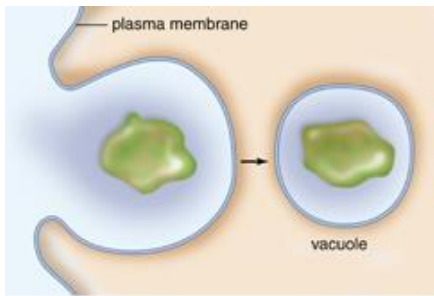
protein

Osmosis

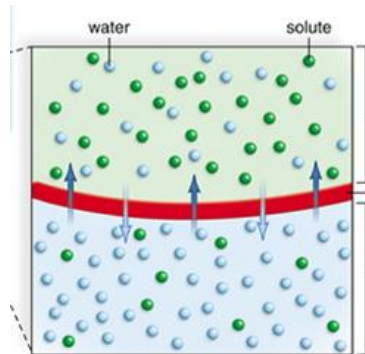
Diffusion

Endo- or Exo-cytosis

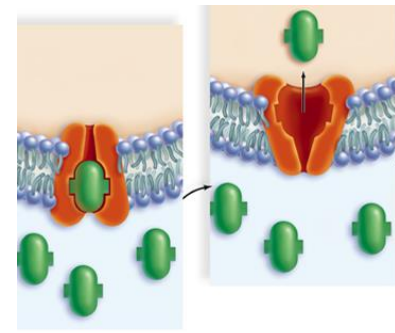




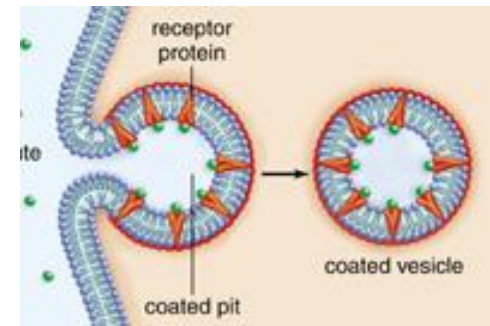
phagocytosis



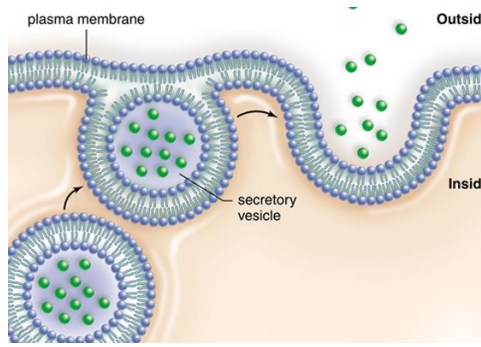
osmosis



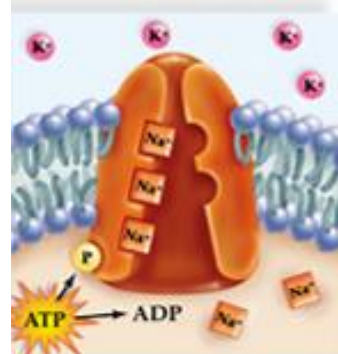
Facilitated transport



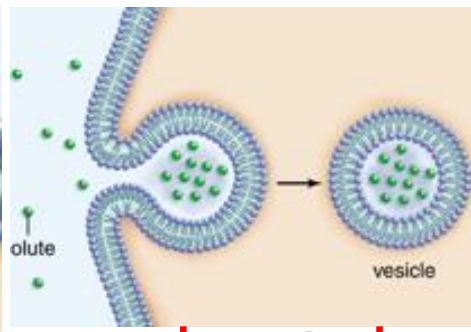
Receptor-mediated Endocytosis



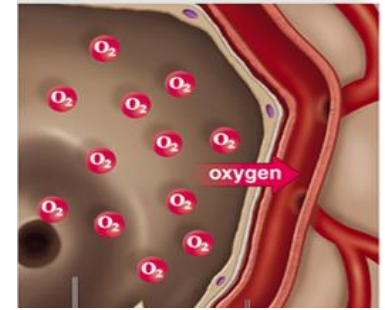
exocytosis



Active transport



pinocytosis



diffusion

Passive Transport vs. Active Transport

High to low concentration

No ATP required

lipid-soluble molecule

Small molecule

Polar molecule

Phospholipid bilayer

Channel proteins

Carrier proteins

Ex. water

Ex. O₂ & CO₂ Ex. glucose

osmosis

Isotonic solution

Hypertonic solution

Hypotonic solution

diffusion

Facilitated diffusion

Low to high concentration

ATP required

Polar molecule

macromolecules

Carrier proteins

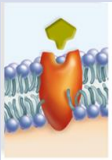

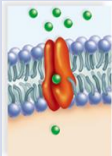
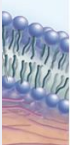
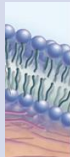
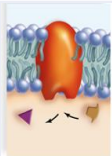

Vesicles involved

Receptor used

Ex. bacteria

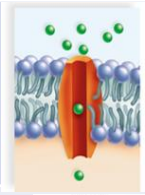
Ex. Na⁺/K⁺ pump

Endocytosis & Exocytosis

Structure/Process	Function
 <p data-bbox="440 134 757 177">Receptor Protein</p>	<p data-bbox="792 134 1866 177">Molecule attaches to it and causes some change in the cell</p>
 <p data-bbox="112 314 757 411">Carbohydrate Chain Glycolipid (in image) & Glycoprotein</p>	<p data-bbox="792 314 1286 357">Involved in cell recognition</p>
 <p data-bbox="374 496 757 588">Carrier Protein Facilitated Transport</p>	<p data-bbox="792 496 1704 582">Glucose is transported by this structure in the cell membrane</p>
 <p data-bbox="374 674 757 765">Phospholipid bilayer Diffusion</p>	<p data-bbox="792 674 1707 765">Oxygen & Carbon Dioxide travels through the cell membrane by this process</p>
 <p data-bbox="374 856 757 948">Phospholipid bilayer Diffusion</p>	<p data-bbox="792 856 1901 948">When small molecules move from high to low concentration through the plasma membrane</p>
 <p data-bbox="417 1056 757 1099">Enzymatic protein</p>	<p data-bbox="792 1056 1870 1148">When a molecule attaches to it, it catalyzes a reaction and products are formed</p>
 <p data-bbox="394 1239 757 1376">Phospholipids Cell membrane Plasma membranes</p>	<p data-bbox="792 1239 1796 1330">The tails are hydrophobic/non-polar and the heads are hydrophilic/polar</p>

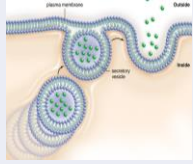
Structure/Process

Function



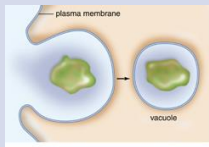
Channel protein
Facilitated Transport

Transports molecules through the cell membrane via an open pore



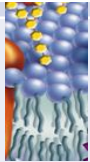
Exocytosis

Uses ATP to transport molecule in vesicles out of the cell



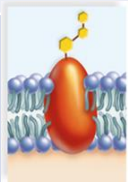
Endocytosis
Phagocytosis

Large molecule enters the cell and a vacuole forms around it



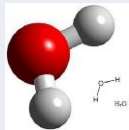
Glycolipid

Carbohydrate chain attached to a lipid on the cell membrane



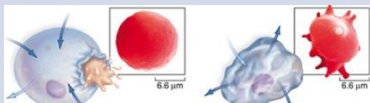
Glycoprotein

Carbohydrate chain attached to a protein on the cell membrane



Osmosis

Water travels through the membrane by this process



Hypotonic & Hypertonic

The 2 environments where the net change in water is not zero (either water gained or lost)