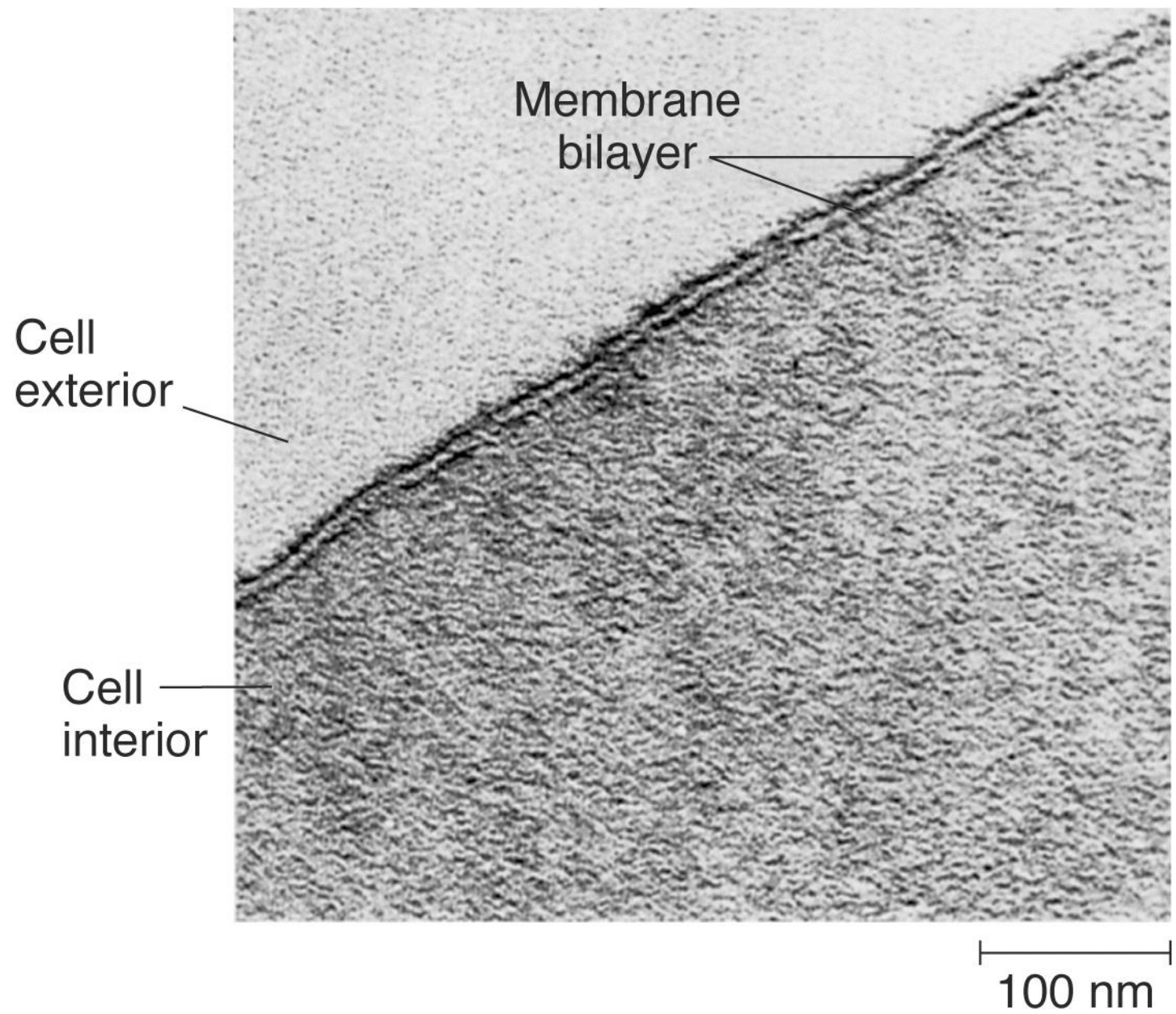


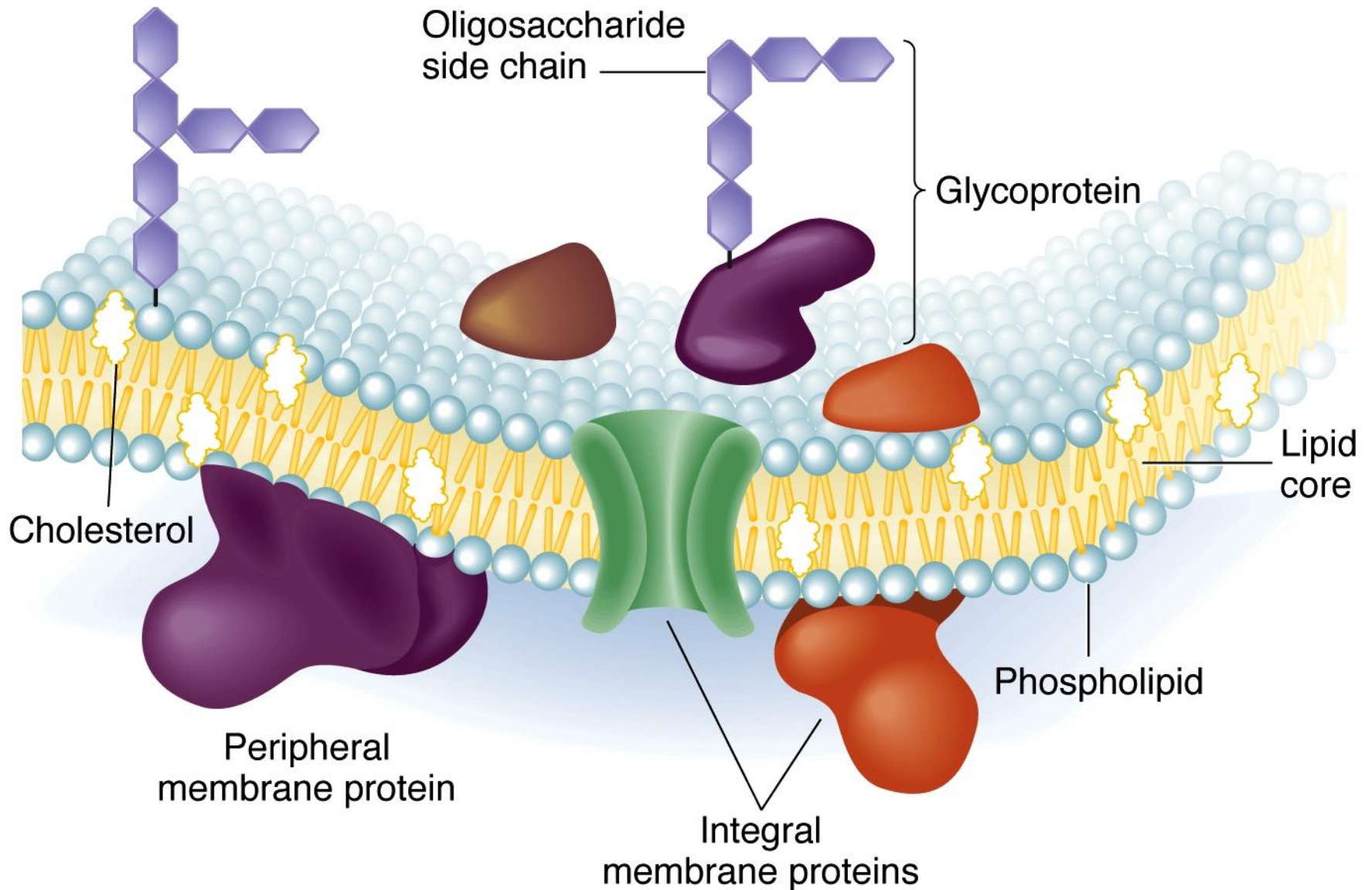
Membranes

- Interesting facts: a Chimp brain- membrane of all cells. 100,000 m², 3- soccer fields
- Membrane-plasma membrane enclose cytoplasm. Very thin- good, ex: gasoline on surface of water, but carries out essential regulation of the cell.

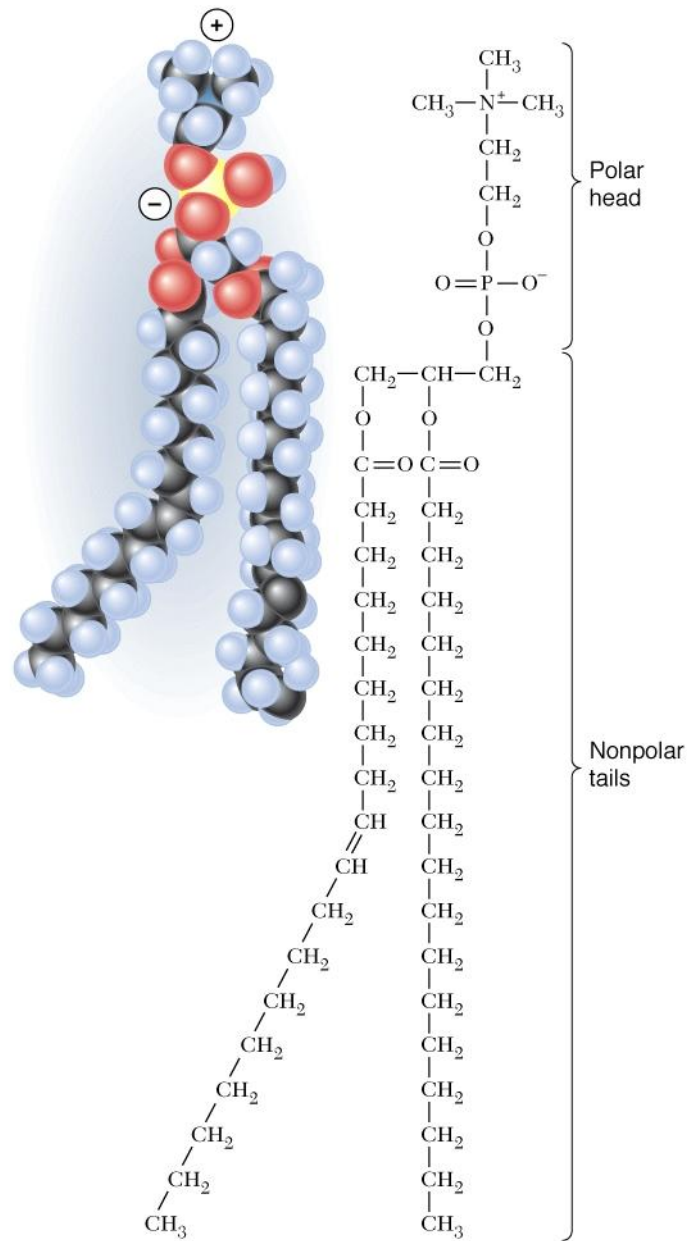


Membrane composition

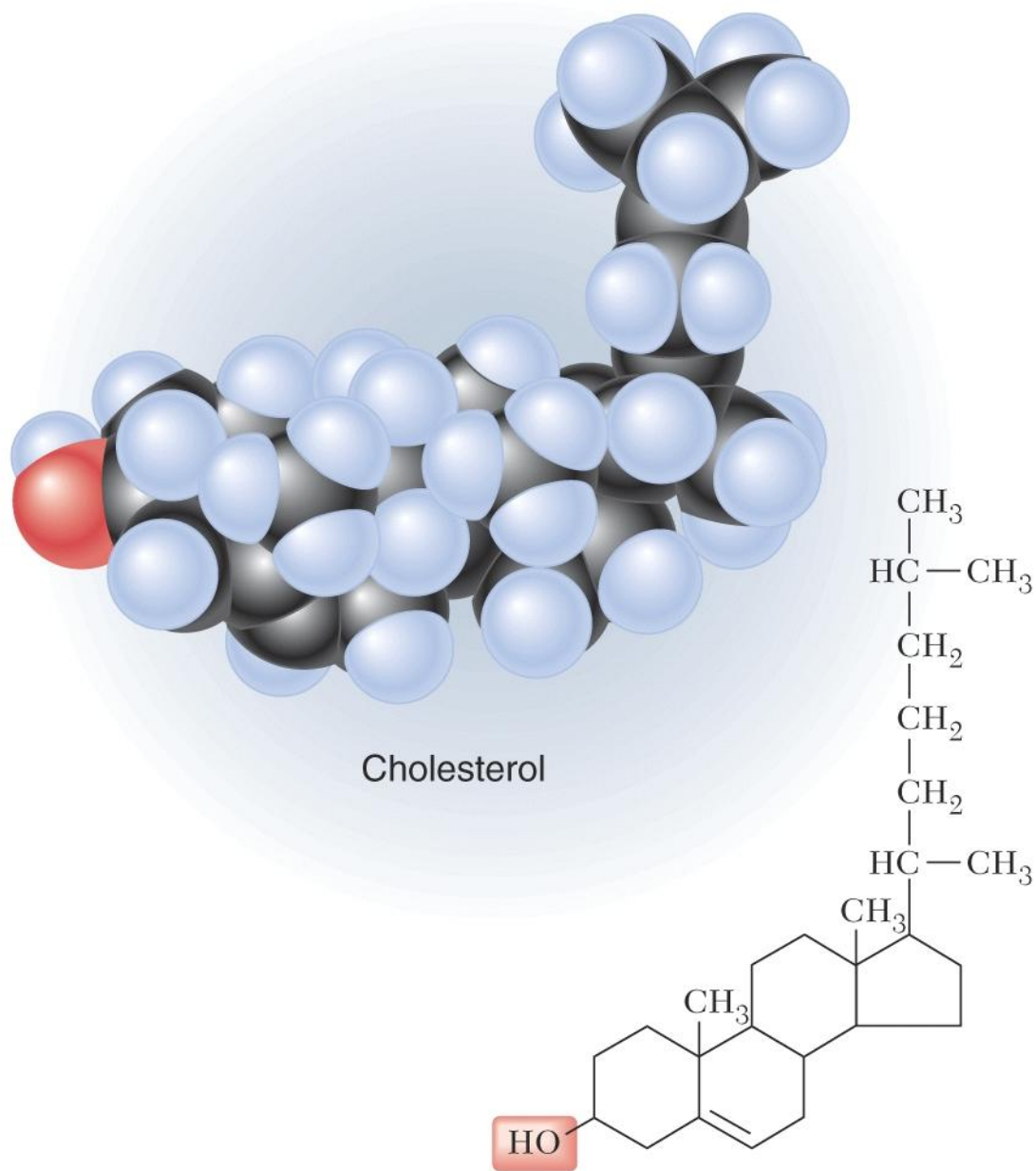
- lipid bilayer: impermeable to passage of most water-soluble molecules

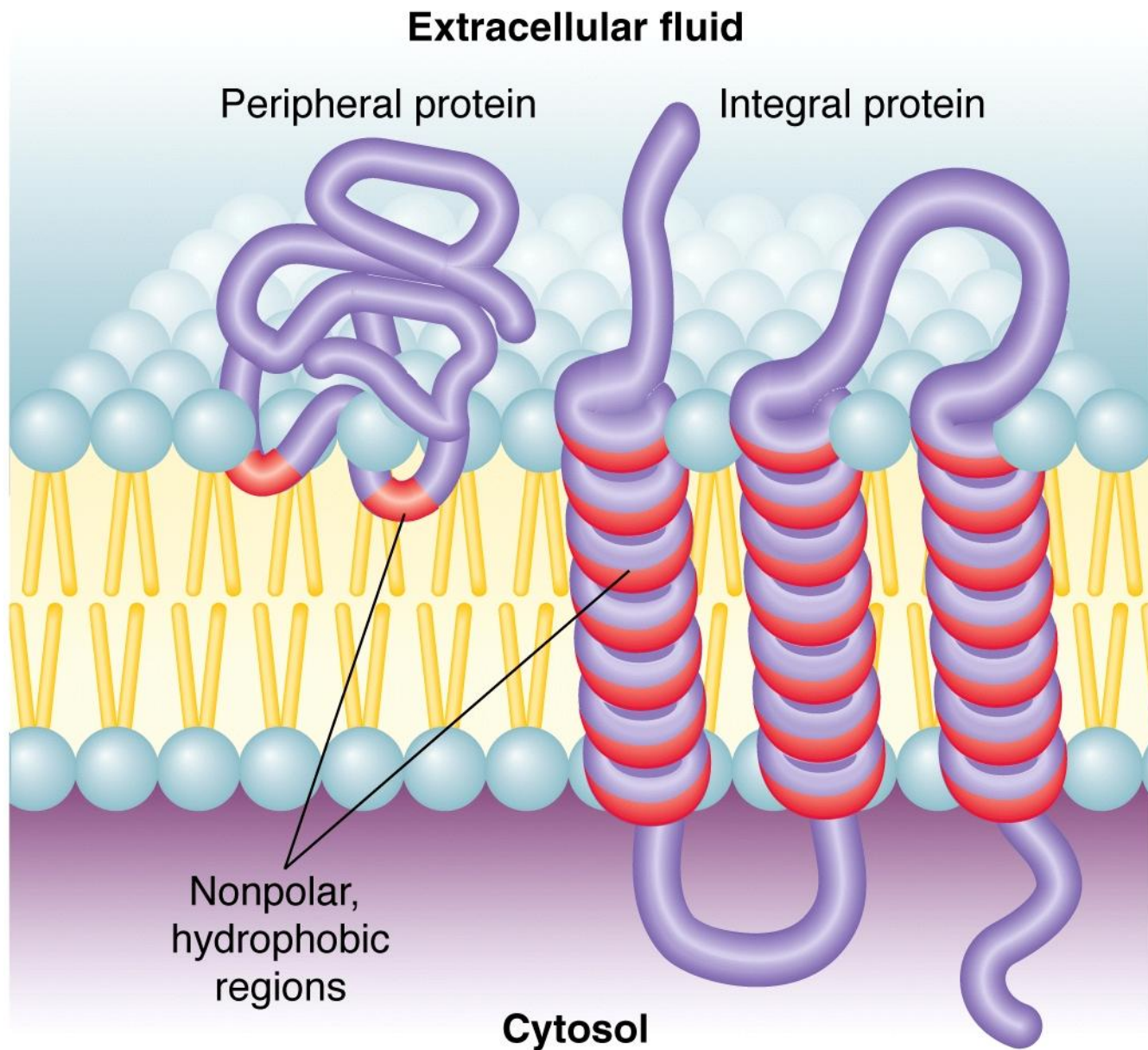


https://en.wikipedia.org/wiki/Fluid_mosaic_model



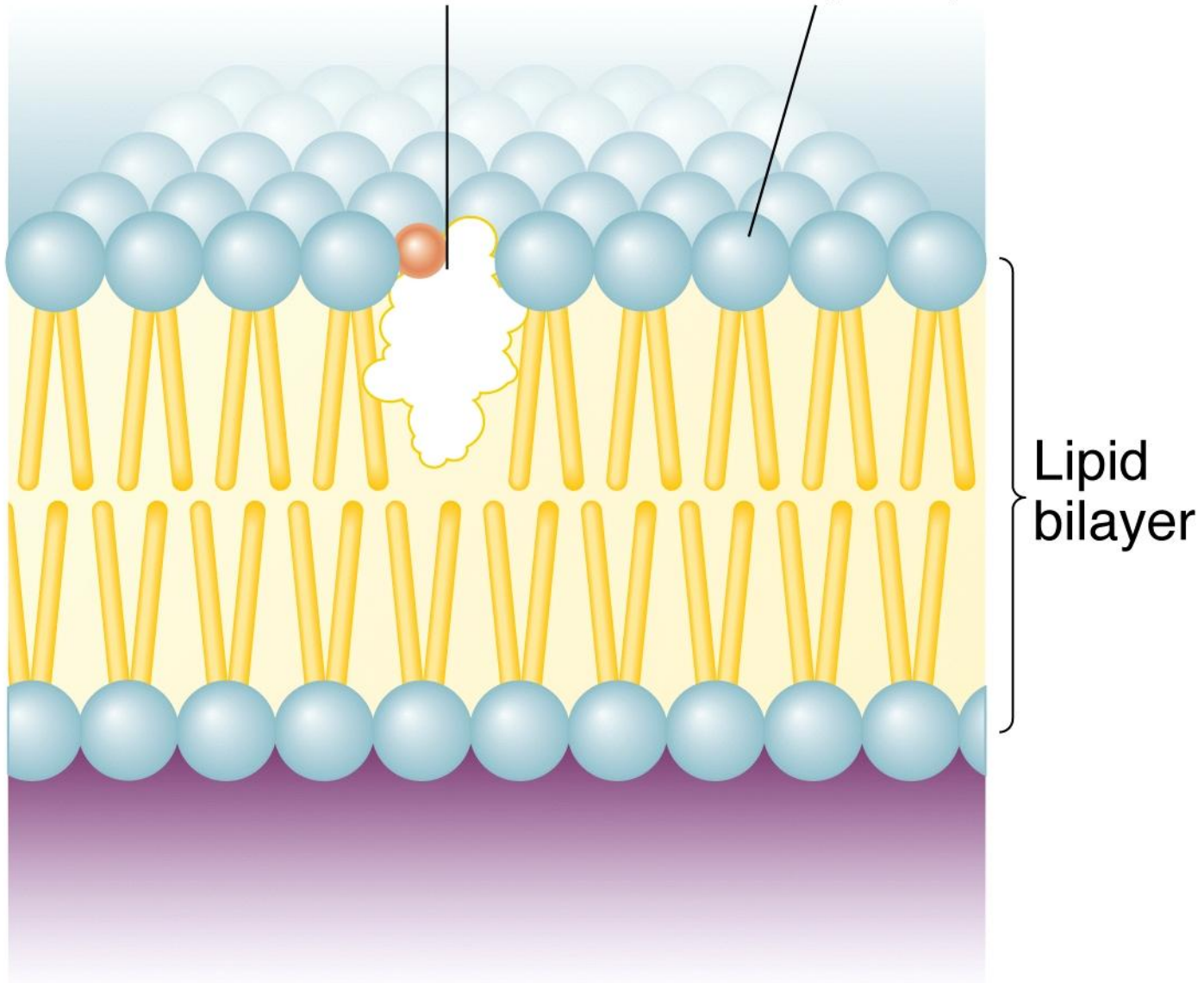
Temp ?





Cholesterol

Phospholipid



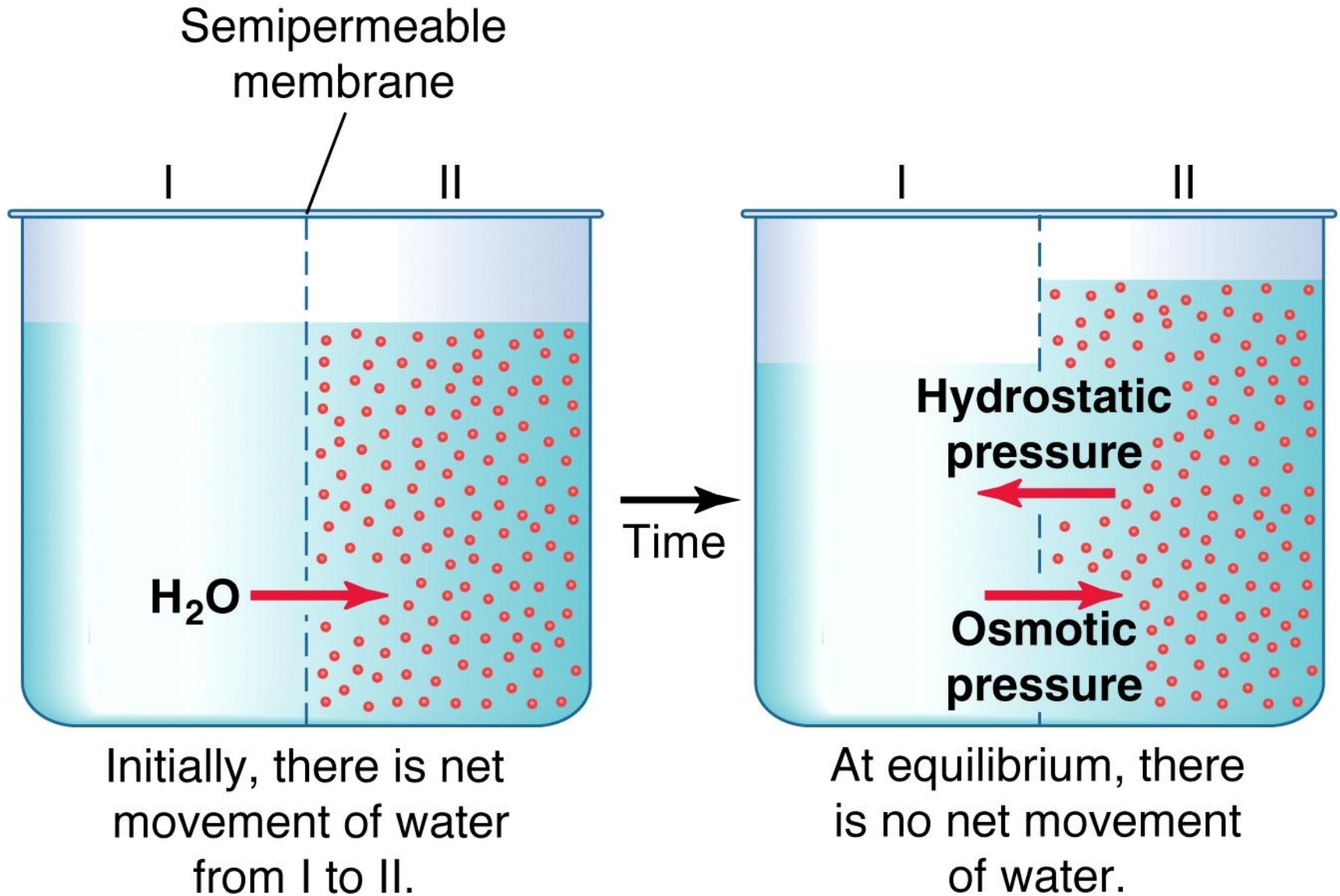
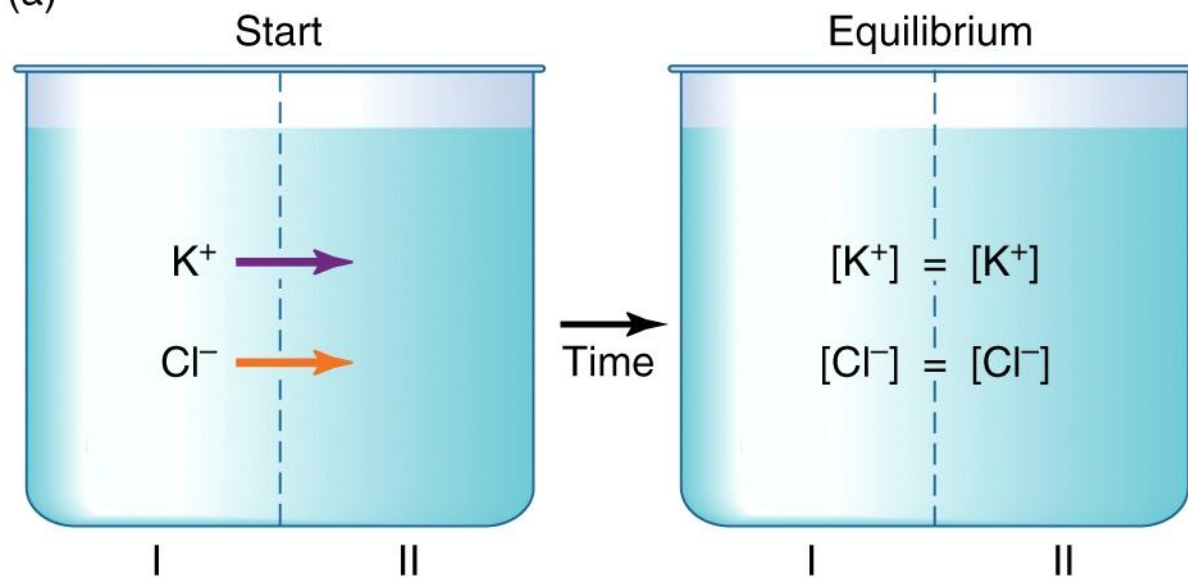


Table 4-1 Osmotic pressure of sucrose
solutions of various concentrations^{*}

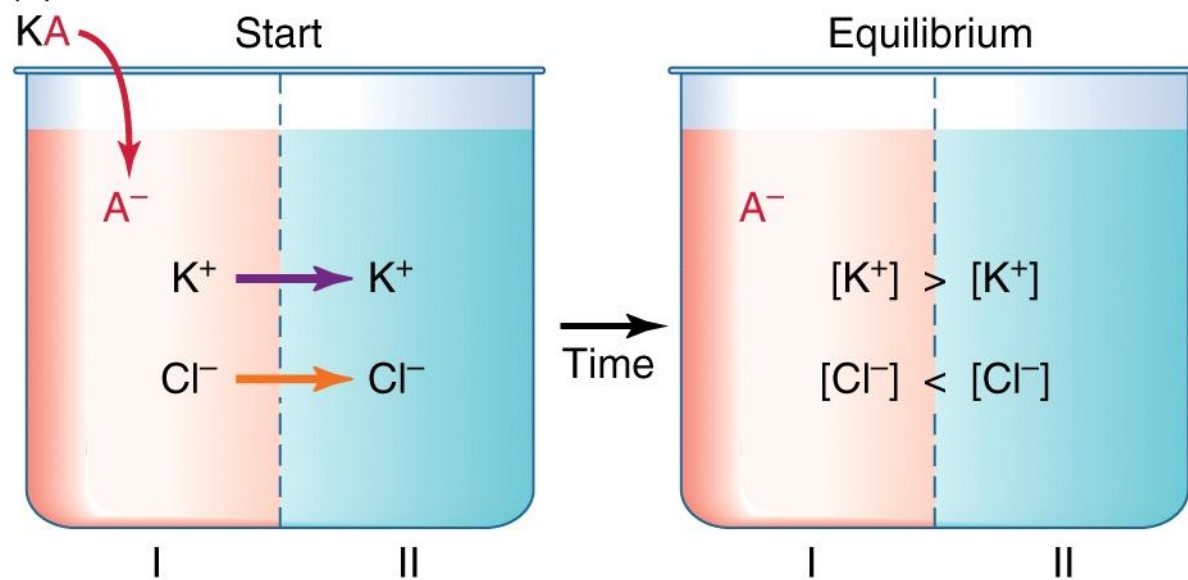
Sucrose (%)	Osmotic pressure (atm)	Ratio of osmotic pressure to percentage of sucrose
1	0.70	0.70
2	1.34	0.67
4	2.74	0.68
6	4.10	0.68

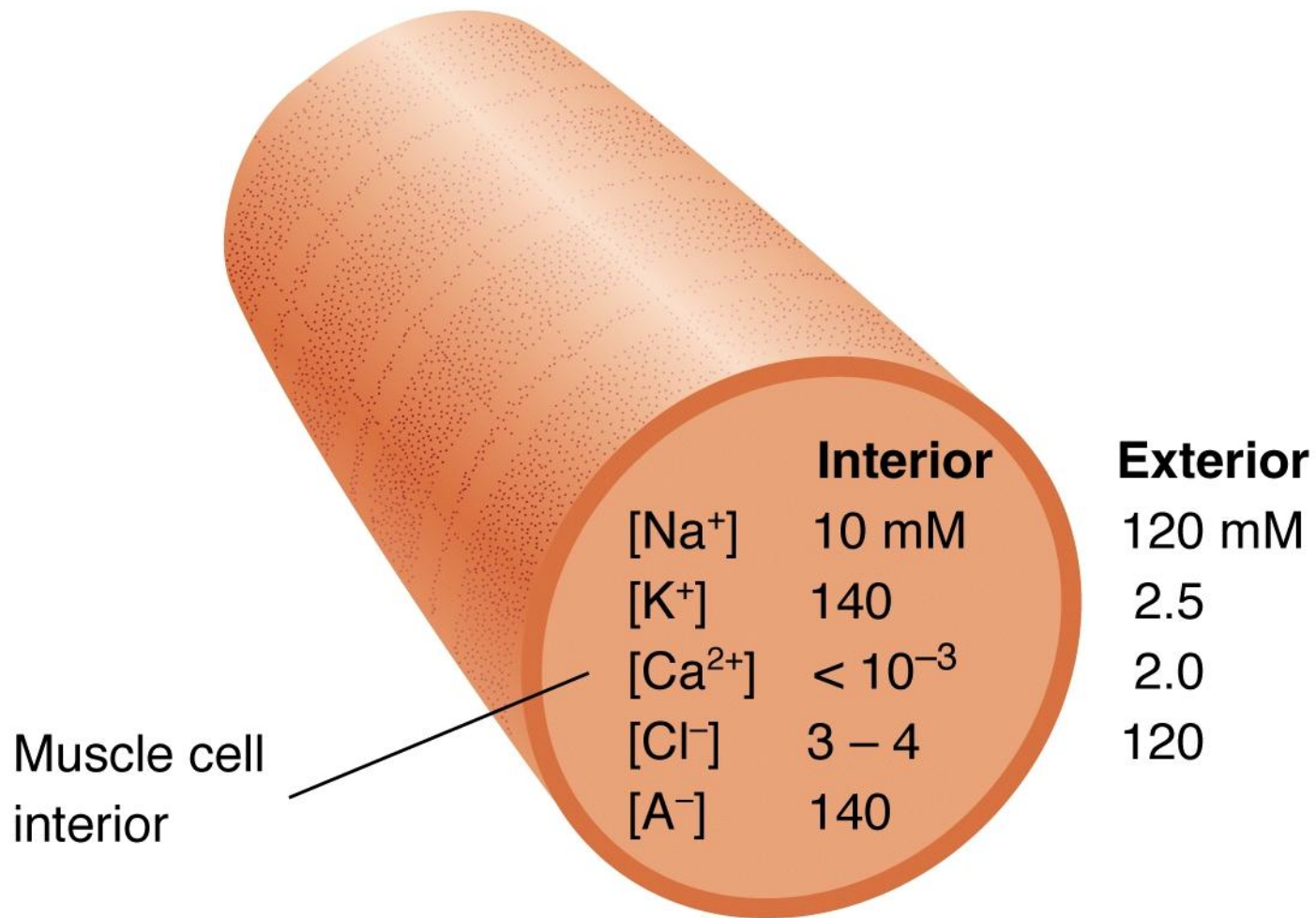
^{*} Results were obtained by Pfeffer (1877) in experimental measurements.

(a)



(b)





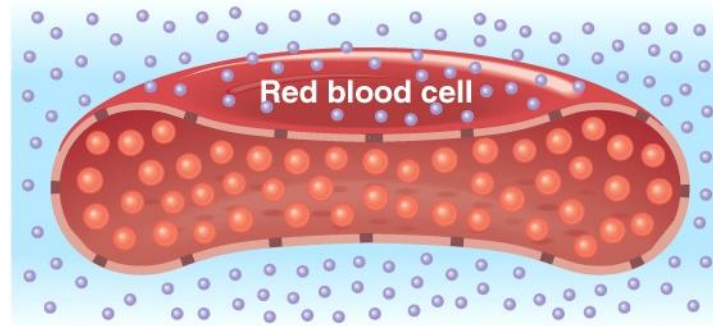
Muscle cell
interior

[A⁻] = molar equivalent of
negative charges carried
by other molecules and ions.

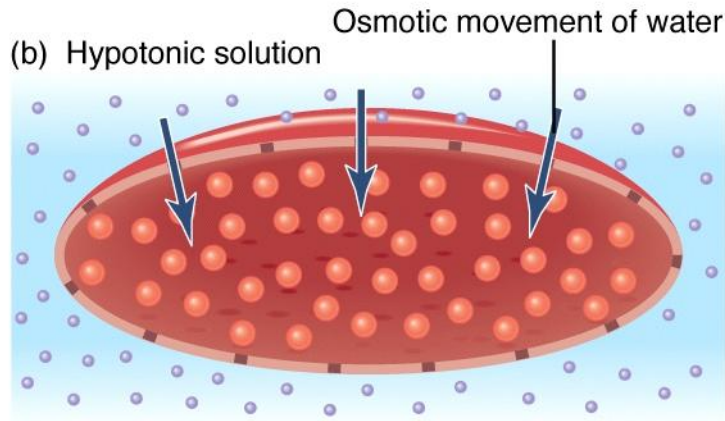
Table 4-2 Internal and external concentrations of some electrolytes in specific nerve and muscle tissues

Tissue	Internal concentrations (mM)			External concentrations (mM)			Ratios, inside/outside		
	Na ⁺	K ⁺	Cl ⁻	Na ⁺	K ⁺	Cl ⁻	Na ⁺	K ⁺	Cl ⁻
Squid nerve	49	410	40–100	440	22	560	1/9	19/1	1/14–1/6
Crab leg nerve	52	410	26	510	12	540	1/10	34/1	1/21
Frog sartorius muscle	10	140	4	120	2.5	120	1/12	56/1	1/30

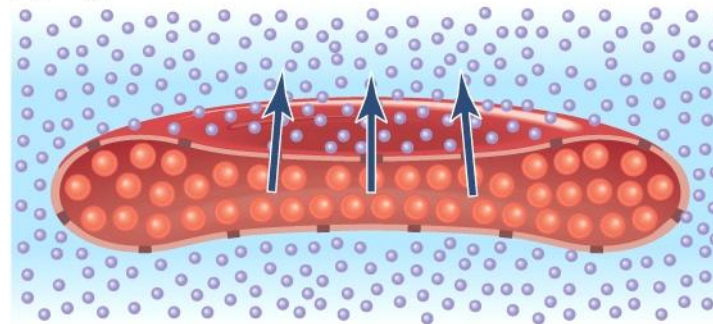
(a) Isotonic solution

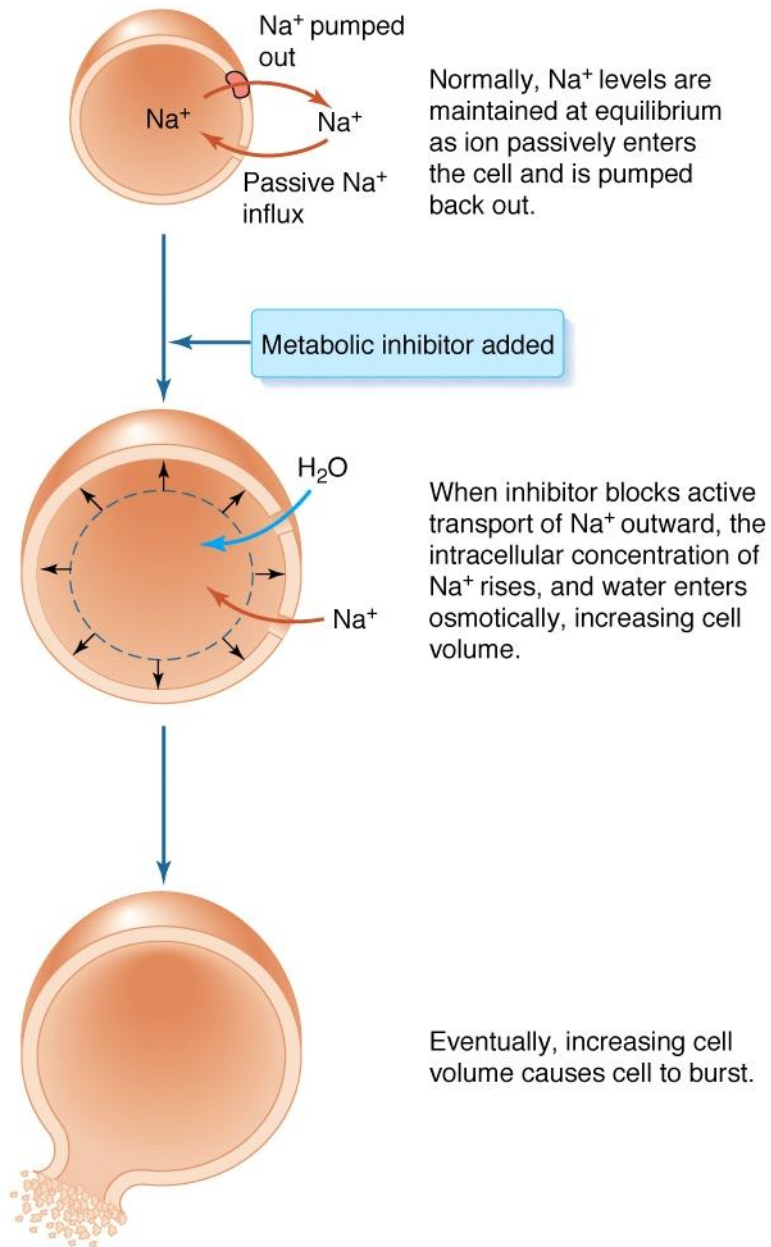


(b) Hypotonic solution



(c) Hypertonic solution





Passive diffusion

Passive transport

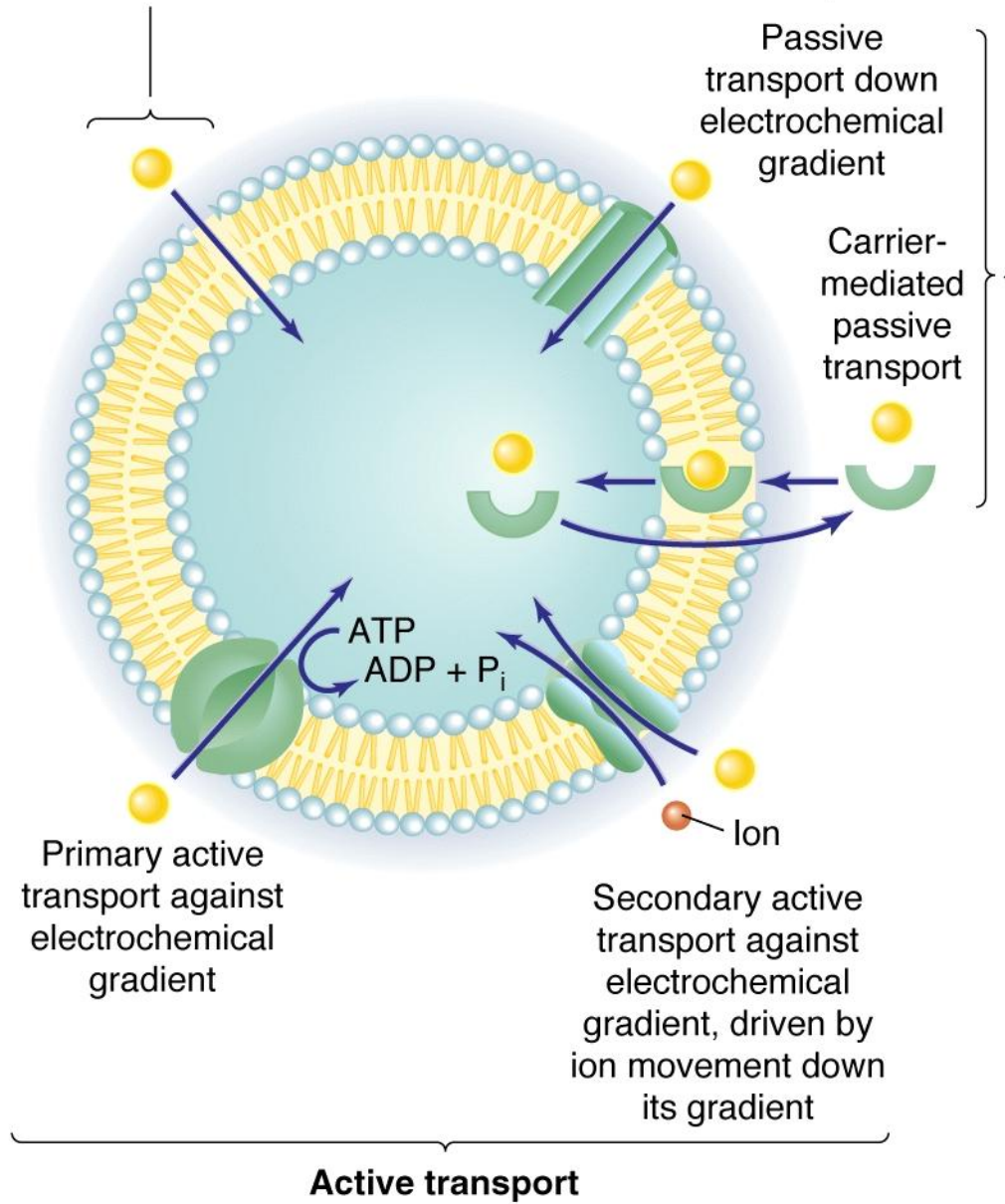
Passive transport down electrochemical gradient

Carrier-mediated passive transport

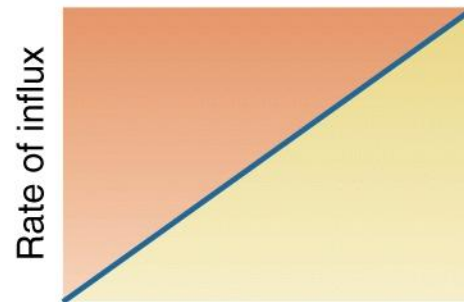
Primary active transport against electrochemical gradient

Secondary active transport against electrochemical gradient, driven by ion movement down its gradient

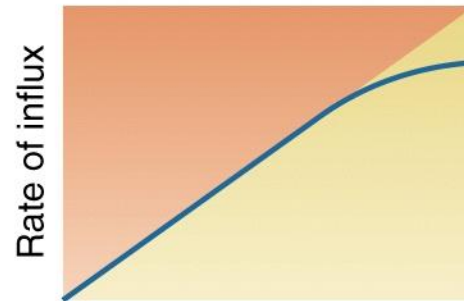
Active transport



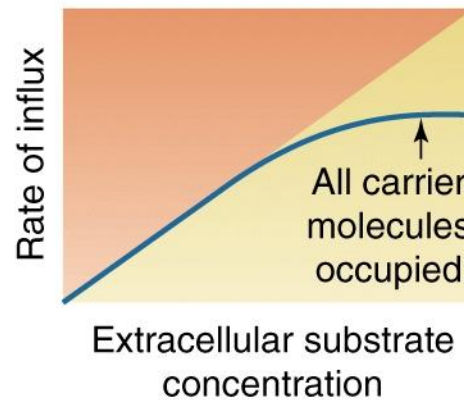
(a) Passive diffusion through membrane



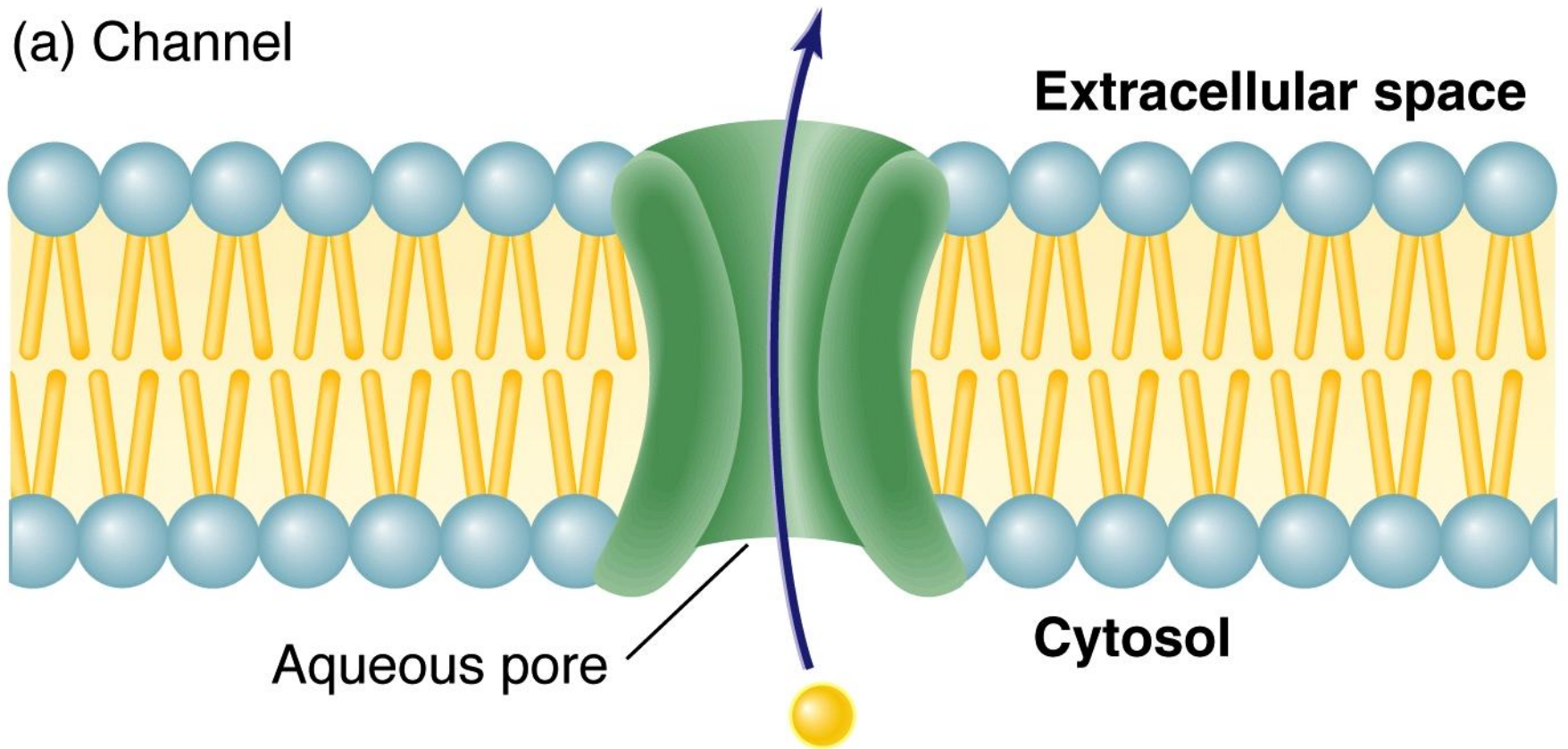
(b) Passive transport through channels



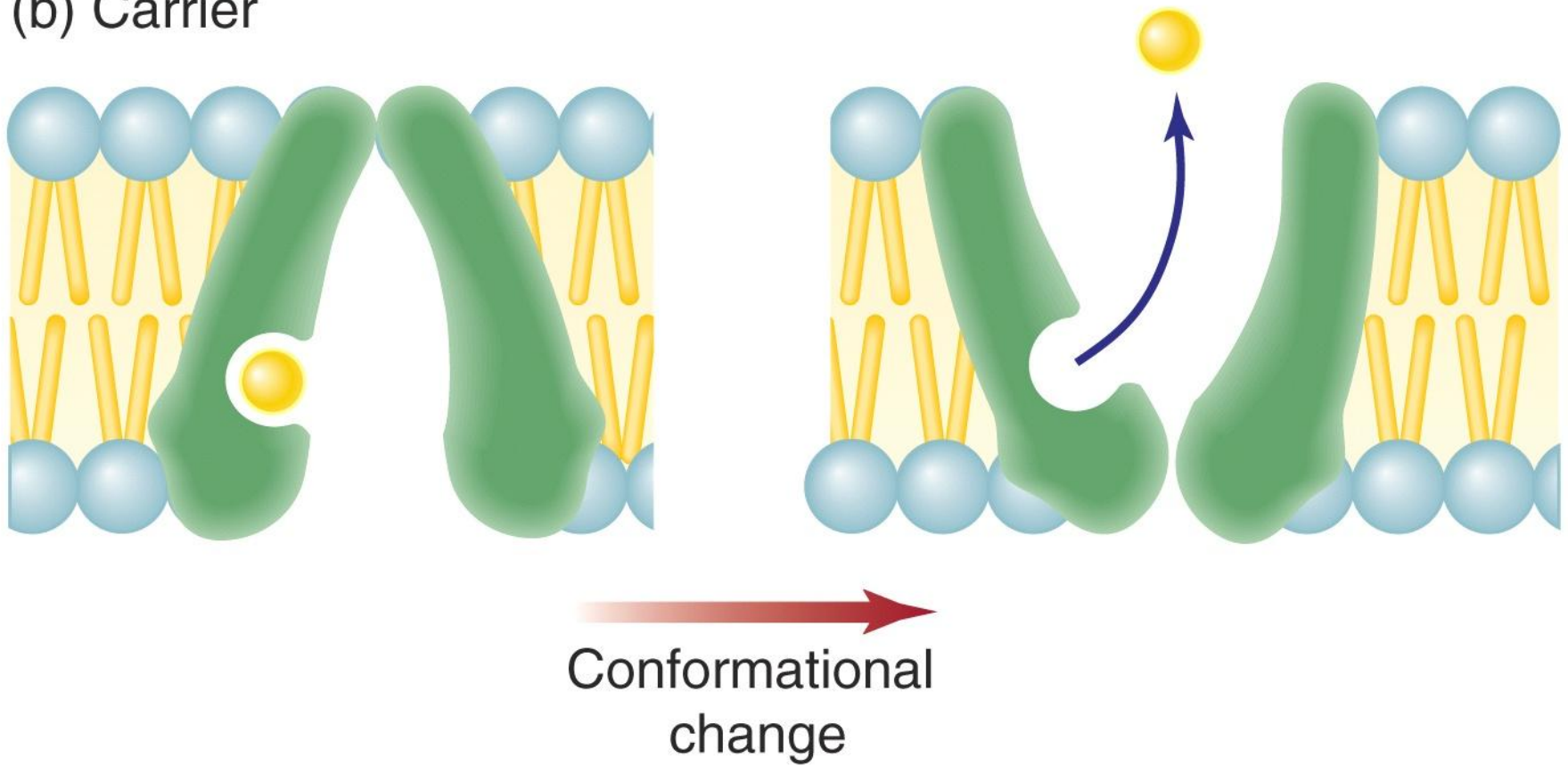
(c) Carrier-mediated transport (passive or active)

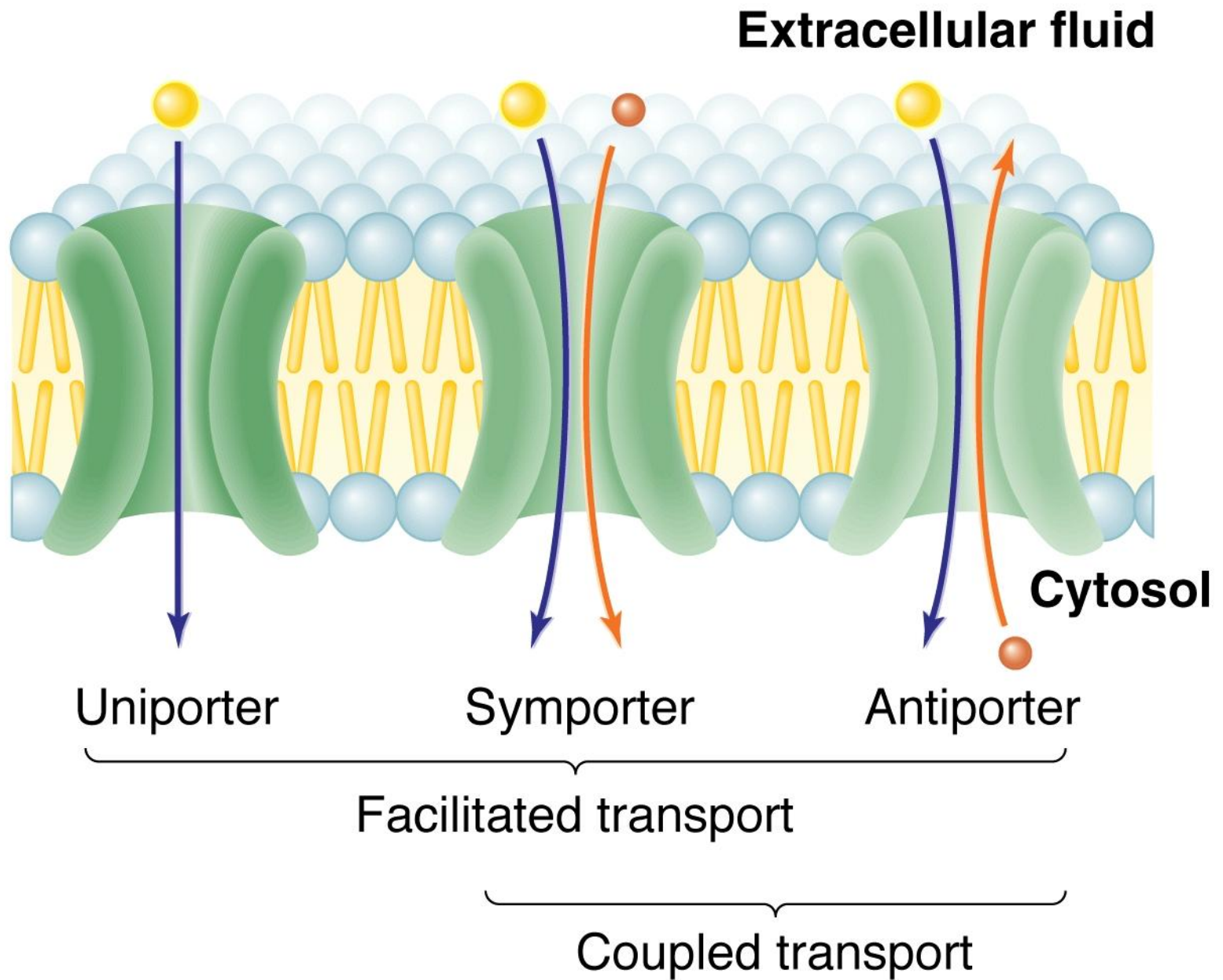


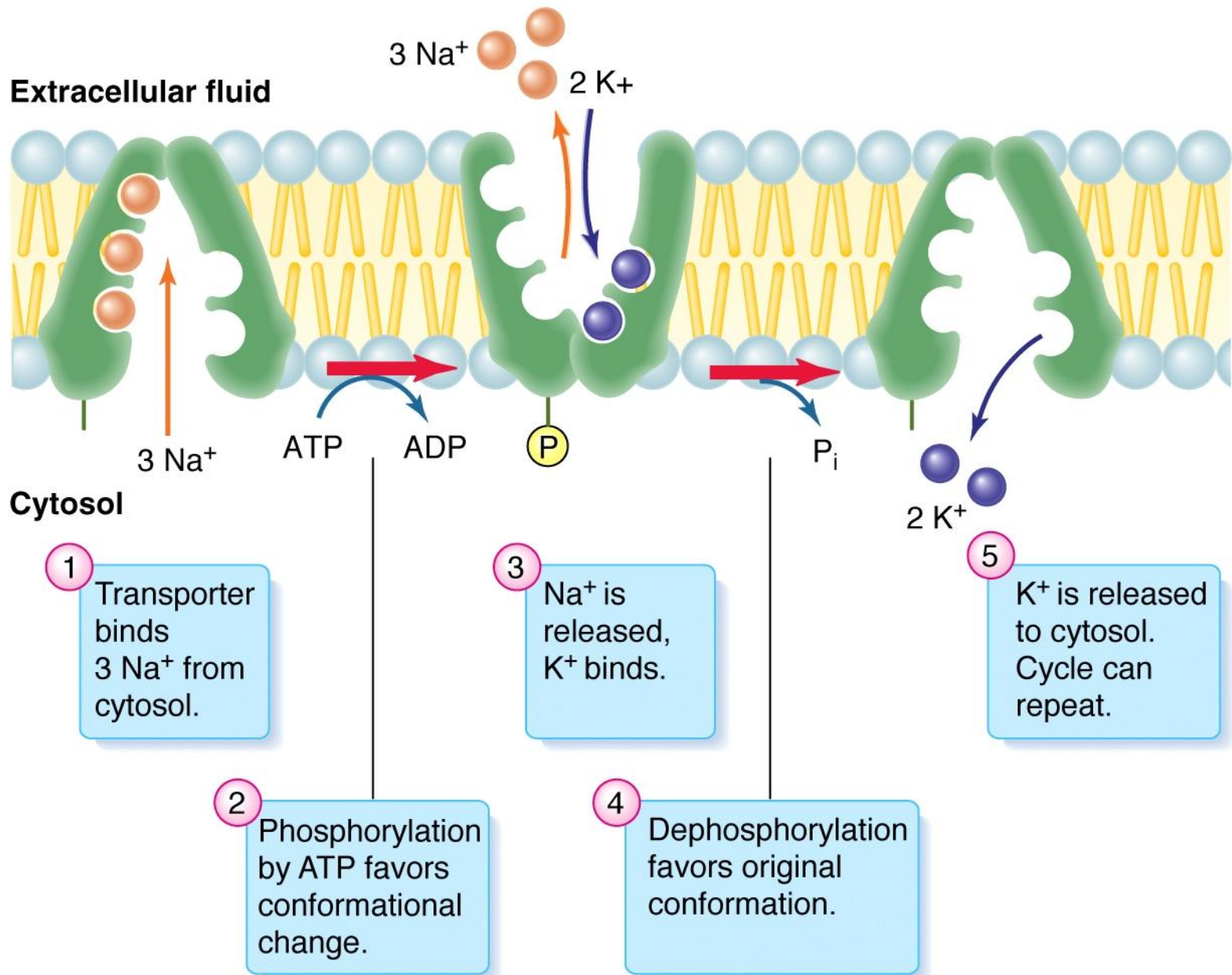
(a) Channel

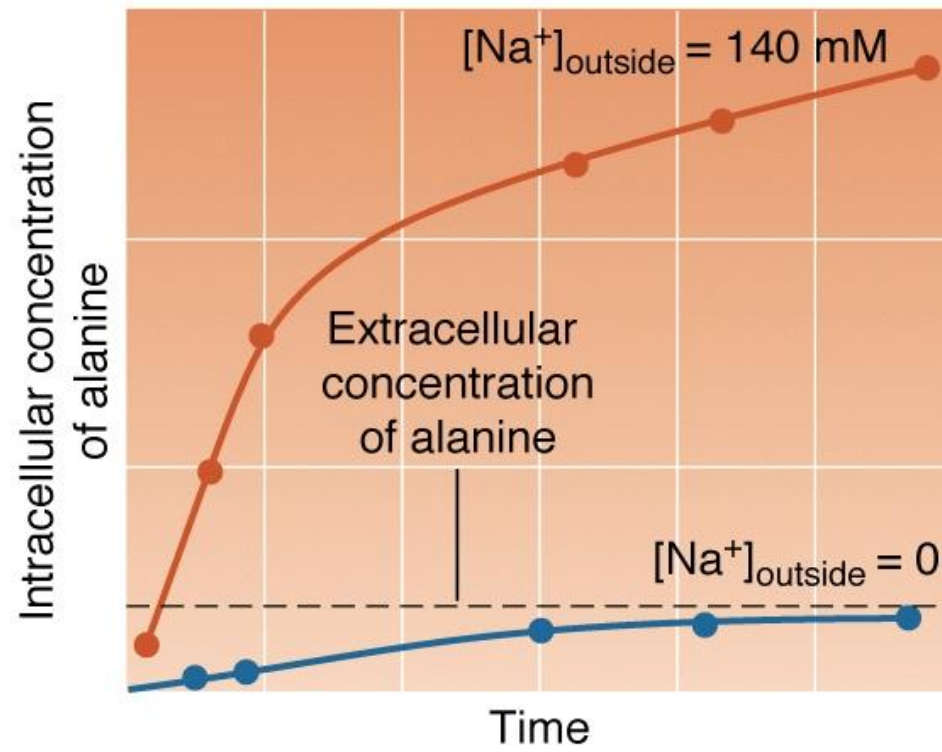


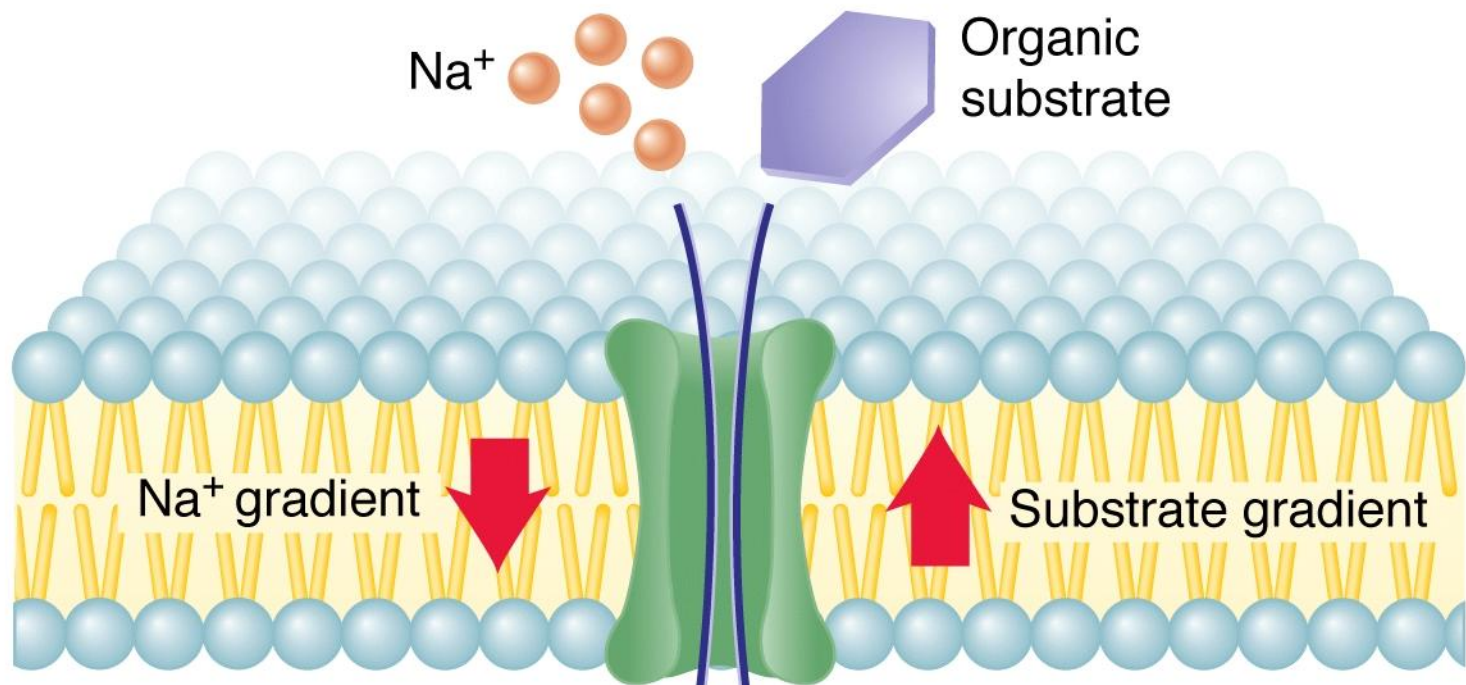
(b) Carrier











Cotransport with Na^+ renders substrate transport against its concentration gradient energetically favorable.

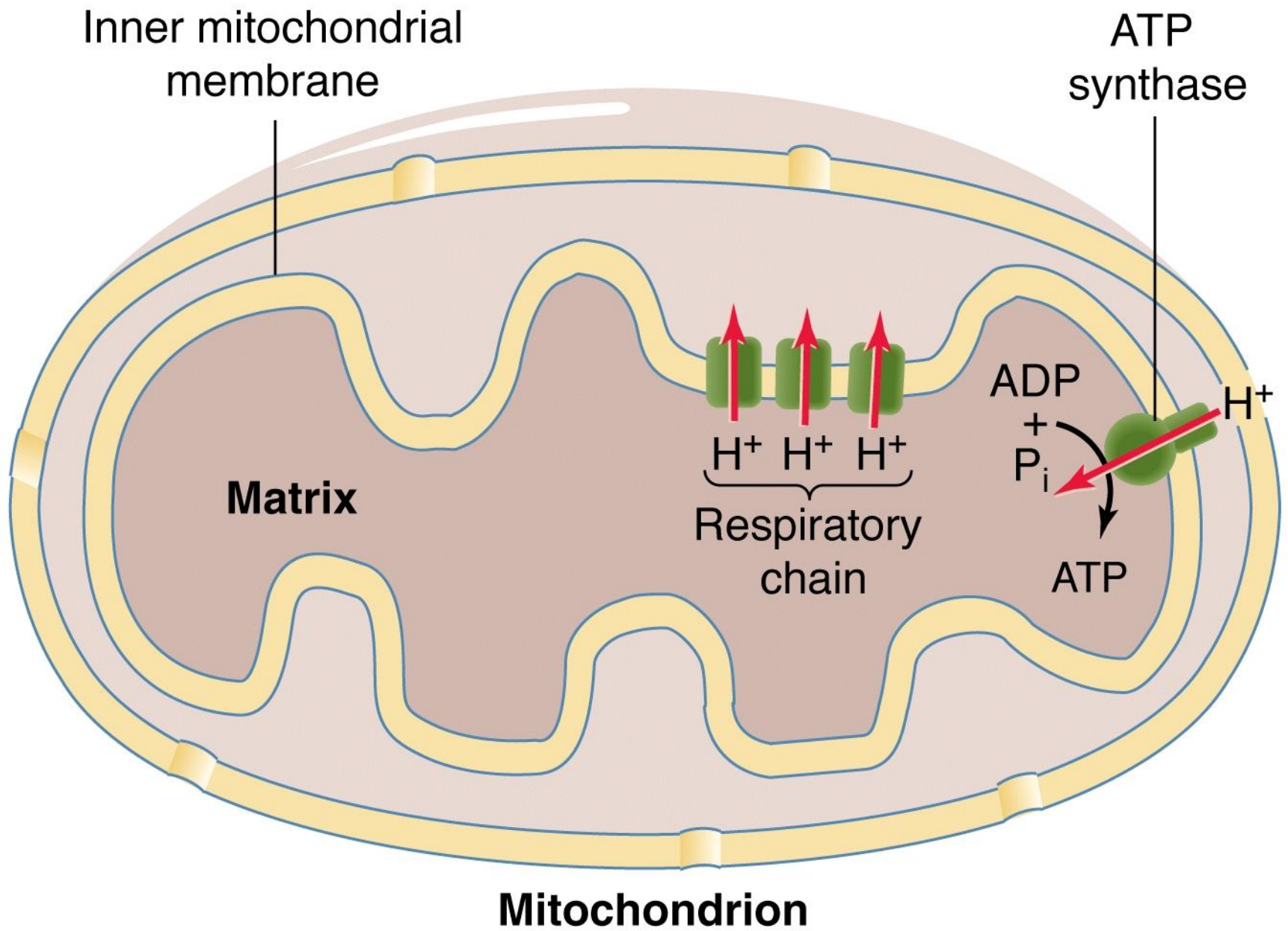
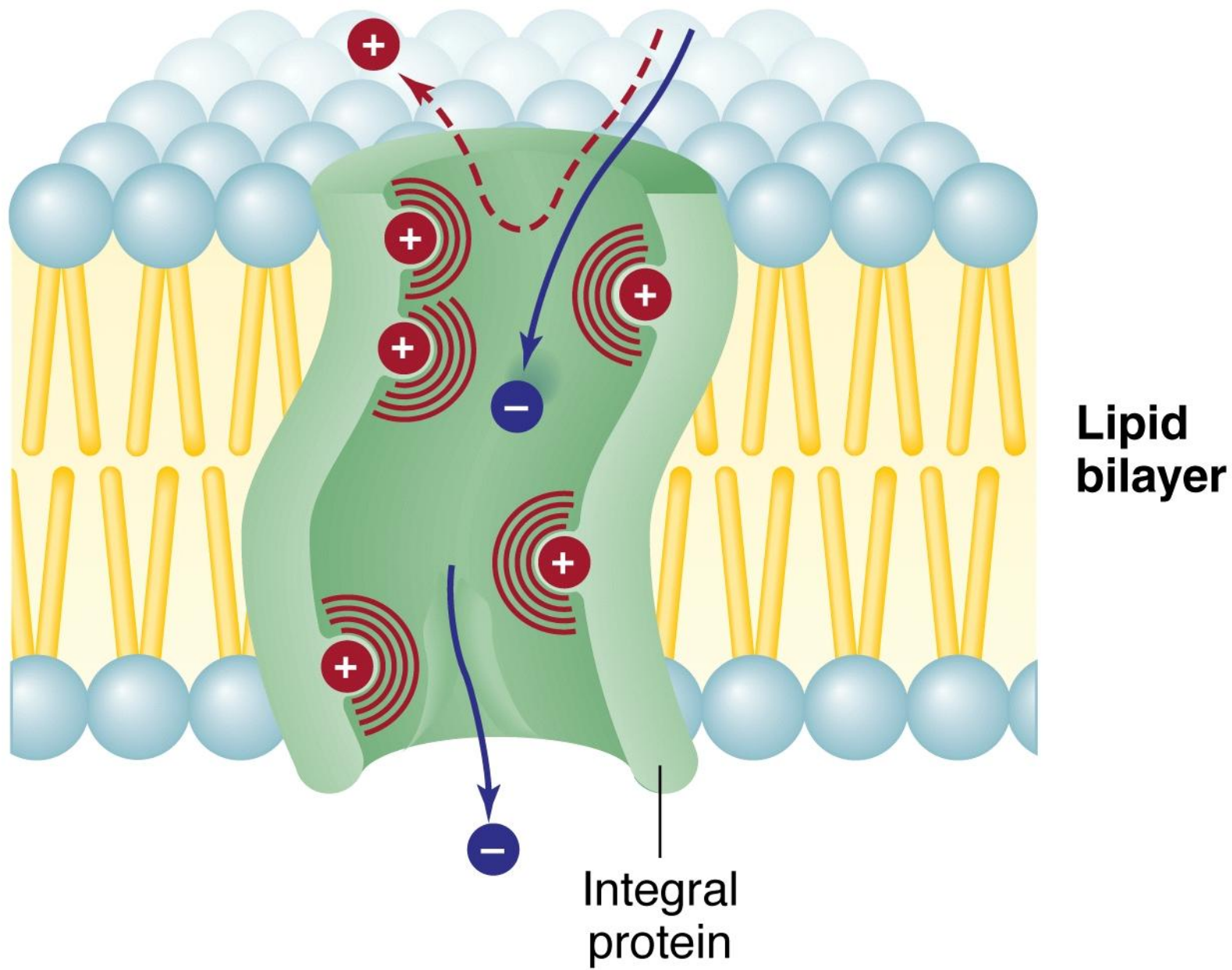
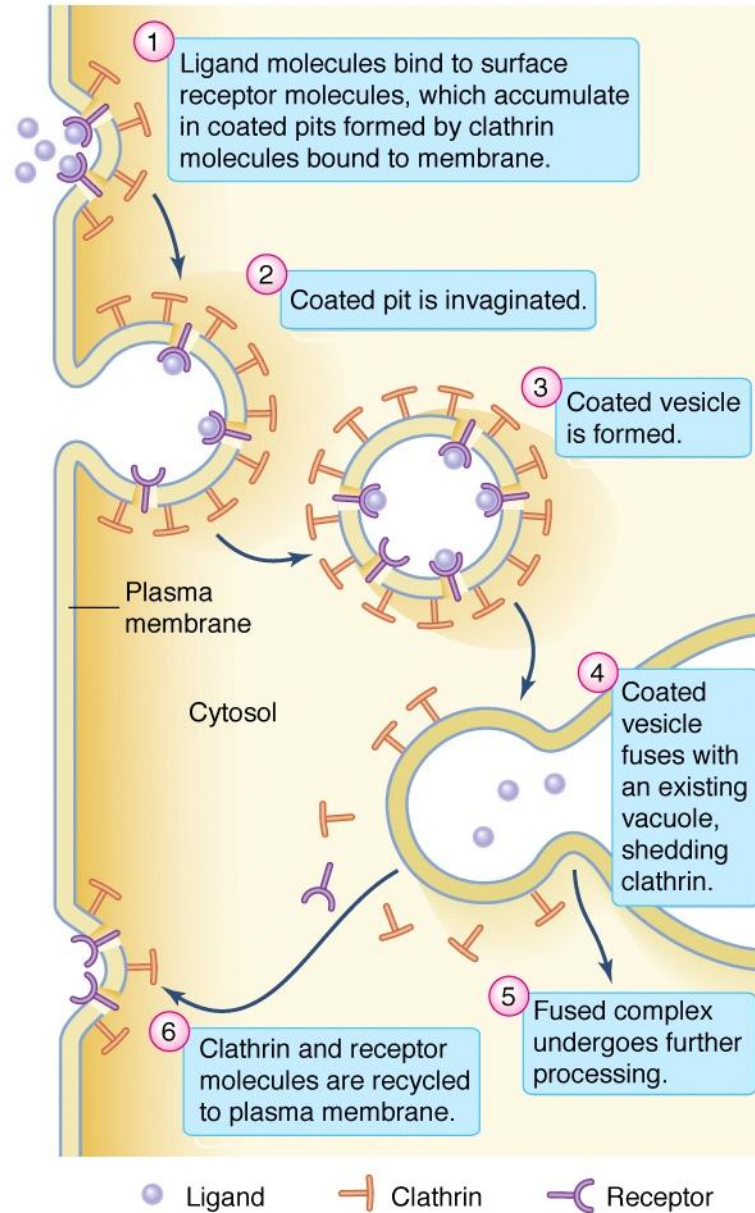


Table 4-3 Ionic radii and hydration energies of the alkali metal cations

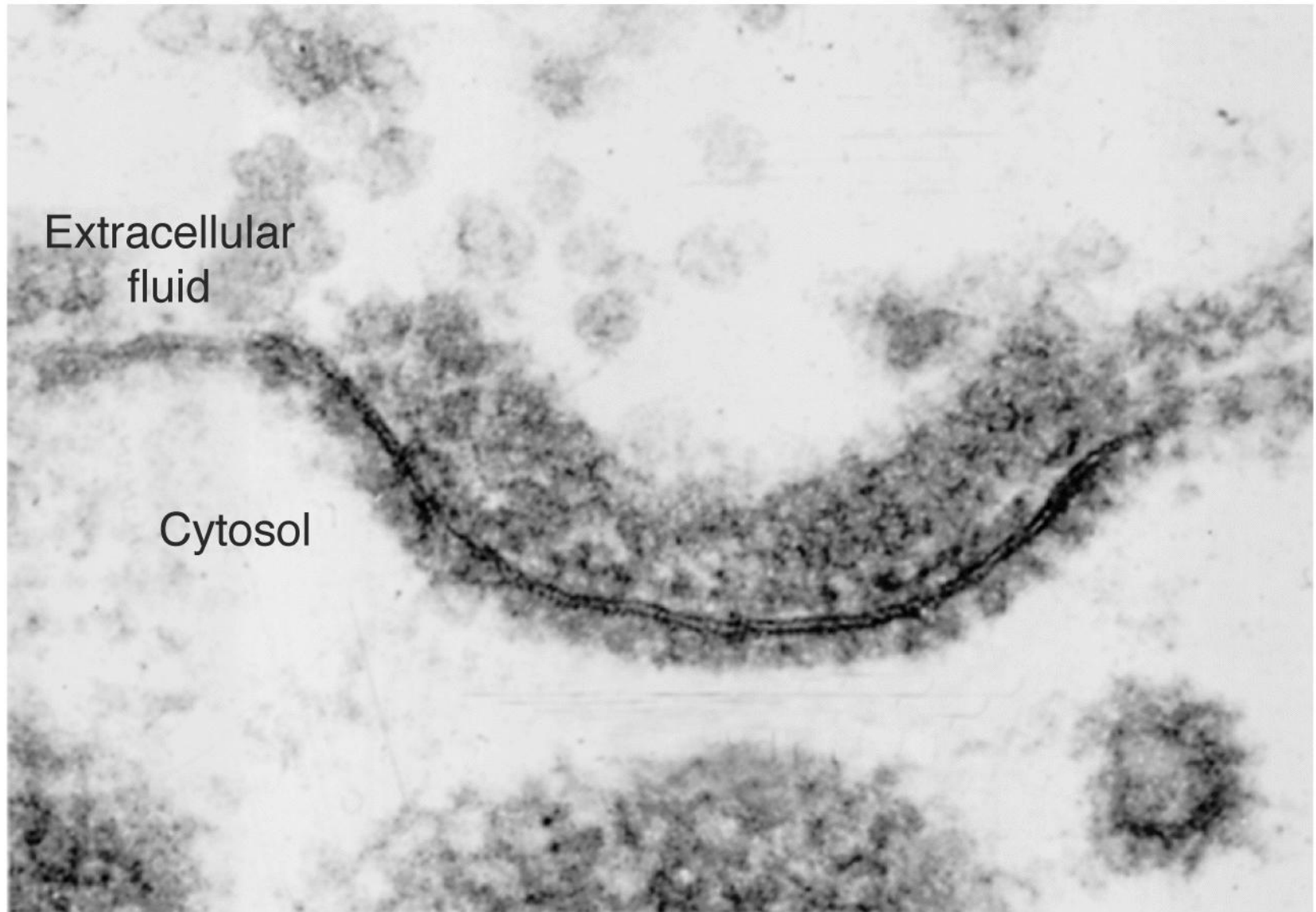
Cation	Ionic radius (Å)		Free energy of hydration (kcal · mol ⁻¹)
Li ⁺	0.60		2122
Na ⁺	0.95		298
K ⁺	1.33		280
Rb ⁺	1.48		275
Cs ⁺	1.69		267



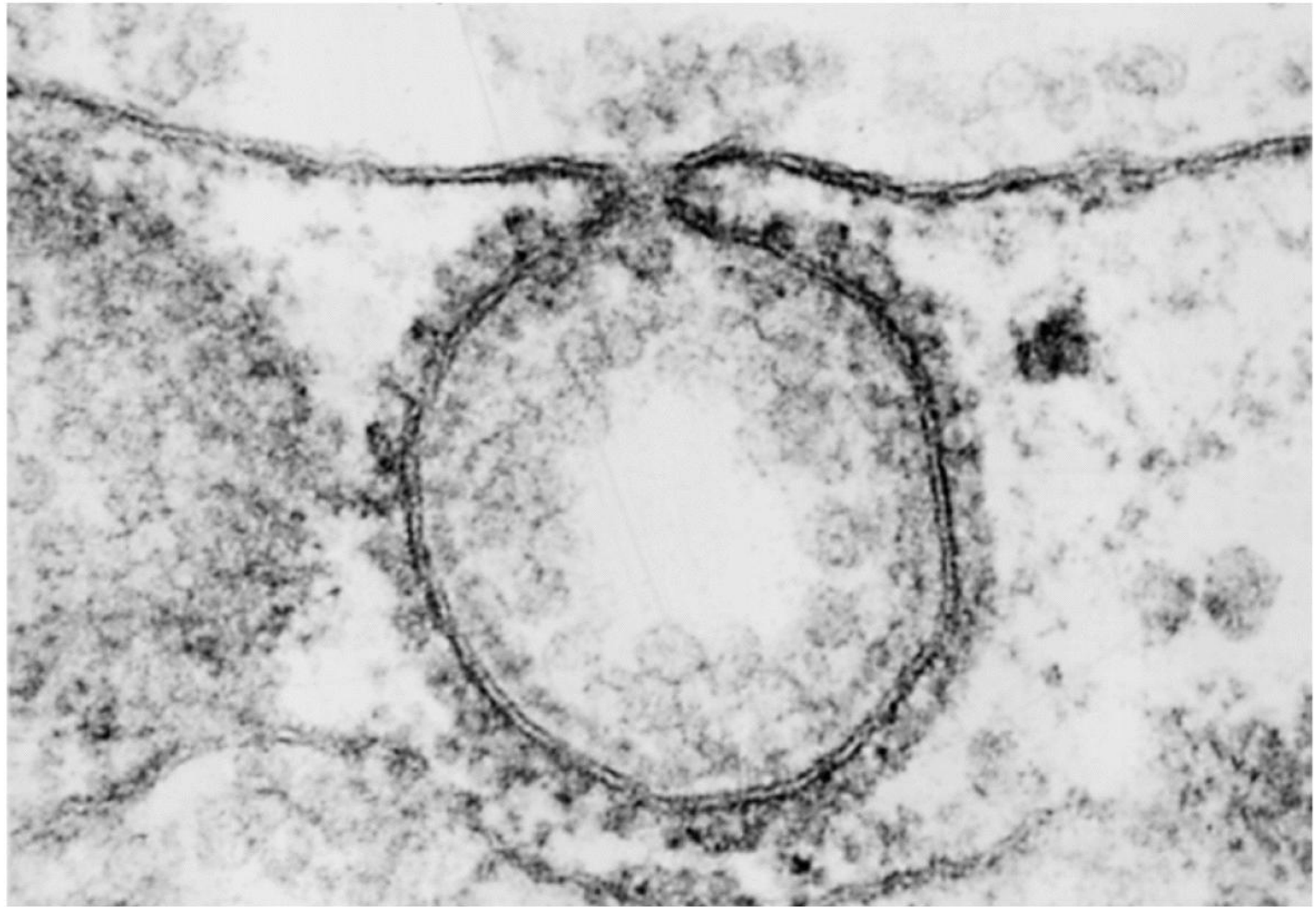
(a)



(b) Coated pit



(c) Coated vesicle



10 Å

