

Active and Passive Transport

Cells have a need to move materials both into and out of the cell. Raw materials and other molecules necessary for metabolism must be accumulated from outside the cell. Some of these substances are scarce outside of the cell and some effort is required to accumulate them. Waste products and molecules for use in other parts of the body must be 'exported' out of the cell. Materials can move into and out of the cell without any effort on the part of the cell. They move by a process called diffusion, which is classed as a **passive transport process** since no energy is required to make it happen. Other processes that move substances may involve the use of energy, and are classed as **active transport**.

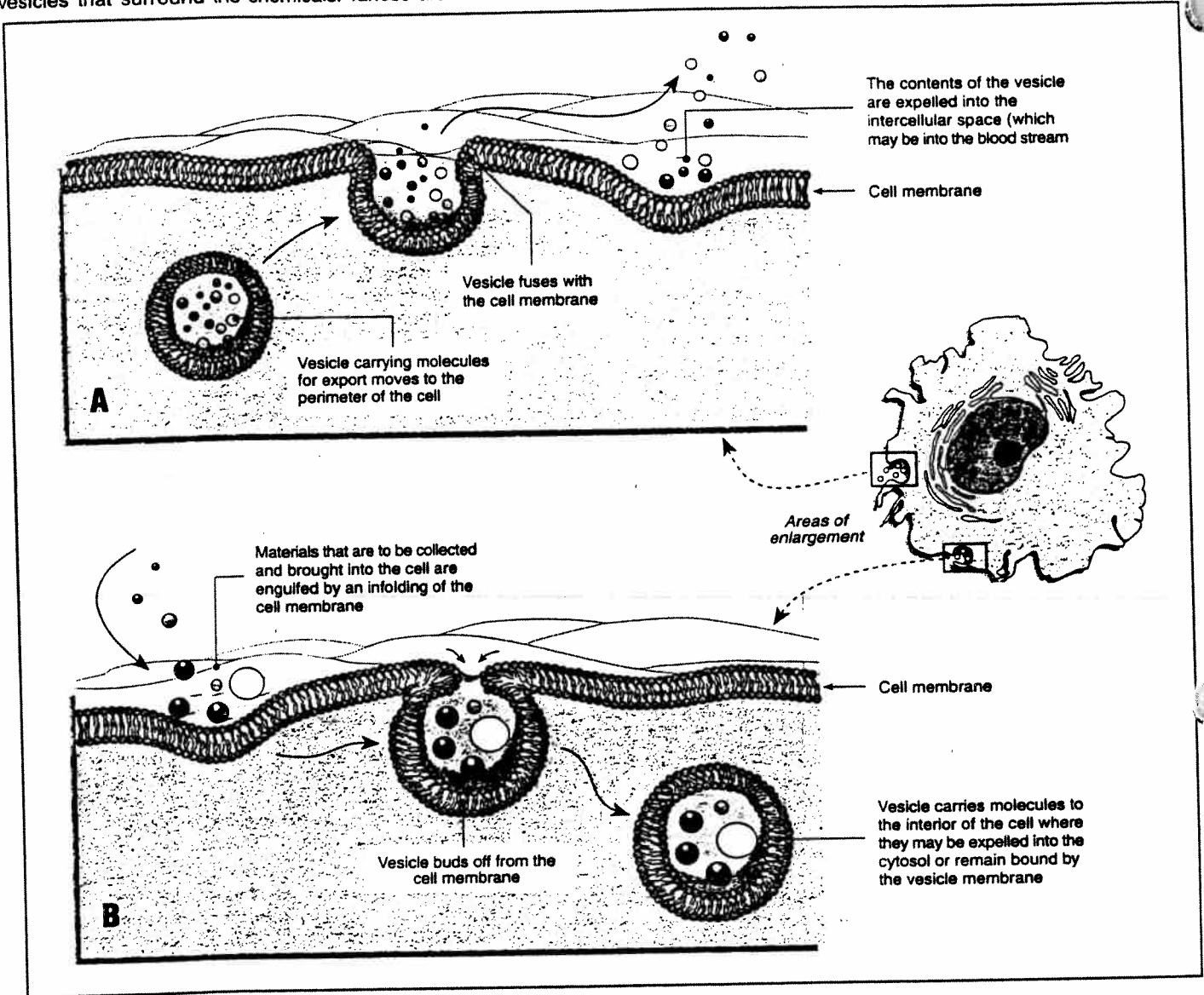
Passive Transport	Active Transport
<p>Diffusion Molecules of liquids, dissolved solids and gases are able to move into or out of a cell without any effort on the part of the cell. These molecules move because they follow a concentration gradient.</p>	<p>Ion Pumps Some cells need to control the amount of a certain ion inside the cell. Proteins in the cell membrane can actively accumulate specific ions on one side of the membrane.</p>
<p>Osmosis Water can also follow a concentration gradient, across a semi-permeable membrane, by diffusion. This is called osmosis. Osmosis causes cells in fresh water to puff up as water seeps in. This water must be continually expelled.</p>	<p>Exocytosis Vesicles budded off from the golgi bodies or endoplasmic reticulum can fuse with the cell membrane, expelling their contents. Common in cells that carry out secretion e.g. glands.</p>
<p>Pinocytosis Ingestion of the fluid surrounding the cell. The cell membrane encloses some of the fluid and pinches off to form a vesicle.</p>	<p>Phagocytosis Ingestion of solids from outside the cell. The cell membrane encloses a particle and buds off to form a food vacuole. Lysosomes will fuse with it to enable digestion of the contents.</p>

- Briefly describe the energy requirements of passive and active transport: _____
- Name a type of cell in the human body that requires an ion pump in order to function: _____
- (a) Describe what happens in the process of exocytosis: _____
- (b) Name a secretory gland which has cells where exocytosis takes place: _____
- (a) Pinocytosis and phagocytosis are two forms of endocytosis. Describe the general process of endocytosis: _____
- (b) Distinguish between pinocytosis and phagocytosis: _____
- (a) Name a protozoan that would use phagocytosis for feeding: _____
- (b) Name a type of human blood cell that uses phagocytosis in its functional role: _____
- Name two gases that move into or out of our bodies by diffusion: _____

Exocytosis and Endocytosis

Cells have ways of moving packets of materials into and out of the cell. Cells that export chemicals (such as endocrine glands secreting hormones) can do so by creating membrane bound vesicles that surround the chemicals. These are moved to the

outer surface of the cell where they fuse with the cell membrane and empty their contents outside the cell – a process called **exocytosis**. The opposite process called **endocytosis** involves the engulfing of materials into the cell.



- Name the cellular transport process illustrated in diagram A above: _____
- Explain the purpose of the process in A above: _____

- Describe an example of when this process is used, and what typical cell type would be involved: _____

- Name the cellular transport process illustrated in diagram B above: _____
- Explain the purpose of the process in B above: _____

- Describe an example of when this process is used, and what typical cell type would be involved: _____
