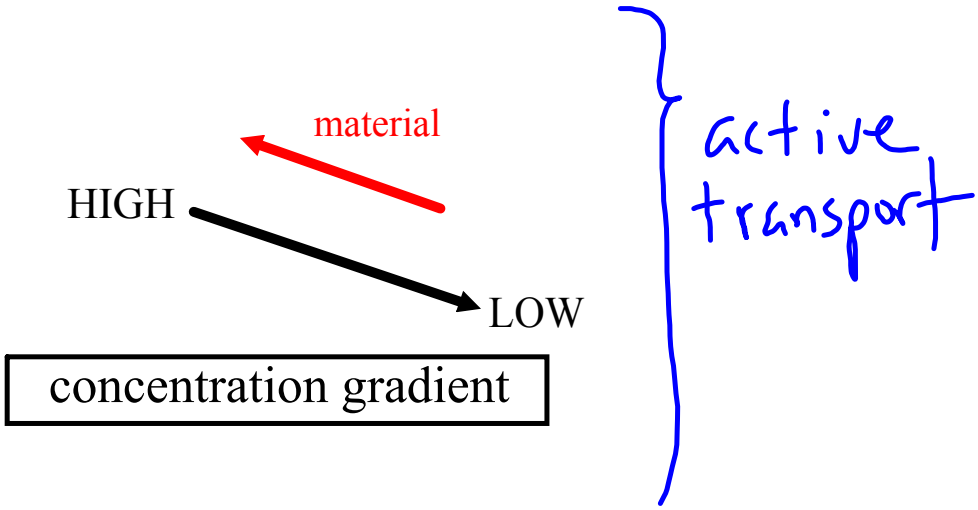
Sometimes cells must move materials <u>against</u> the concentration gradient. This requires the use of cellular energy.



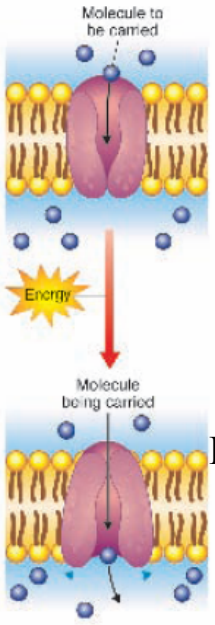
Active Transport

Molecular Transport

Small molecules and ions (calcium, potassium and sodium ions) are carried across membranes by proteins in the membrane that act like energy-requiring pumps.

Changes in protein shape seem to play an important role in the pumping process.

Figure 7-19 -> Page189



Low Concentration

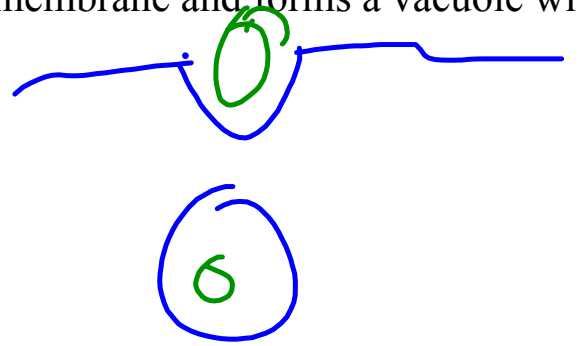
High Concentration

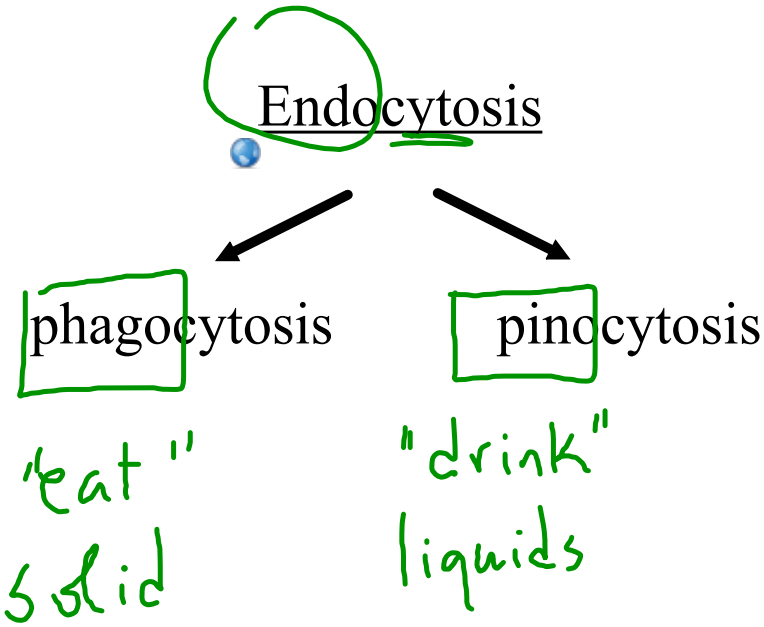
A considerable portion of the energy used by cells in their daily activities is devoted to providing the energy to keep this form of active transport working.

Endocytosis

Endocytosis is the process of taking material into the cell by means of infoldings, or pockets, of the cell membrane.

The pocket that results breaks loose from the outer portion of the cell membrane and forms a vacuole within the cytoplasm.




Endocytosis
phagocytosis
pinocytosis
"eat"
solid
"drink"
liquids

In phagocytosis (cell eating), extensions of cytoplasm surround a particle and package it within a food vacuole. The cell then engulfs it.

Amoeba (unicellular organism)

In pinocytosis, liquids are taken up from the surrounding environment. Tiny pockets form along the cell membrane, fill with liquid and pinch off to form vacuoles within the cell.

exit

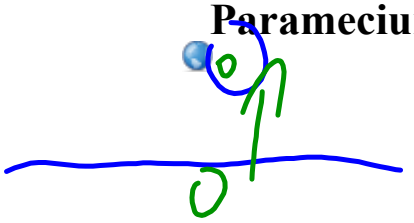
Exocytosis ✓

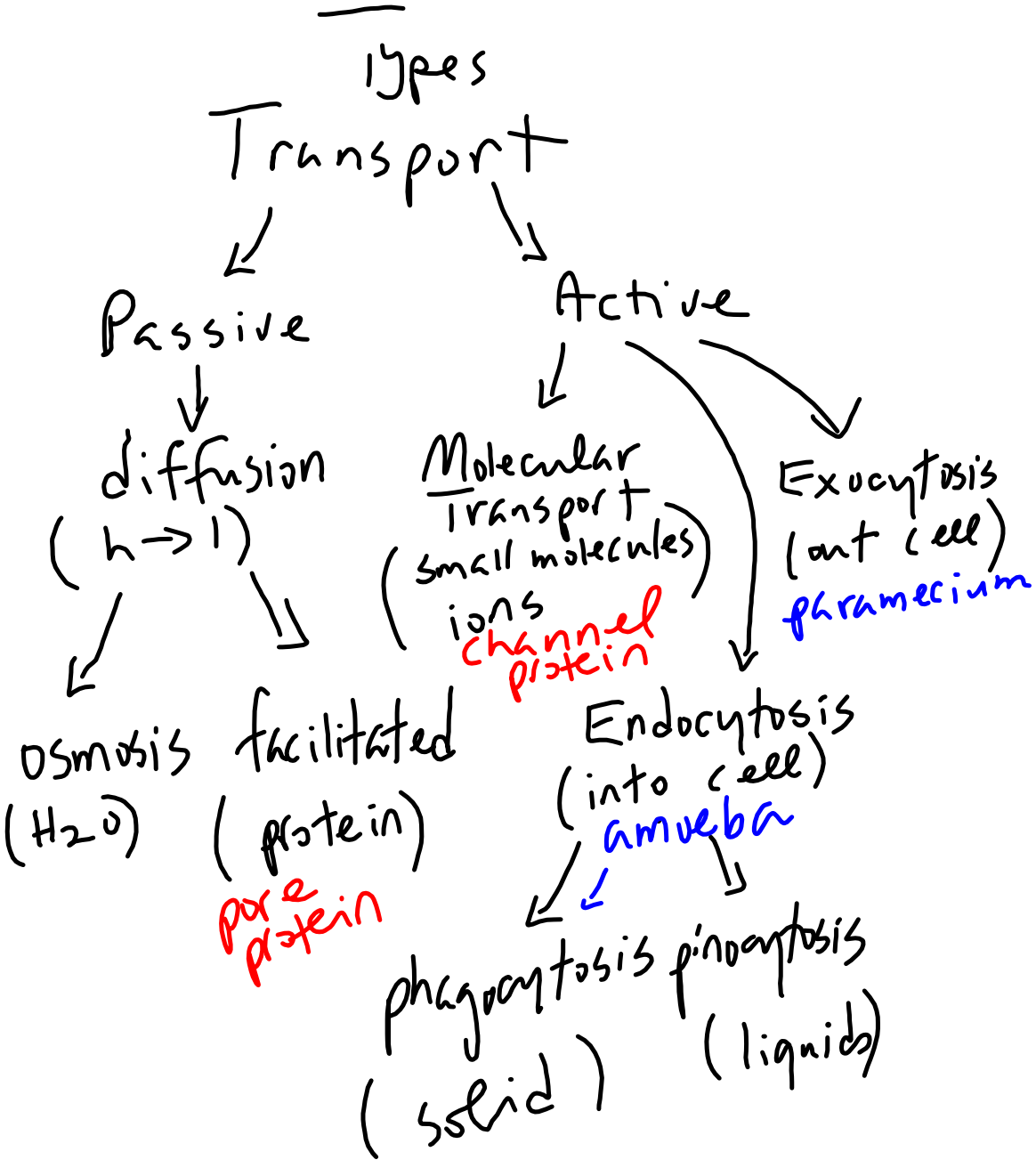
In the process of exocytosis, cells release large amounts of material from the cell.

The membrane of the vacuole surrounding the material fuses with the cell membrane forcing the contents out of the cell.

The removal of water by a contractile vacuole is an example of this type of transport.

Paramecium (unicellular organism)




Types
Transport
Passive
Active
diffusion
(h→l)
Molecular
Transport
(small molecules
ions
channel
protein
Exocytosis
(out cell)
paramecium
osmosis
(H2O)
facilitated
(protein)
pore
protein
Endocytosis
(into cell)
amoeba
phagocytosis
(solid)
pinocytosis
(liquids)

Attachments

Two_Types_of_Cells__Prokaryotic_and_Eukaryotic.asf

Bacteria.asf