



Summary Table: Comparison of Different Types of Transport

	Type of Transport	Type of Protein	Direction X Moves	Source of Energy to transport X	Example(s)	
					Name	Function
1	Simple Diffusion	None	Down its gradient	Gradient of X	Restricted to very small molecules and hydrophobics	How CO ₂ enters RBC
2	(Facilitated) diffusion through a Channel	Transmembrane channel	Down its gradient	Gradient of X	Water channels in kidney & RBC; many types of ion channels	control vol. of urine & RBC; flux of ions
3	Facilitated Diffusion using a carrier protein; also called 'carrier mediated transport'	Carrier or Permease	Down its gradient	Gradient of X	Glucose transporter in many plasma membranes (GLUT 1, 2, etc.)	How Glucose exits epithelial cells to body; enters adipose tissue
					RBC anion Exchanger*	Maximizes CO ₂ transport by blood
4	Primary (Direct) Active Transport	Pump	Up its gradient	ATP	Na ⁺ /K ⁺ pump	Maintain high [K ⁺], low [Na ⁺] in cells
5	Secondary (Indirect) Active Transport	Pump or co-transporter	Up its gradient	Not ATP (directly): usually a gradient of some substance other than X	Glucose/Na ⁺ Co-transport	How Glucose enters epithelial cells from lumen
<p>* (1) In some older books band 3 protein is called an anion channel. It transports ions but is not a channel. (2) An exchanger can be considered facilitated diffusion, since the concentrations of the substances themselves drive the reaction. Alternatively, it can be considered secondary active transport, because movement of one of the substances down its gradient can drive transport of the other substance up its gradient.</p>						