

CHAPTER 03 + LAB

Movements through Cell Membranes

Also see:
Cells: Summary Notes

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Some illustrations are courtesy of McGraw-Hill.



Movements Into and Out of the Cell

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Reminder: Review states of matter/kinetic energy.

Passive Transport

(Physical processes)

requires *no* cellular energy

simple diffusion

facilitated diffusion

osmosis

filtration

Active Transport

(Physiological processes)

requires cellular energy

endocytosis

exocytosis

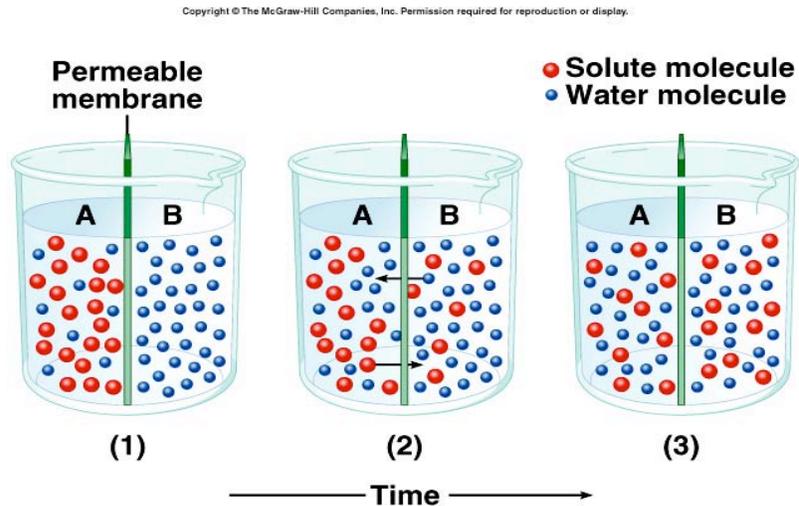
transcytosis

Simple Diffusion

3

movement of substances from regions of higher concentration to regions of lower concentration.

oxygen, carbon dioxide and lipid-soluble substances

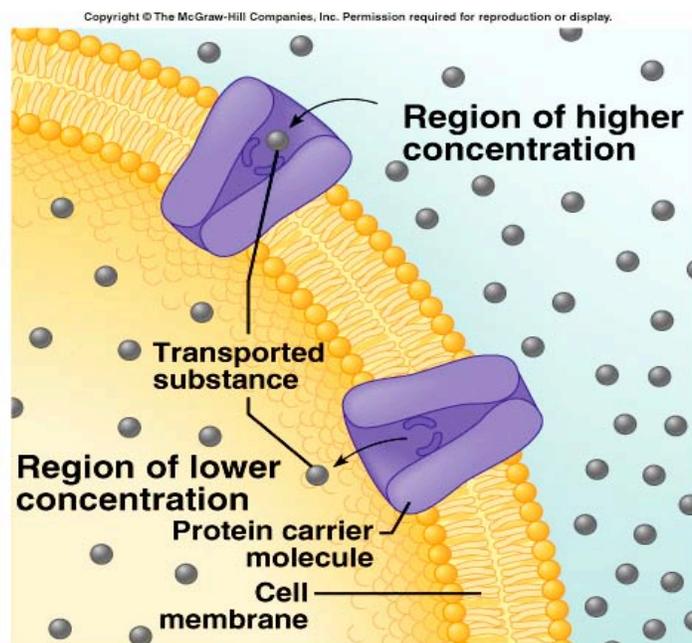


Facilitated Diffusion

4

diffusion across a membrane with the help of a channel or carrier molecule.

i.e. Glucose

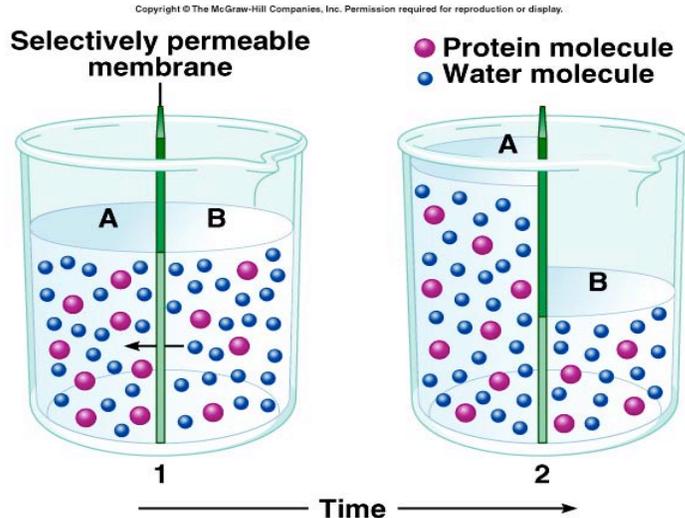


Osmosis

5

movement of water through a selectively permeable membrane from regions of higher concentration to regions of lower concentration.

water moves toward a higher concentration of solutes



Osmosis

6

Osmotic Pressure – ability of osmosis to generate enough pressure to move a volume of water

Osmotic pressure increases as the concentration of nonpermeable solutes increases

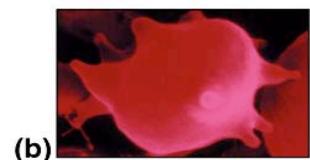
isotonic same osmotic pressure

RBC: **normal physiological saline** (0.85% NaCl)



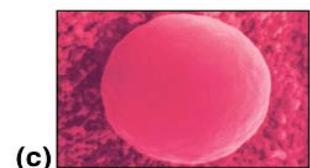
hypertonic higher osmotic pressure

RBC: **crenation** (i.e., 1.5% NaCl)



hypotonic lower osmotic pressure

RBC: **hemolysis** (i.e., 0.25% NaCl)

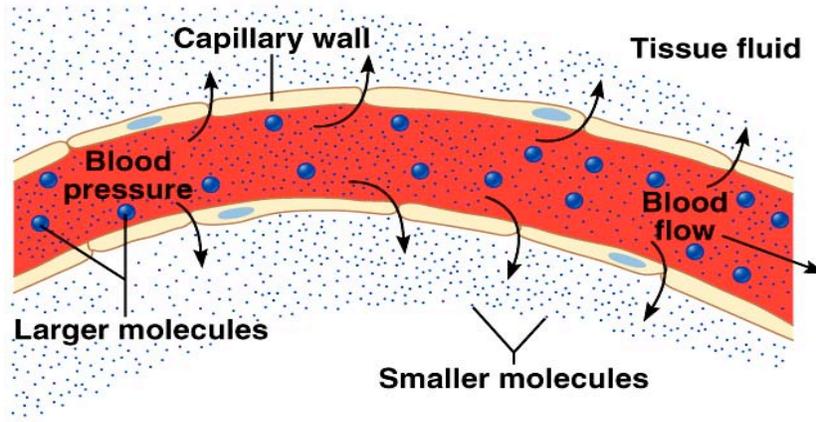


Filtration

7

smaller molecules are forced through porous membranes.
Hydrostatic pressure is important in the body.
Example: molecules leaving blood capillaries

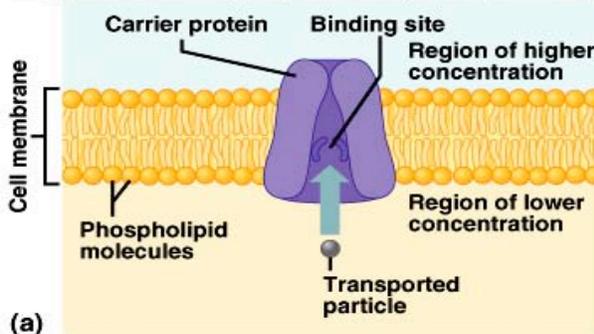
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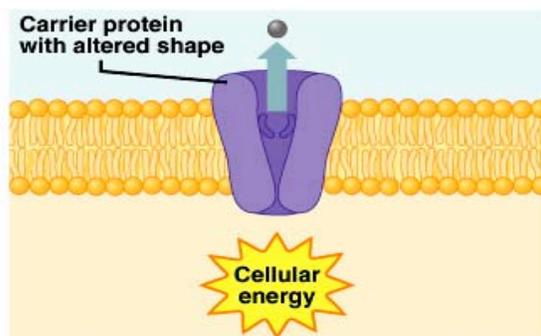
Active Transport

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(a)



(b)

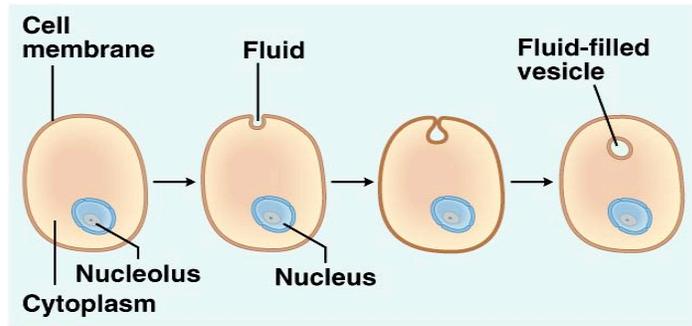
Carrier molecules transport substances across a membrane from regions of lower concentration to regions of higher concentration.

(against the concentration gradient)

sugars, amino acids,
sodium ions, potassium ions, etc.

Endocytosis

Cell engulfs a substance by forming a vesicle around the substance



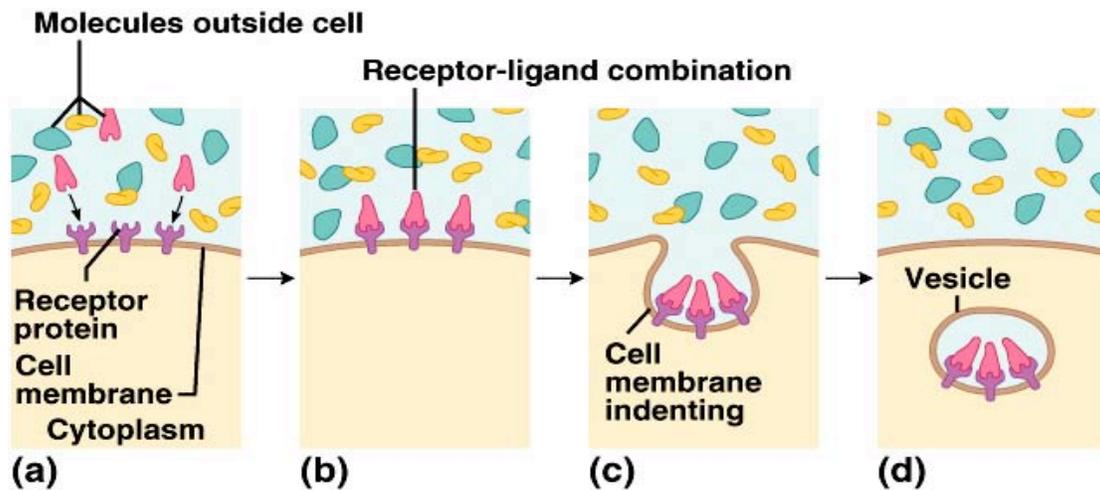
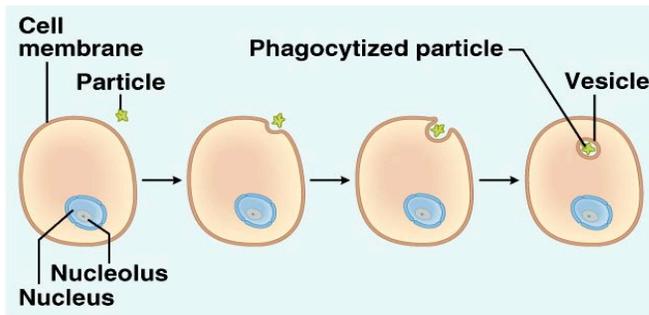
3 types:

Dated Terminology →
Modern: Endocytosis

Pinocytosis
substance is mostly water
Phagocytosis
substance is a solid

Receptor-mediated endocytosis
requires the substance to bind to a membrane-bound receptor

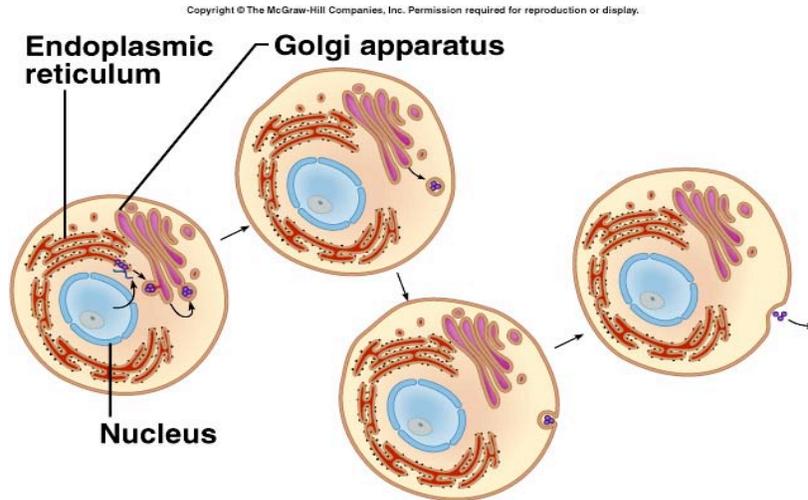
Endocytosis



Exocytosis

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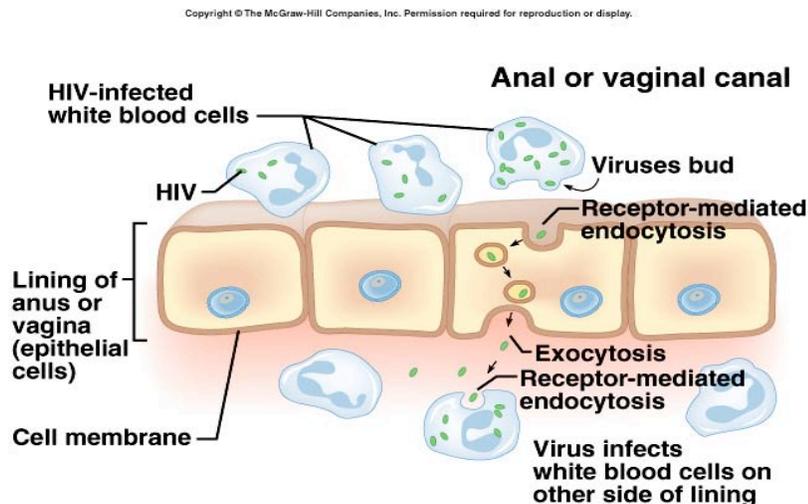
reverse of endocytosis.
substances in a vesicle fuse with cell membrane.
contents **released outside the cell.**
i.e., release of neurotransmitters from nerve cells



Transcytosis

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endocytosis followed by exocytosis.
transports a substance rapidly through a cell.
Example: HIV crossing a cell layer



The
End