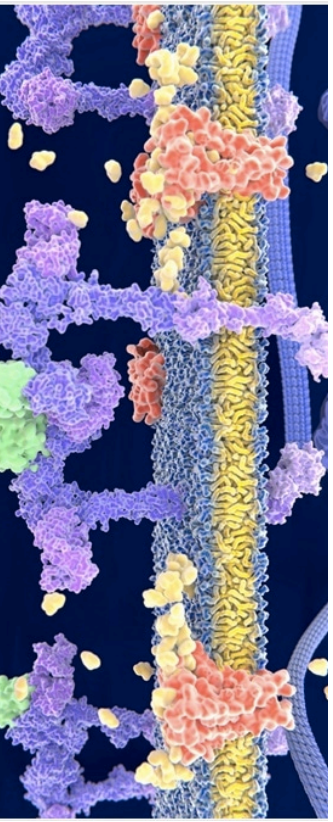


Transporte de membrana
Transportadores

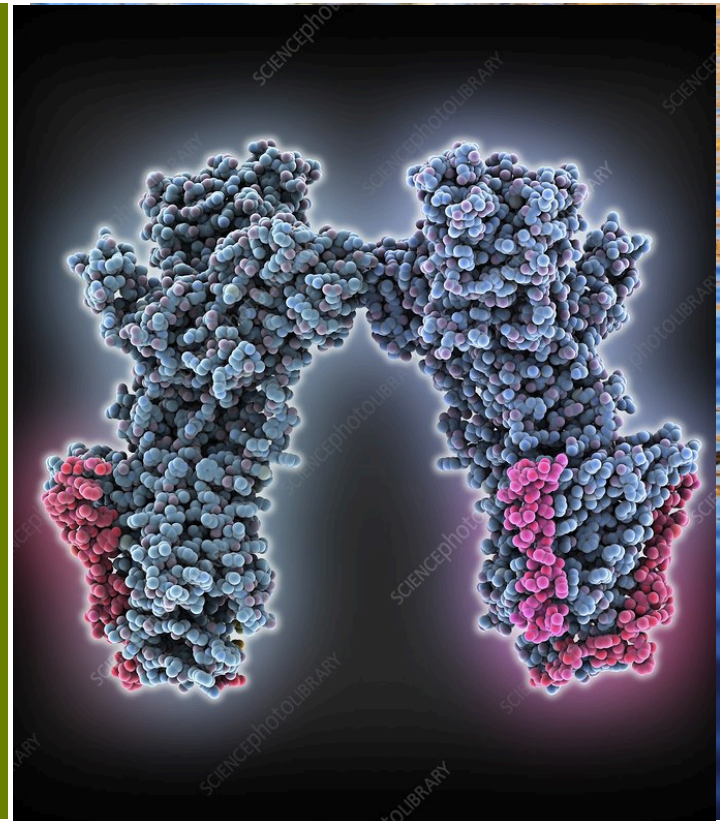
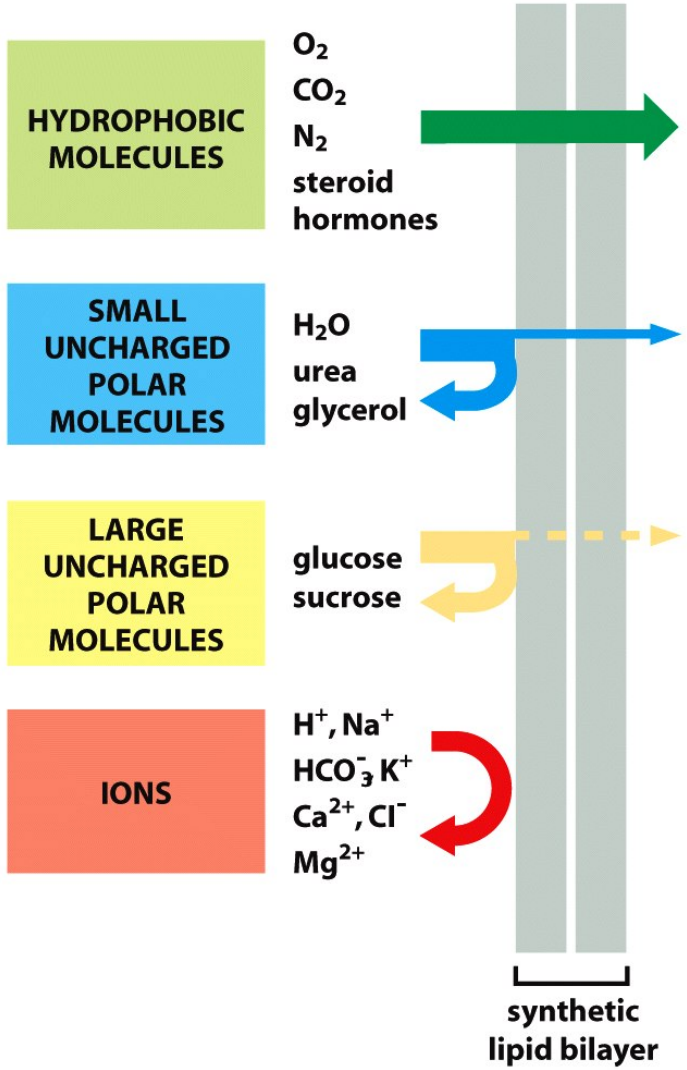


Table 11–1 A Comparison of Ion Concentrations Inside and Outside a Typical Mammalian Cell

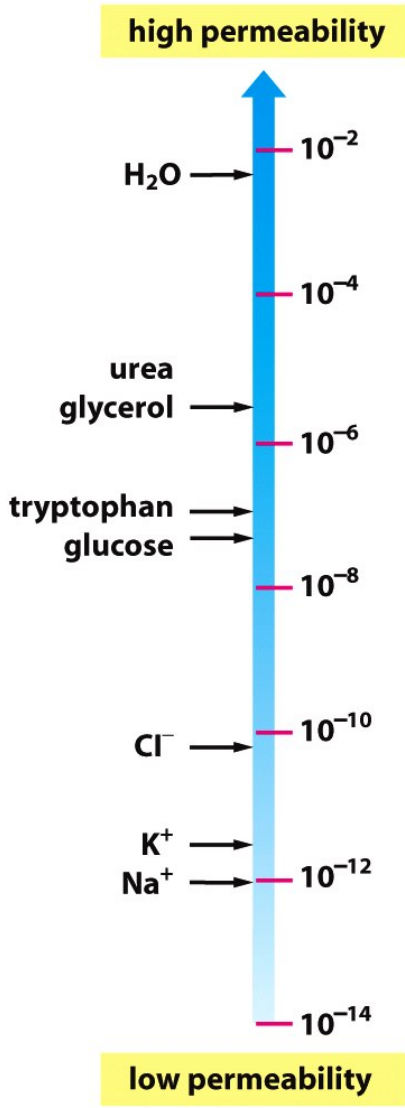
COMPONENT	INTRACELLULAR CONCENTRATION (mM)	EXTRACELLULAR CONCENTRATION (mM)
Cations		
Na^+	5–15	145
K^+	140	5
Mg^{2+}	0.5	1–2
Ca^{2+}	10^{-4}	1–2
H^+	7×10^{-5} ($10^{-7.2}$ M or pH 7.2)	4×10^{-5} ($10^{-7.4}$ M or pH 7.4)
Anions*		
Cl^-	5–15	110

*The cell must contain equal quantities of positive and negative charges (that is, it must be electrically neutral). Thus, in addition to Cl^-, the cell contains many other anions not listed in this table; in fact, most cell constituents are negatively charged (HCO_3^-, PO_4^{3-}, proteins, nucleic acids, metabolites carrying phosphate and carboxyl groups, etc.). The concentrations of Ca^{2+} and Mg^{2+} given are for the free ions. There is a total of about 20 mM Mg^{2+} and 1–2 mM Ca^{2+} in cells, but both are mostly bound to proteins and other substances and, for Ca^{2+}, stored within various organelles.

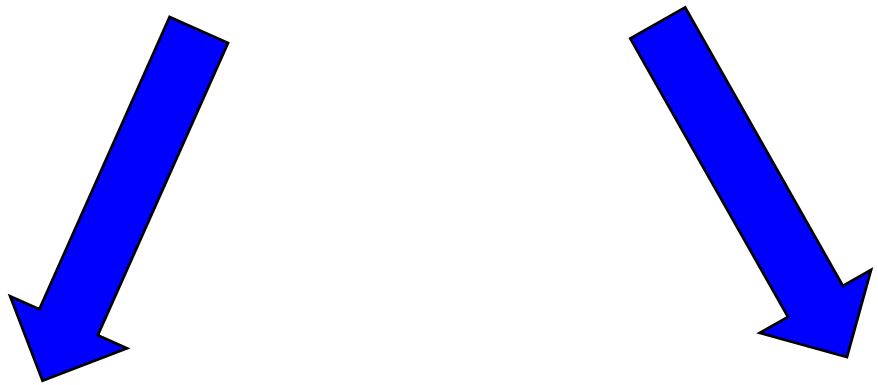
Permeabilidad relativa de bicapas lipídicas sintéticas a diferentes clases de moléculas



Coeficientes de permeabilidad



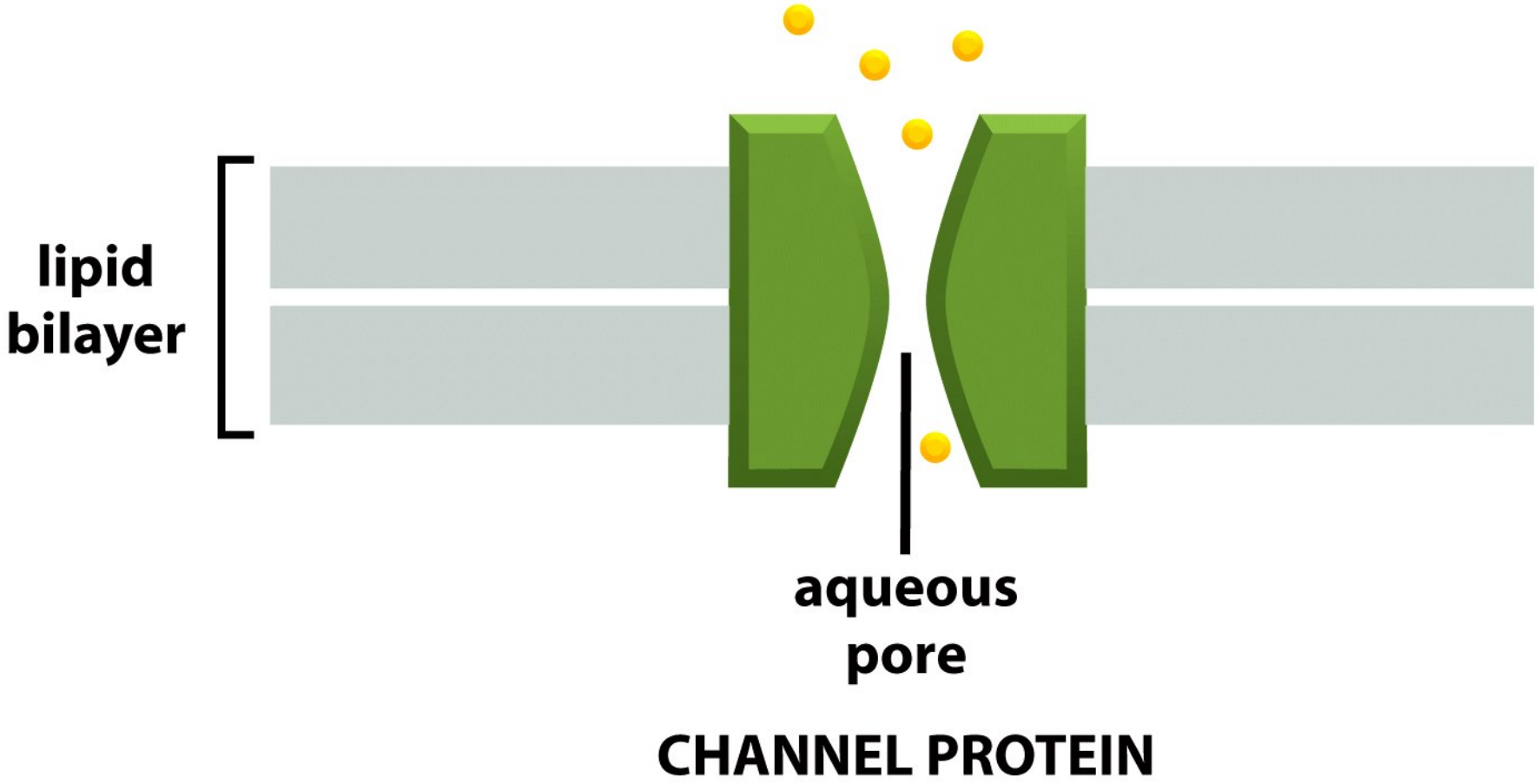
PROTEÍNAS DE MEMBRANA NECESARIAS PARA EL TRANSPORTE DE SOLUTOS



TRANSPORTADORES

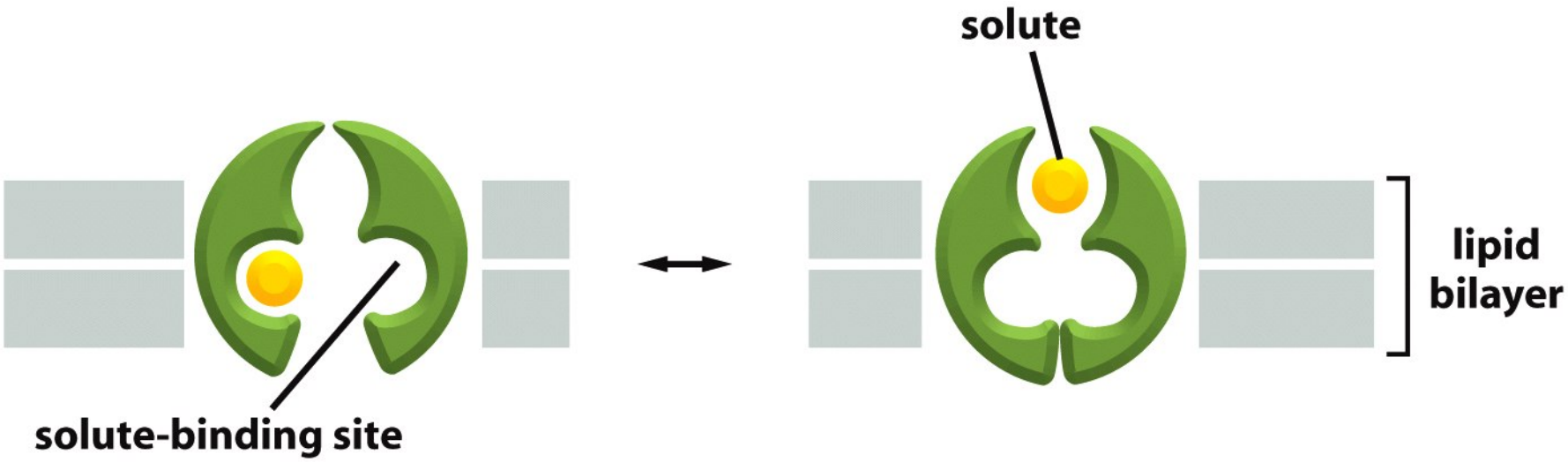
CANALES

CANAL



“PUERTA ESTRECHA”

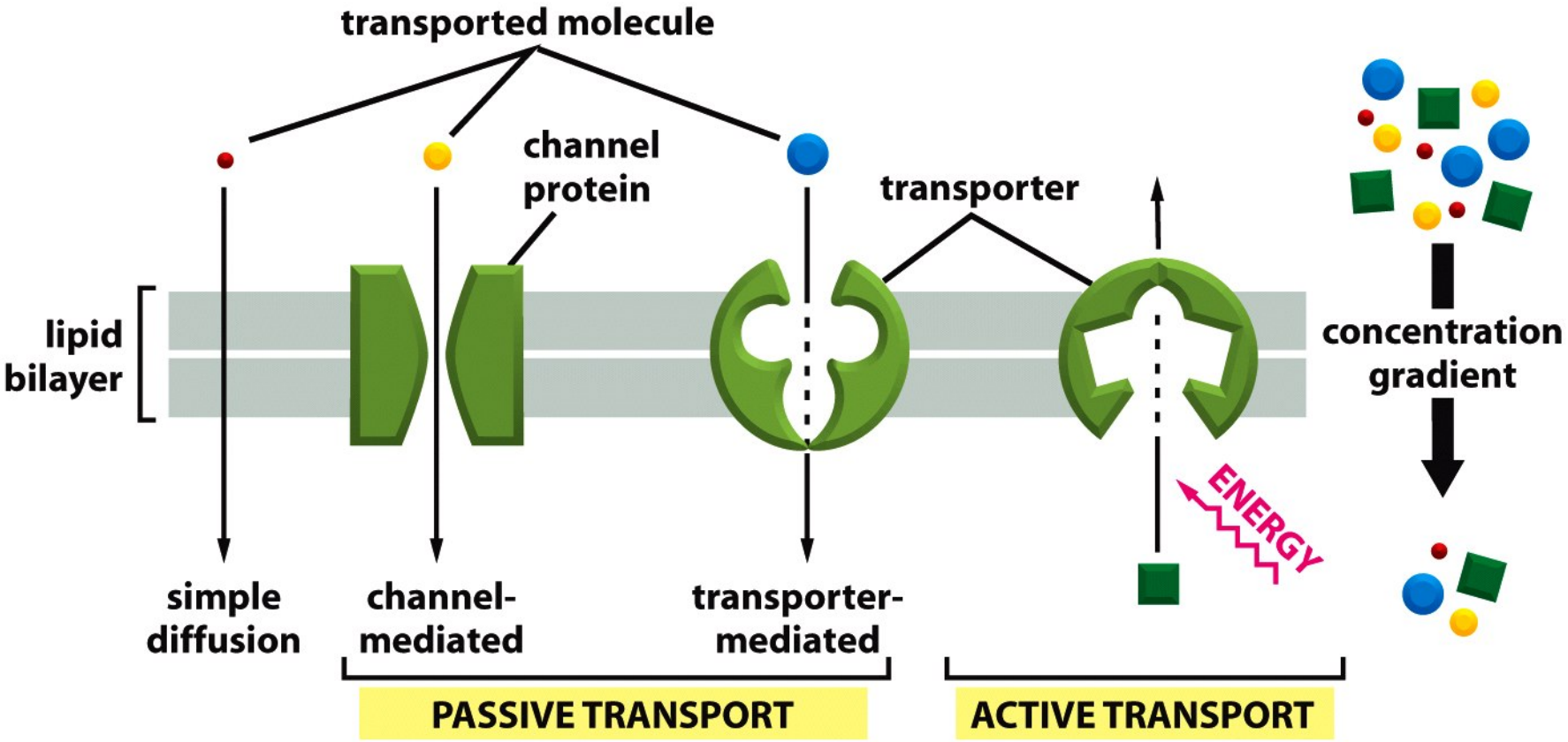
TRANSPORTADOR



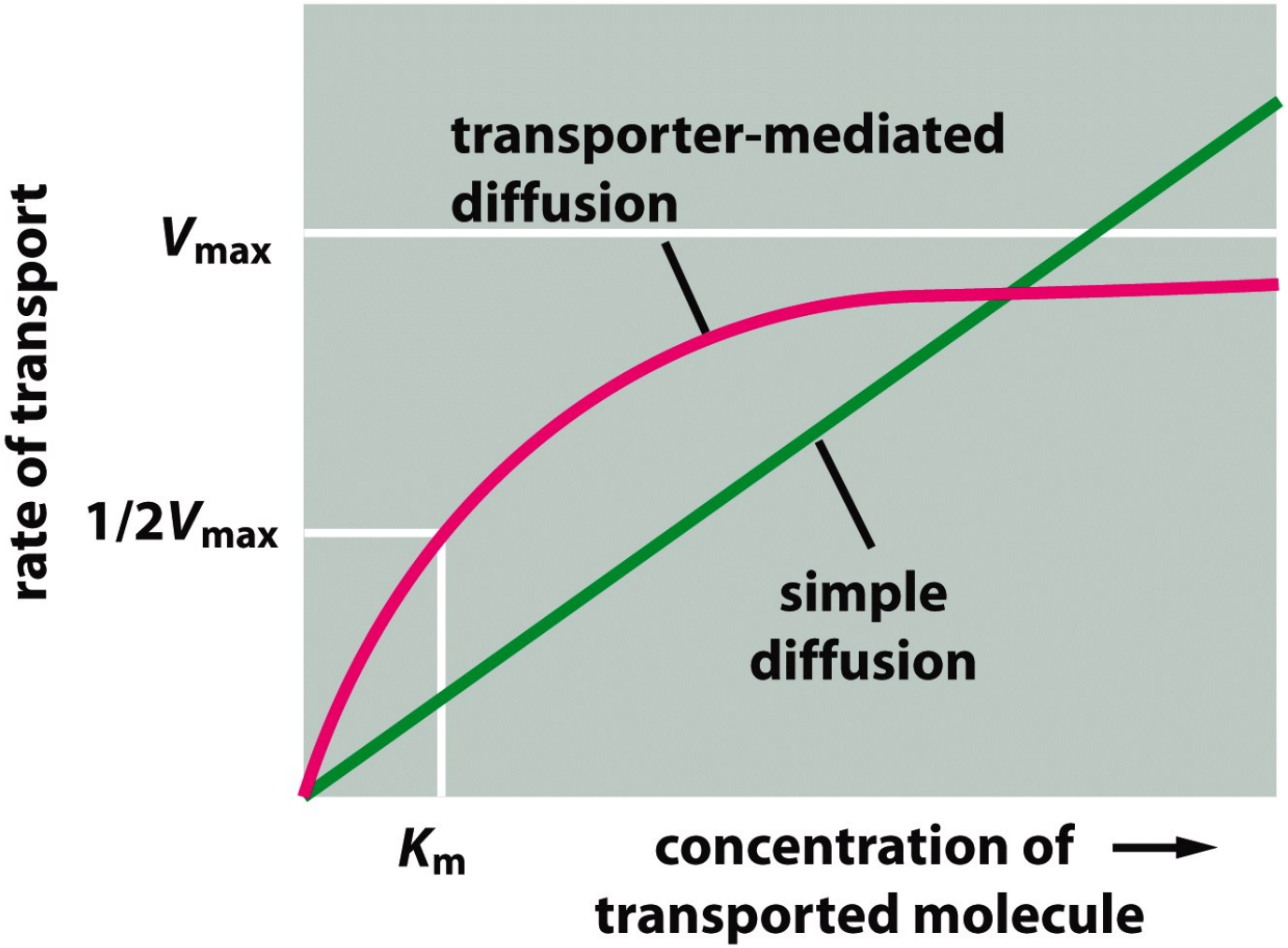
TRANSPORTER

"MOLINETE"

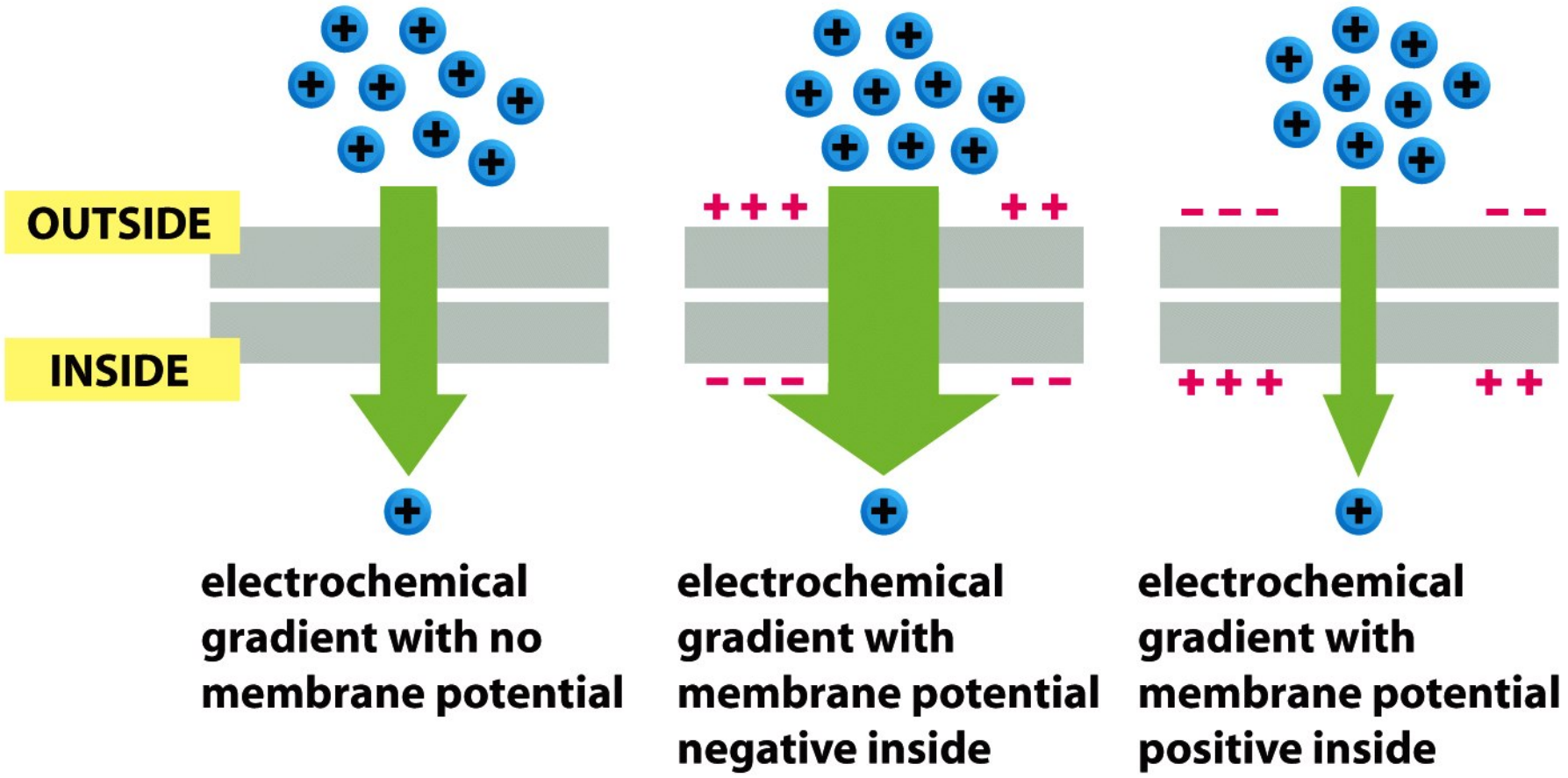
Transporte activo y pasivo



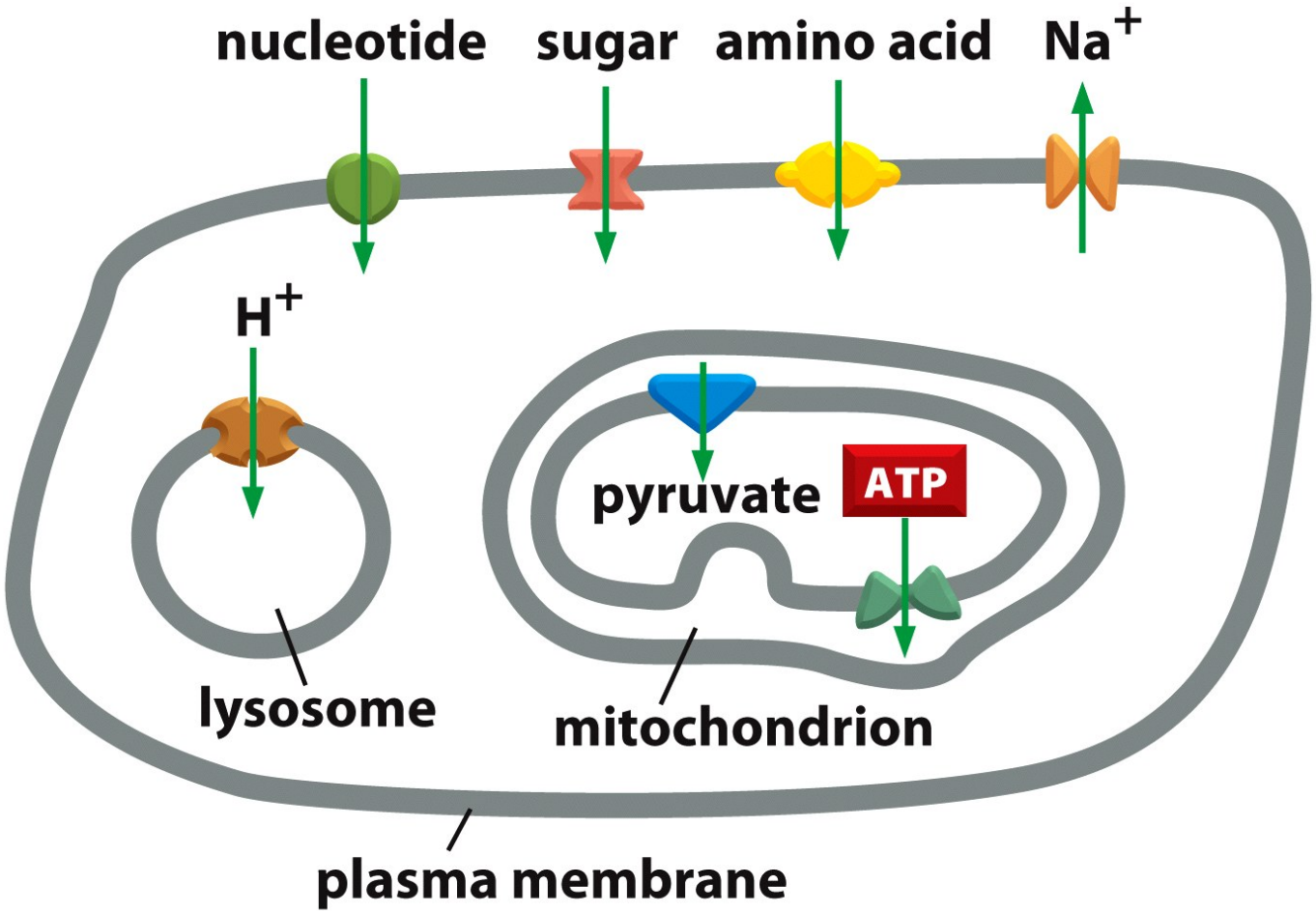
Cinética de difusión simple y de difusión mediada por un transportador



El transporte pasivo puede ser impulsado por gradientes de concentración y por fuerzas eléctricas



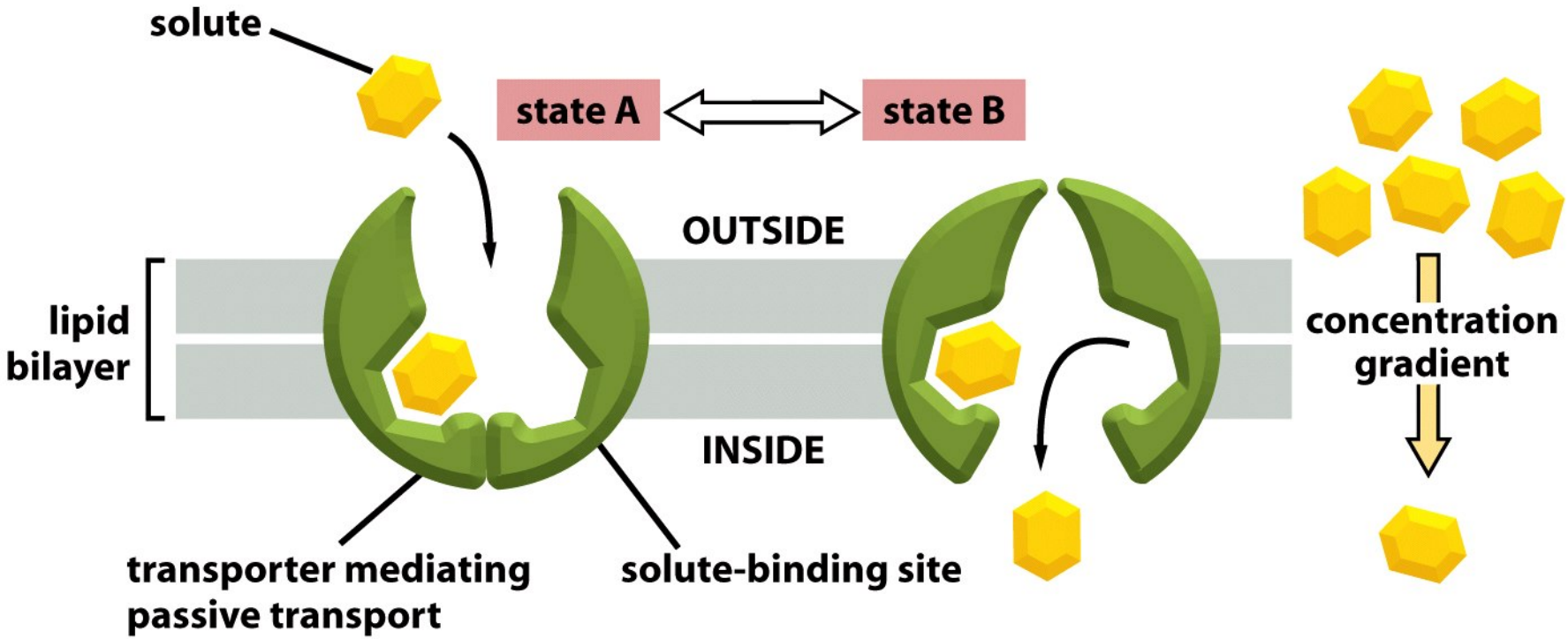
Cada membrana posee su propio conjunto característico de proteínas transportadoras y canales



TRANSPORTADORES

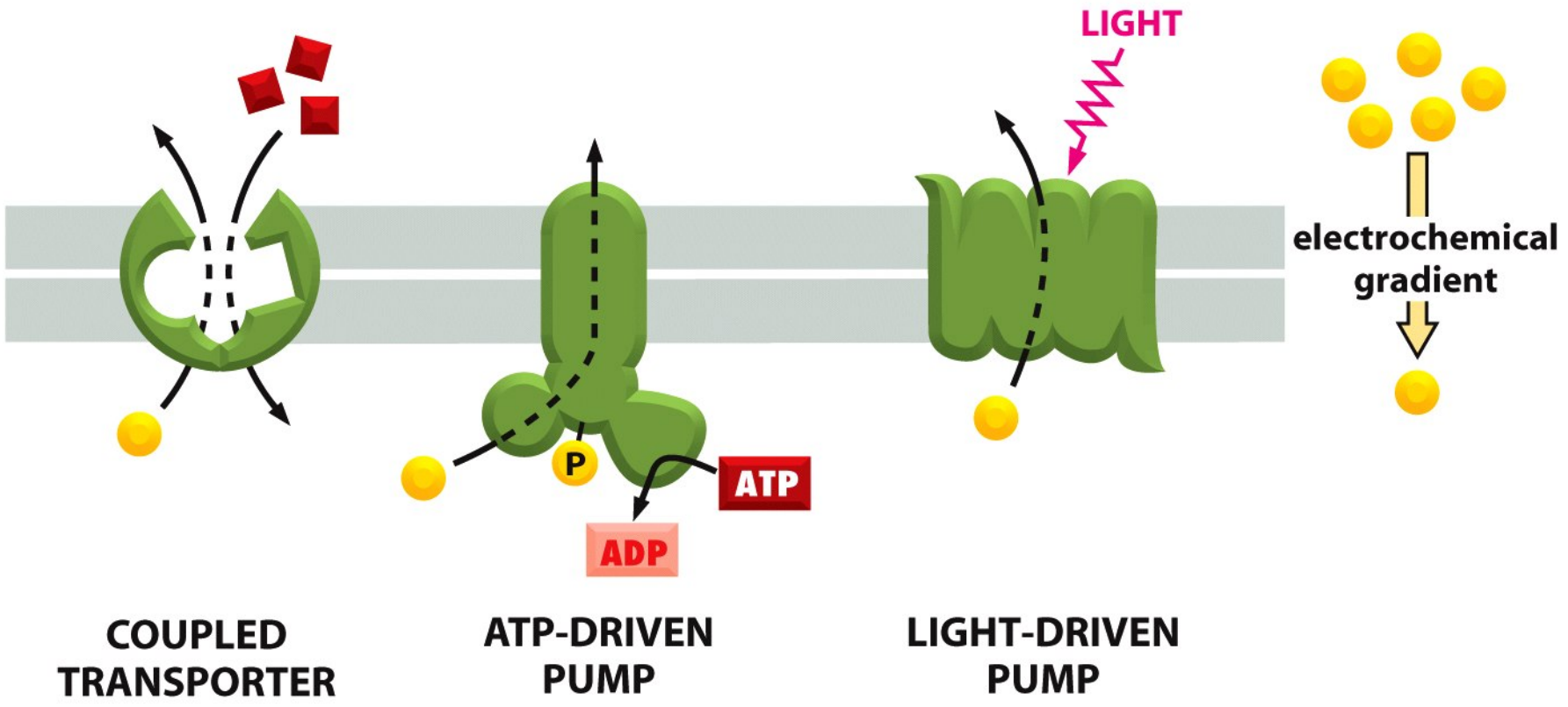
Cambios conformacionales en el transportador podrían mediar el movimiento **pasivo** de un soluto

Transportador de glucosa



Transporte y dirección dependen del gradiente de concentración de glucosa en células hepáticas y otros tipos celulares

El transporte activo moviliza solutos en contra de sus gradientes electroquímicos



La bomba de Na+-K+ utiliza la E derivada de la hidrólisis de ATP para bombear Na+ hacia el exterior y K+ hacia el interior en contra de sus gradientes electroquímicos

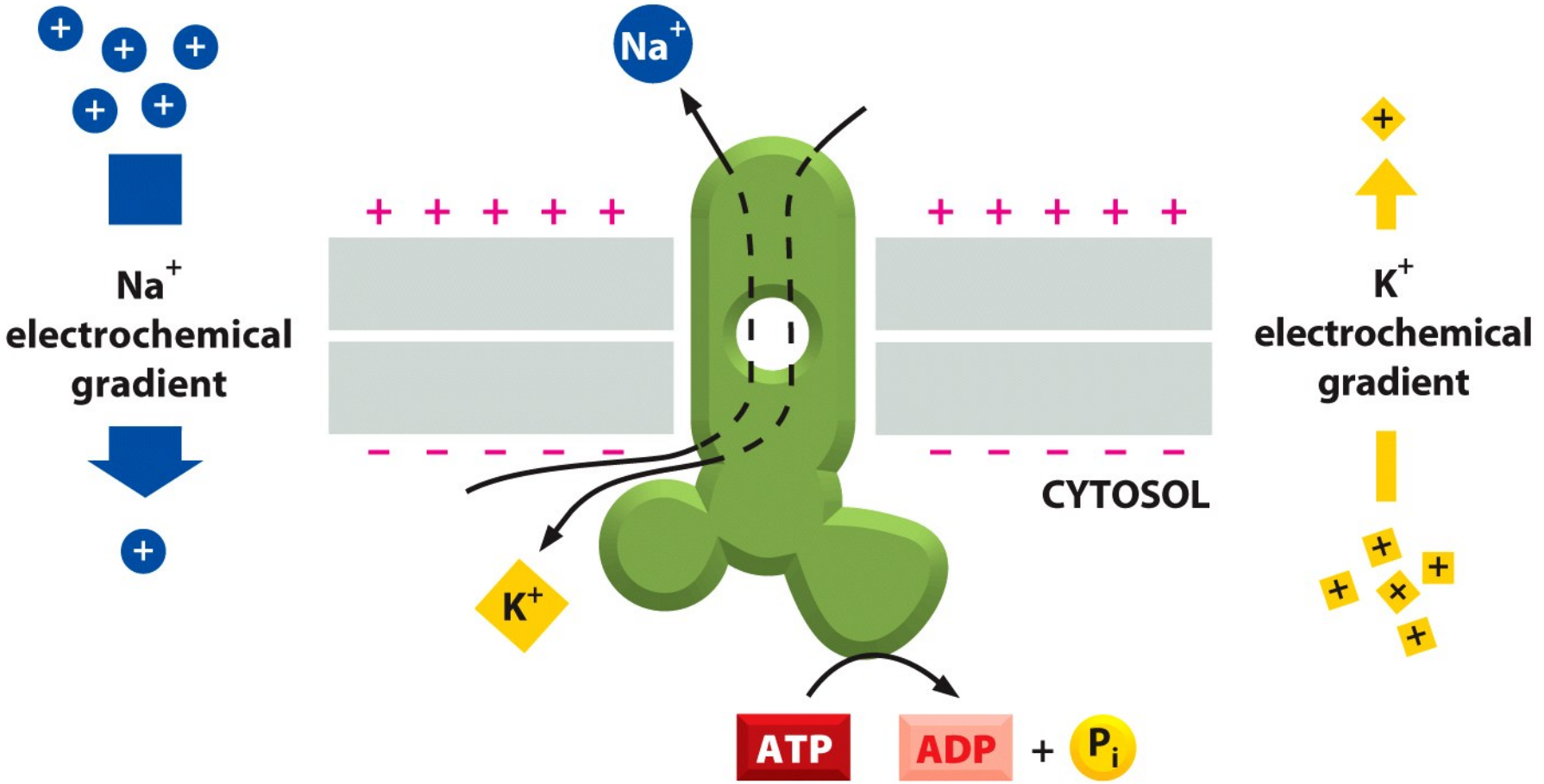
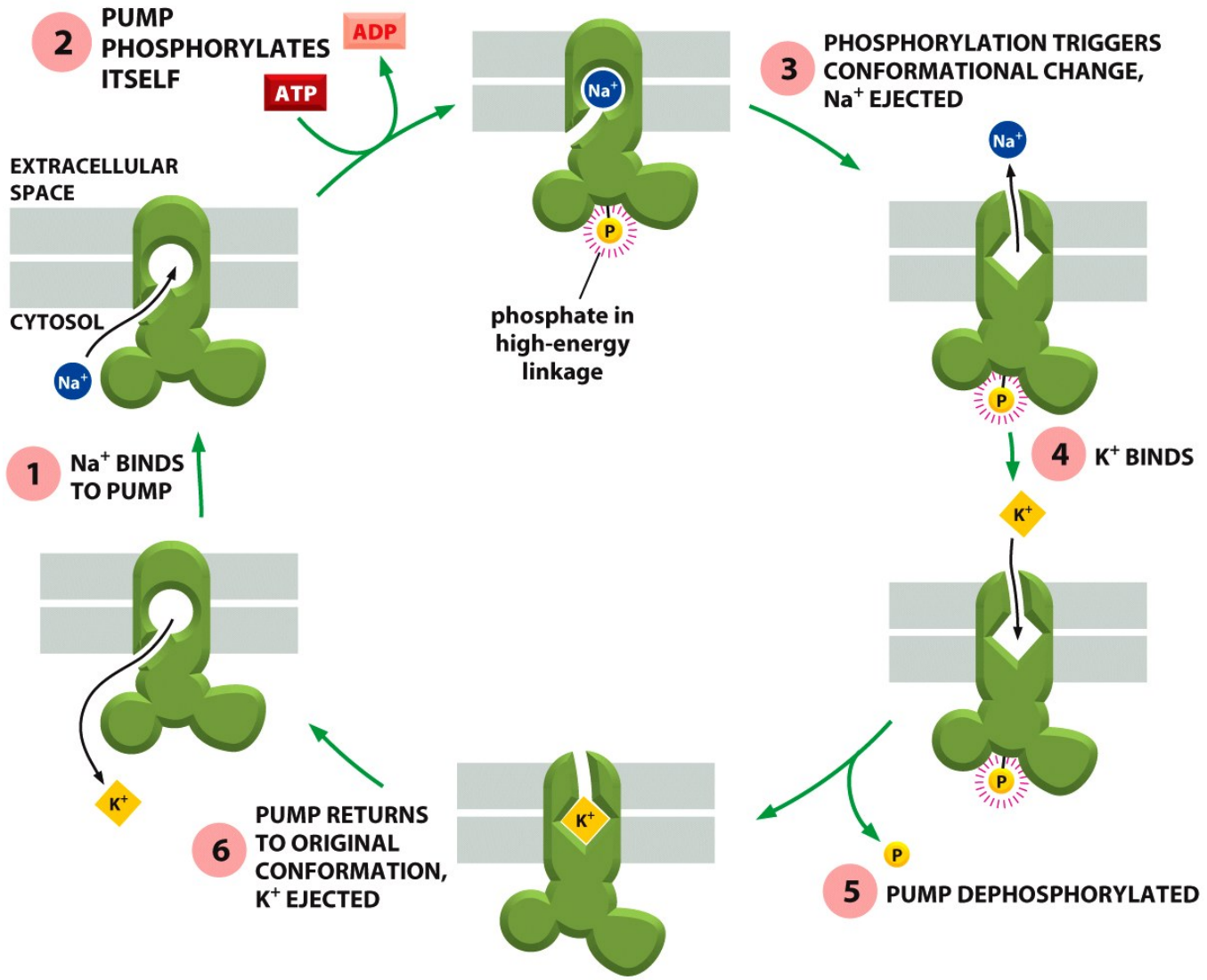
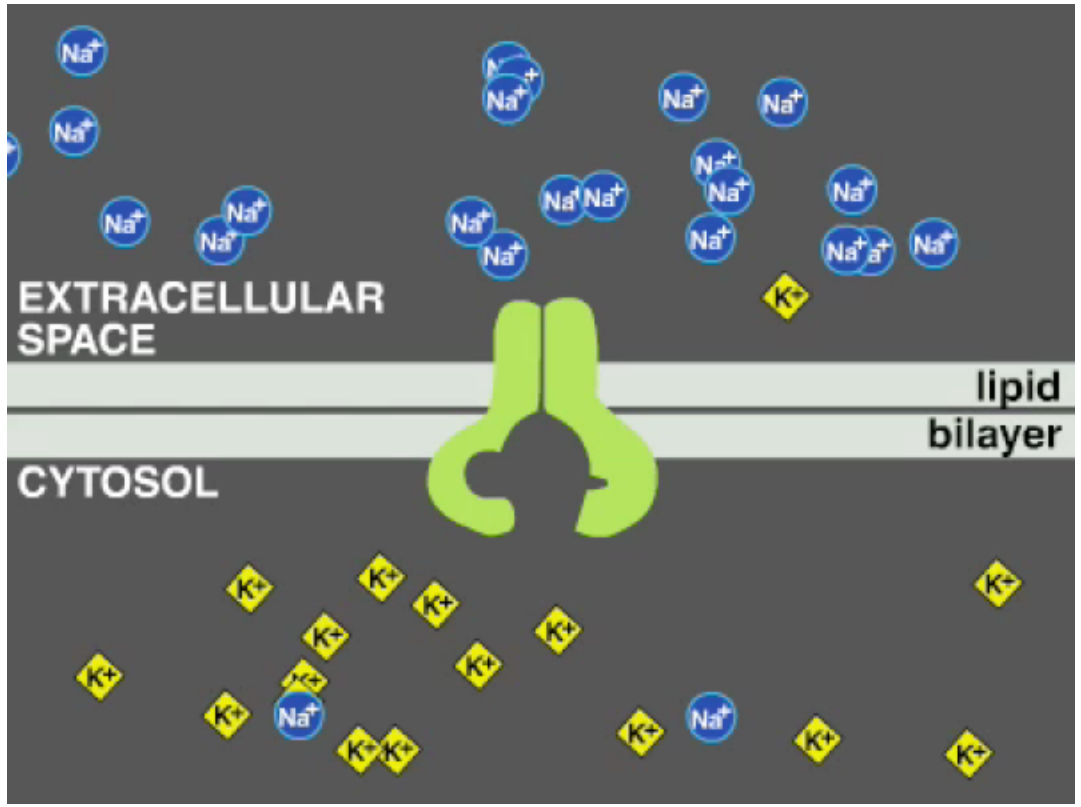


Figure 12-9 Essential Cell Biology 3/e (© Garland Science 2010)

La bomba de Na+ K+ transporta iones en forma cíclica




EXTRACELLULAR SPACE
lipid bilayer
CYTOSOL

Las concentraciones citoplásmicas de Ca^{2+} se mantienen a un nivel reducido por la acción de bombas de Ca^{2+}

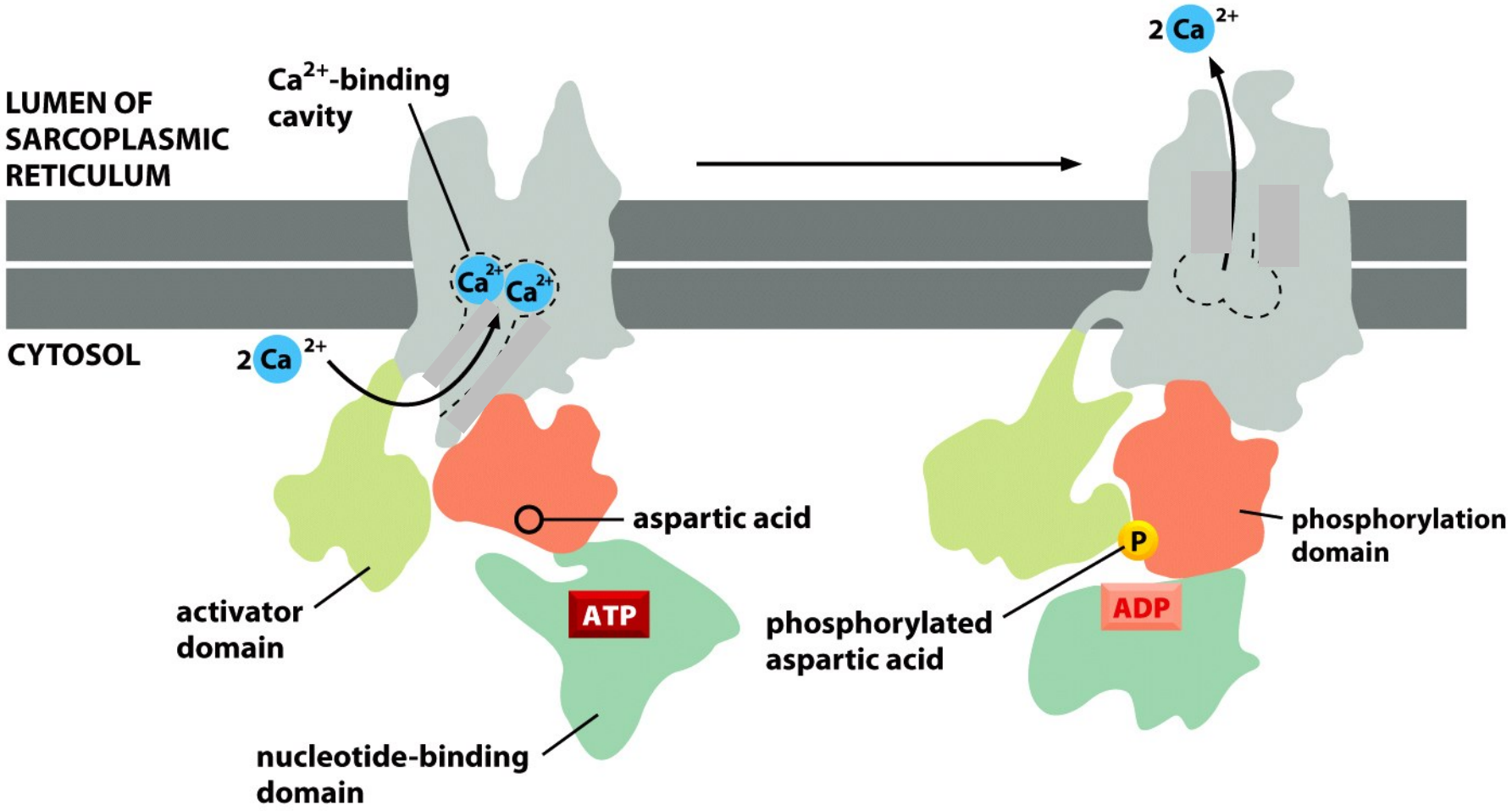
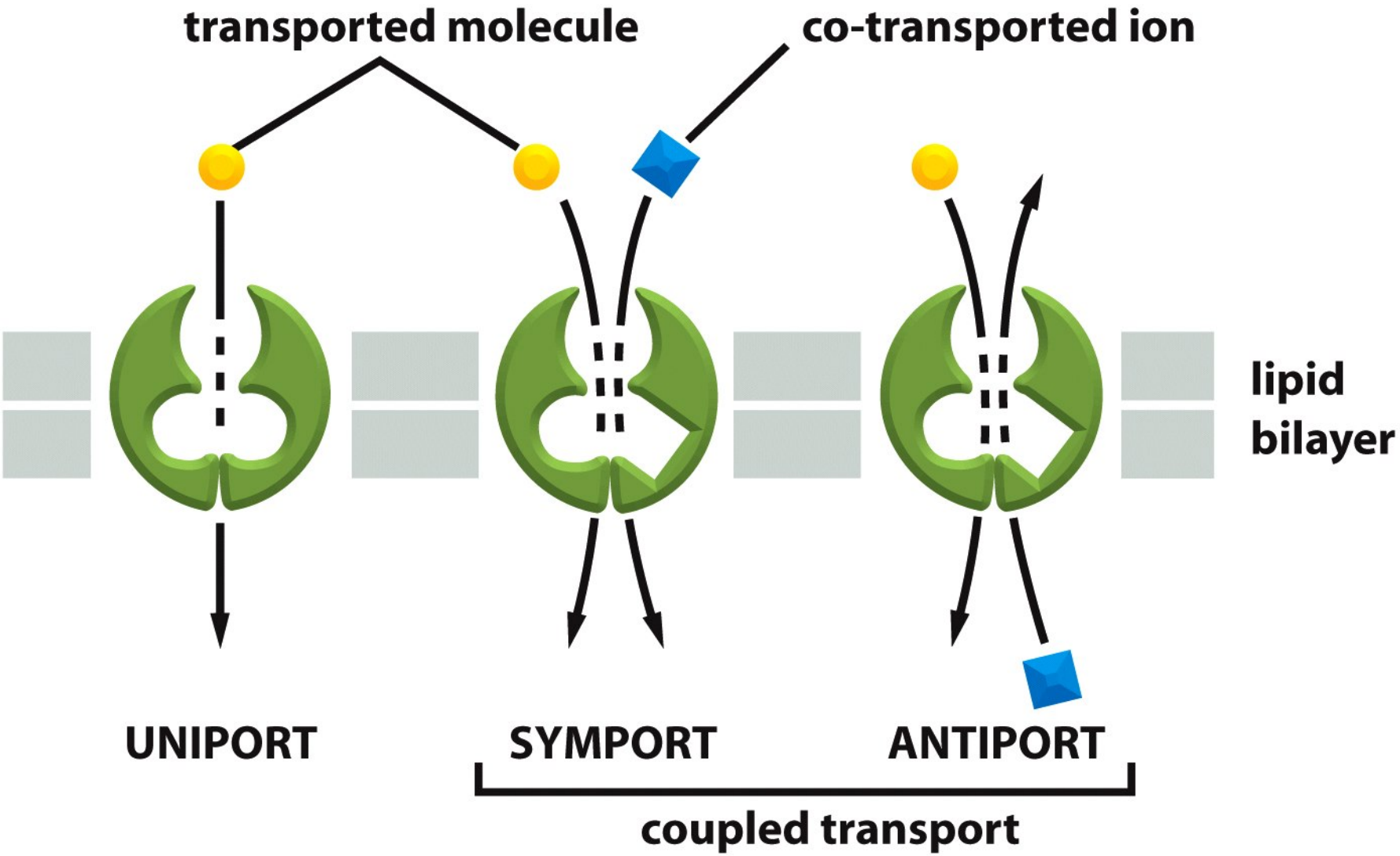
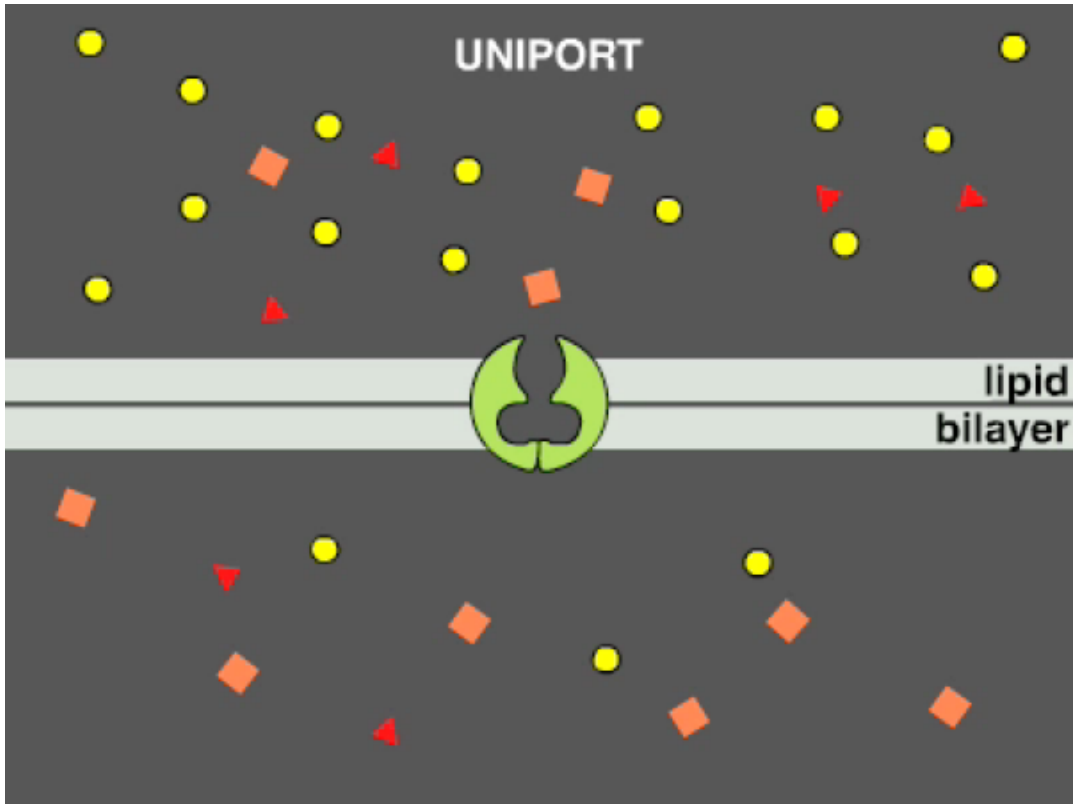


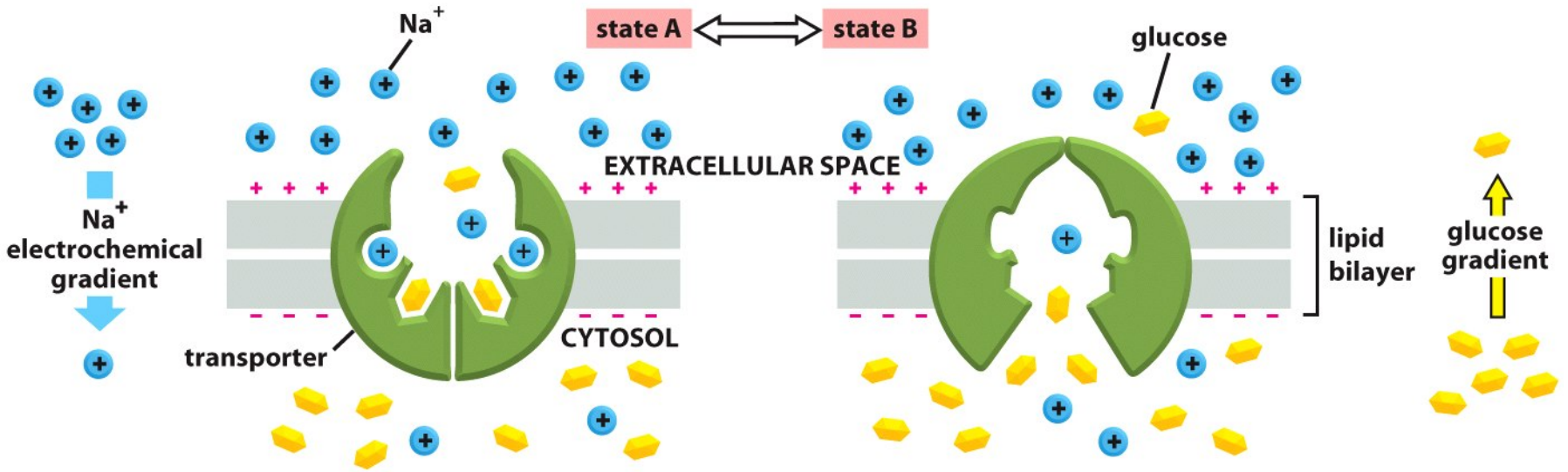
Figure 12-15 Essential Cell Biology 3/e (© Garland Science 2010)

Movimiento mediado por transportadores

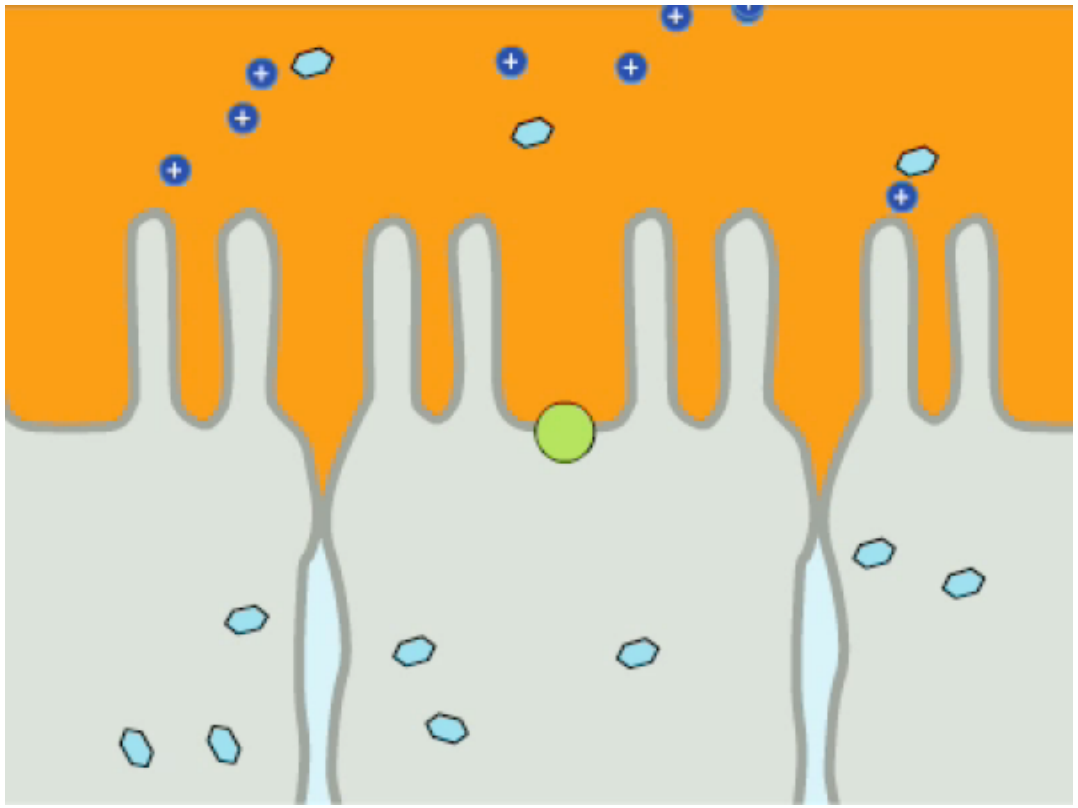



UNIPORT
lipid
bilayer

La proteína (simporter) que media el transporte de glucosa-Na+ utiliza el gradiente electroquímico del Na+ para impulsar el ingreso de glucosa en la célula

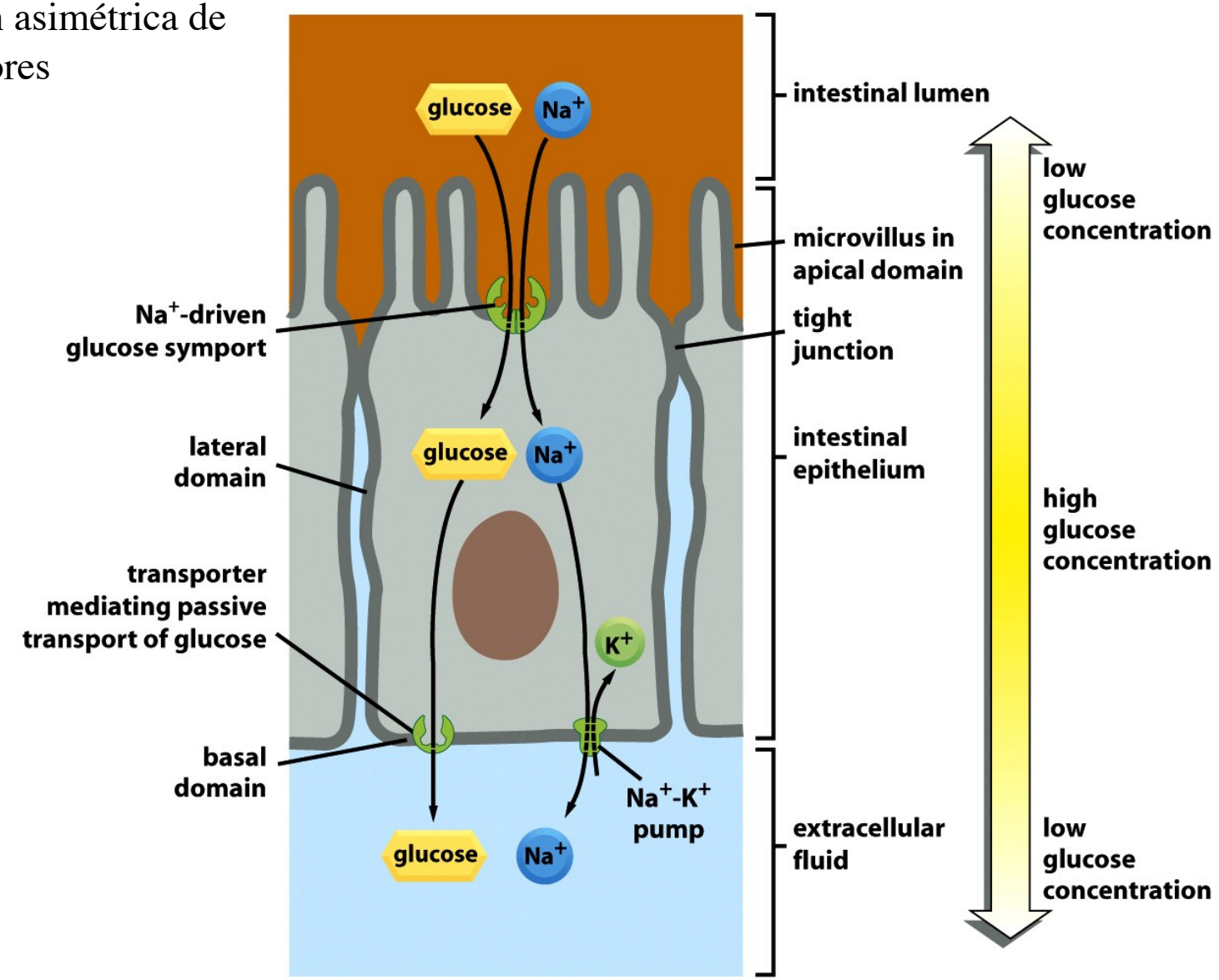


Las células animales utilizan el gradiente de Na+para captar nutrientes en forma activa (transportadores acoplados)

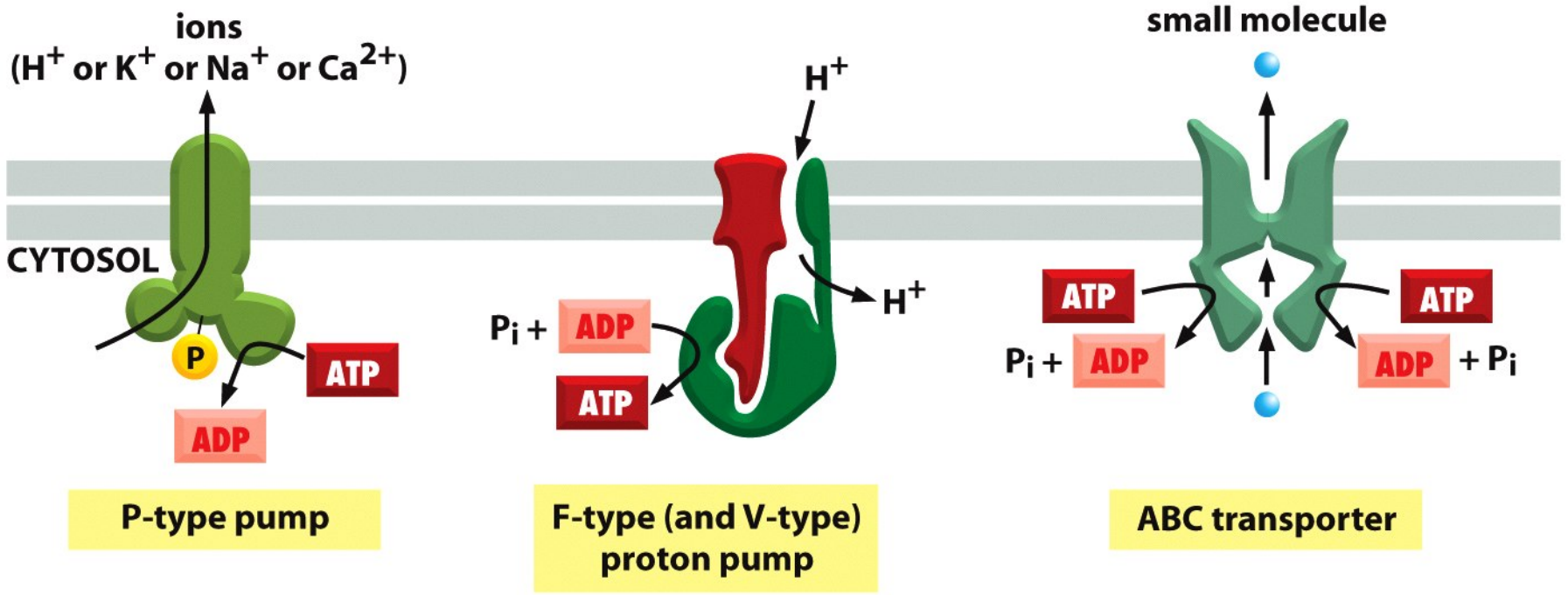


Transporte transcelular

Distribución asimétrica de transportadores



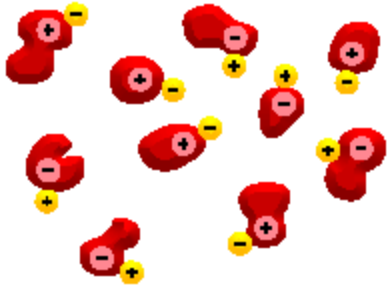
Bombas transportadoras que dependen de ATP



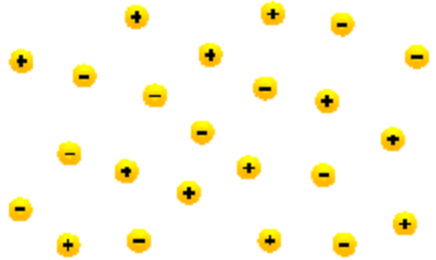
Balance de agua intracelular

Fuentes de osmolaridad intracelular

Macromoléculas cargadas

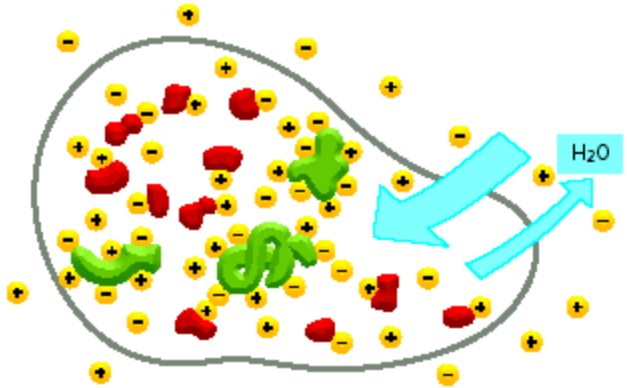


Moléculas orgánicas pequeñas



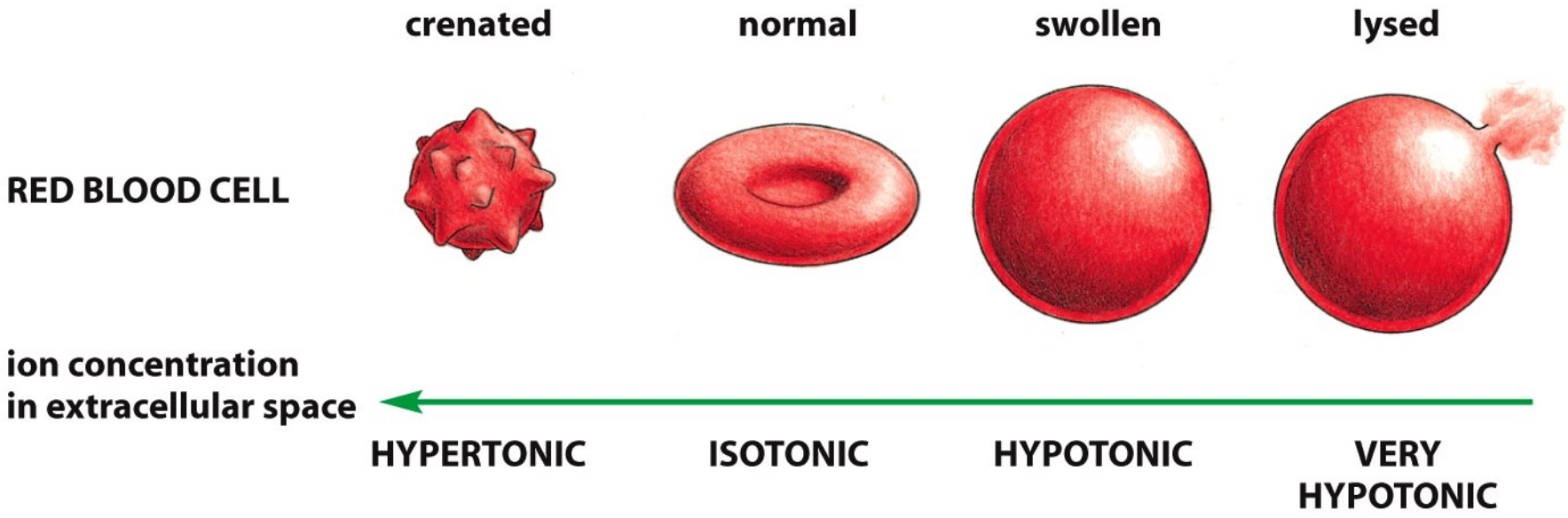
Iones inorgánicos pequeños

El problema

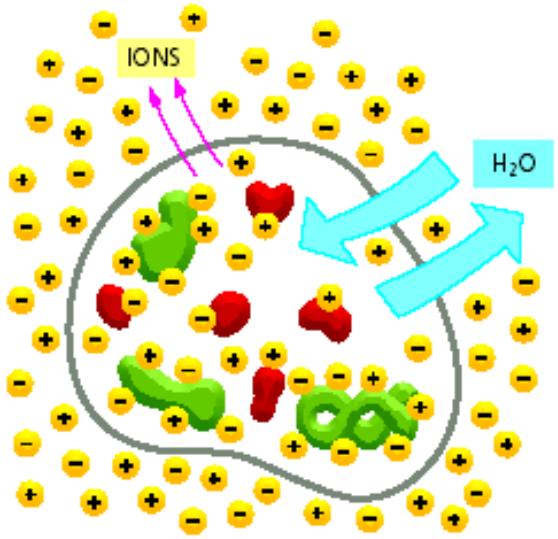


osmosis

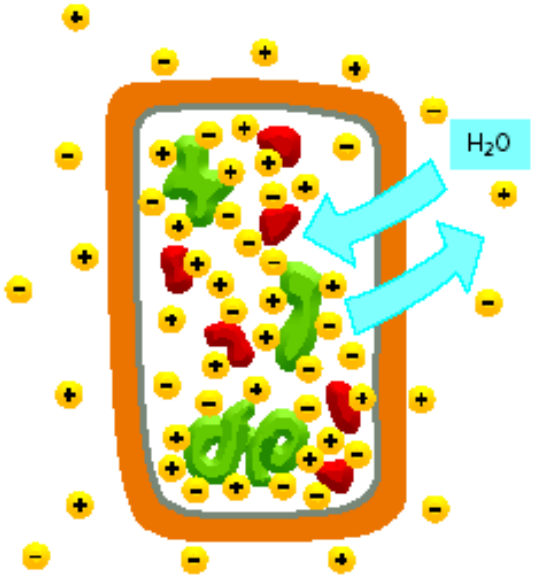
Respuesta de eritrocitos a los cambios de osmolaridad del fluido extracelular



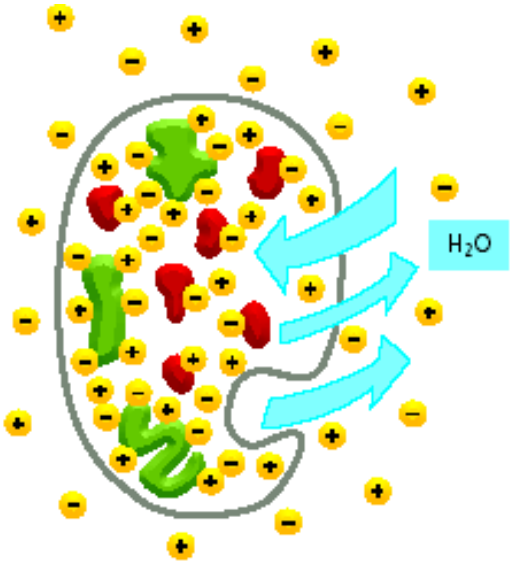
La solución



célula animal



célula vegetal



protozoos

Mantiene concentración intracelular de solutos reducida

Presencia de pared celular

Eyección periódica del agua