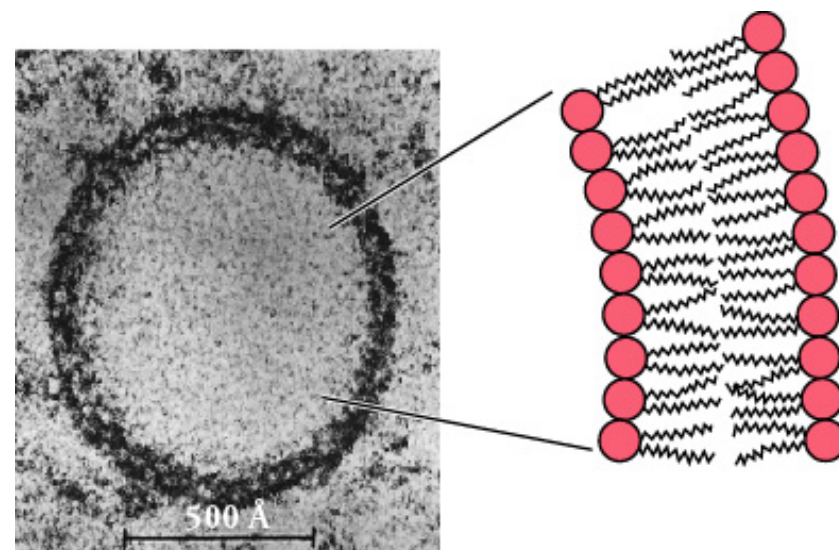
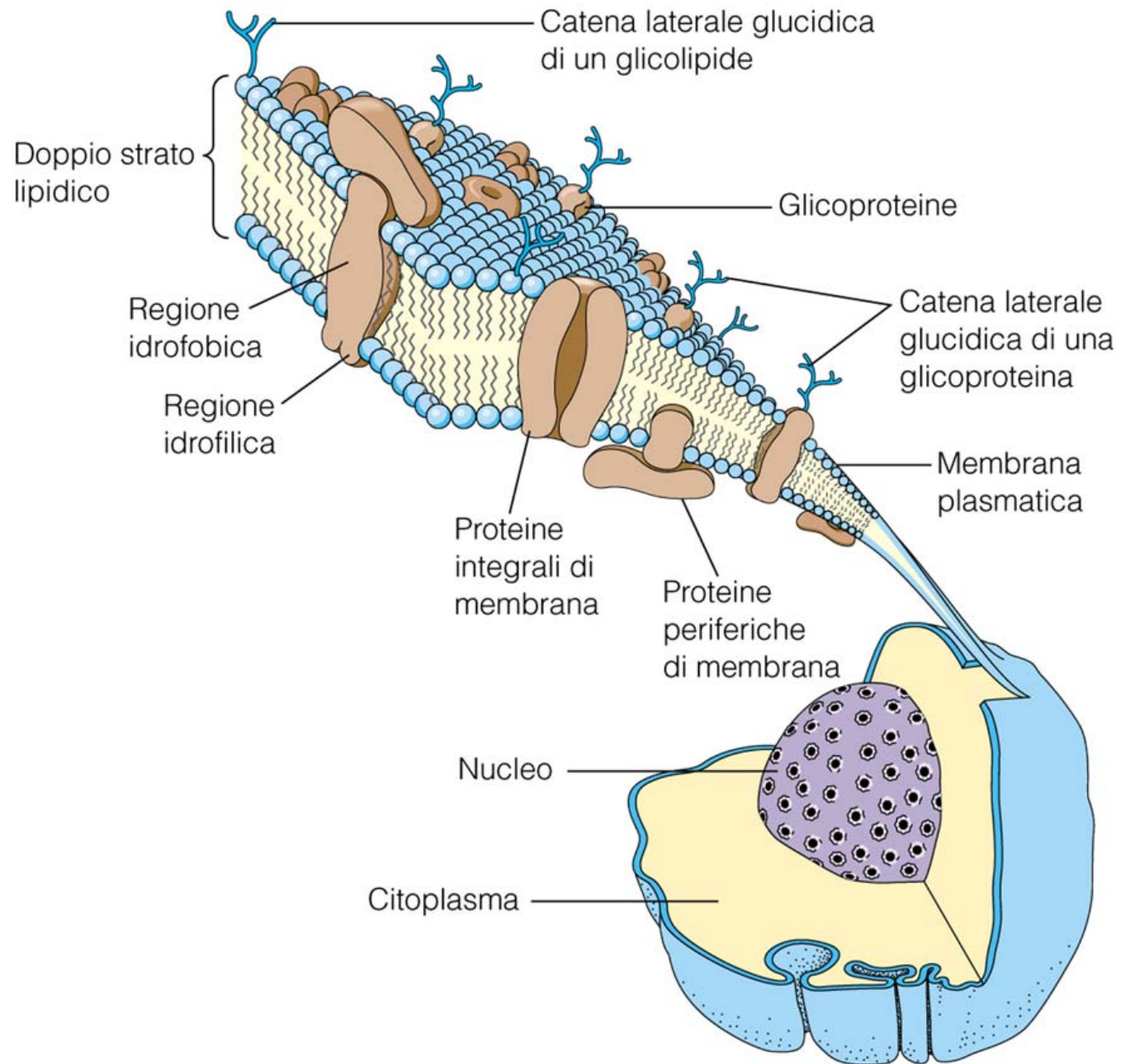
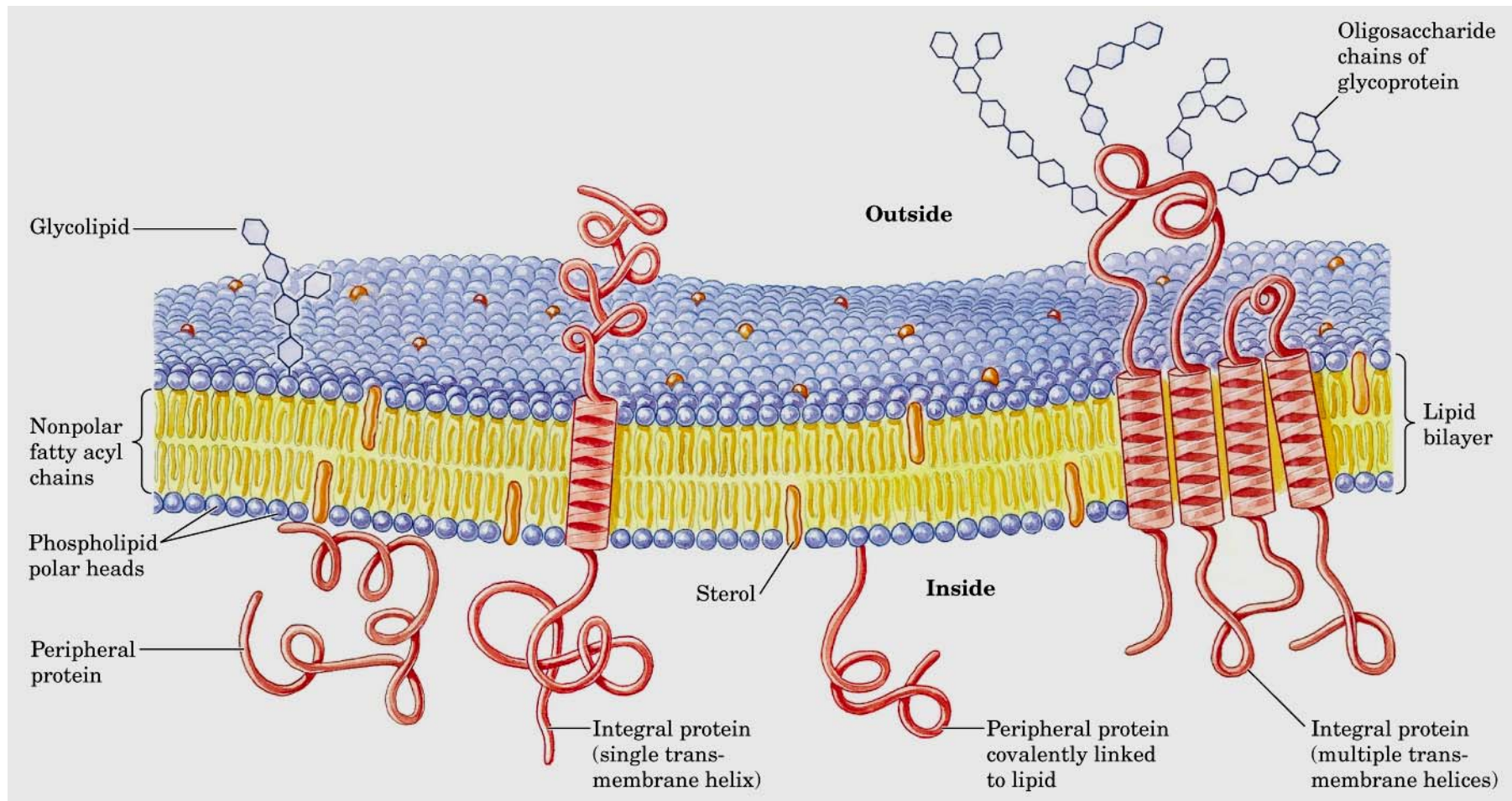


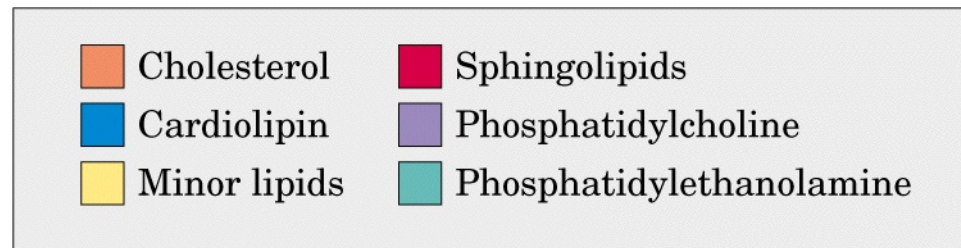
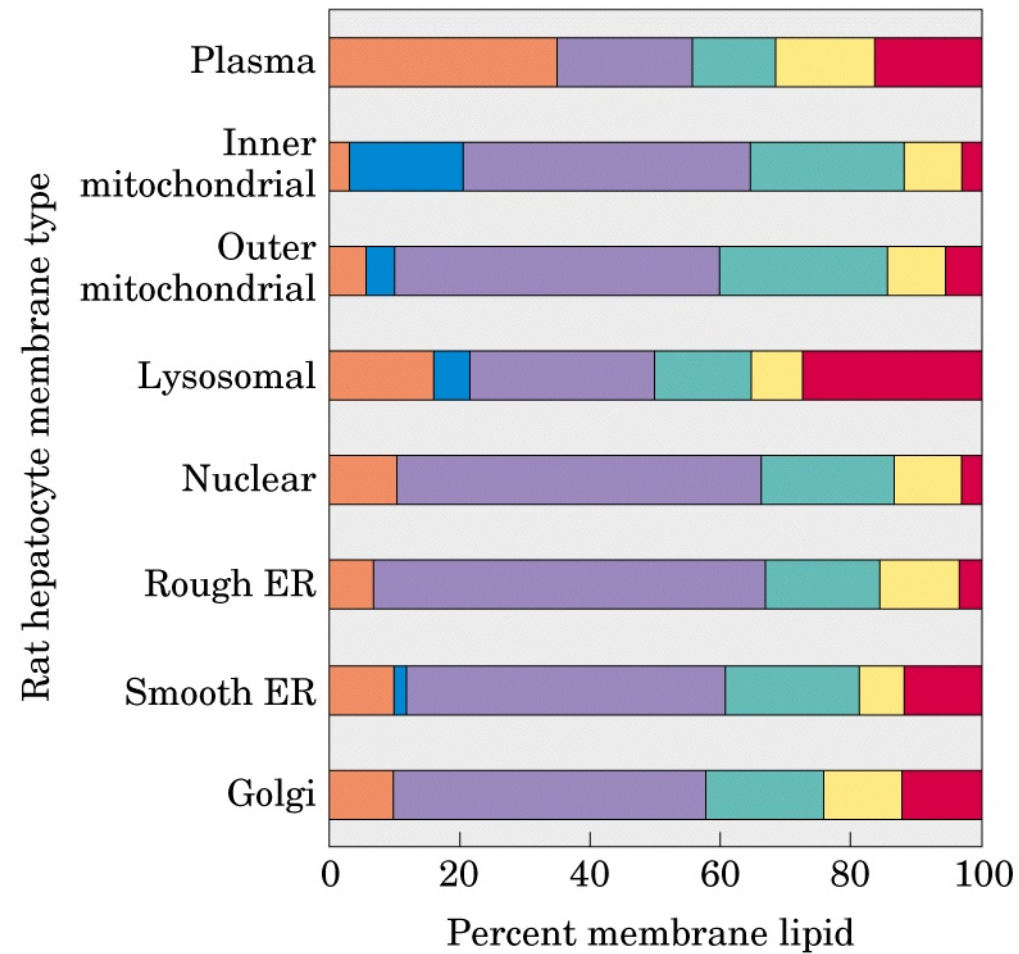
STRUTTURA E FUNZIONE DELLE MEMBRANE

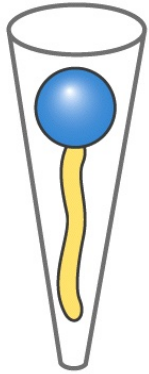


(a)

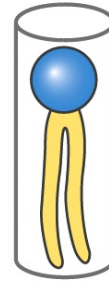




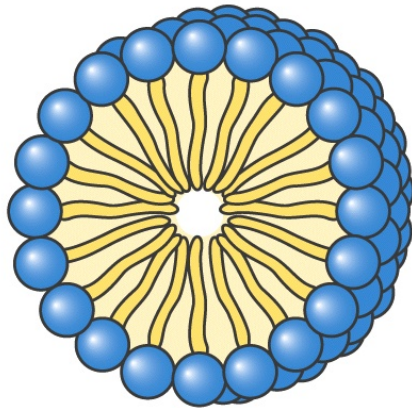




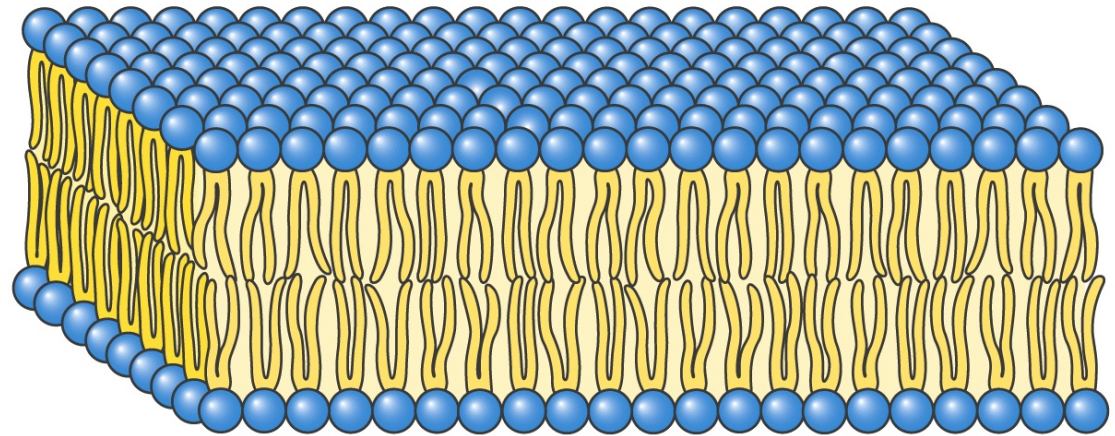
Individual units are wedge-shaped (cross-section of head greater than that of side chain)



Individual units are cylindrical (cross-section of head equals that of side chain)

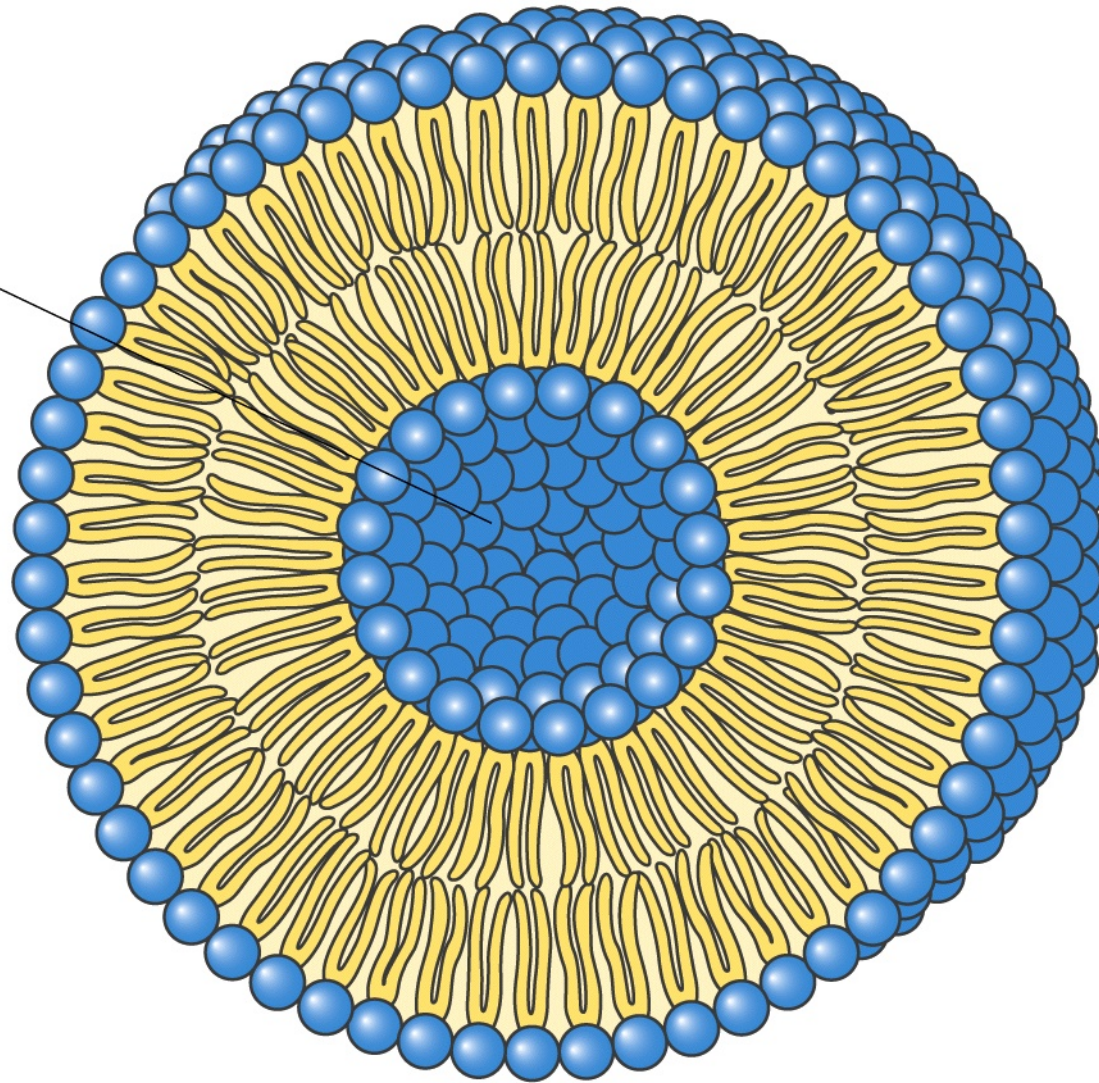


Micelle
(a)

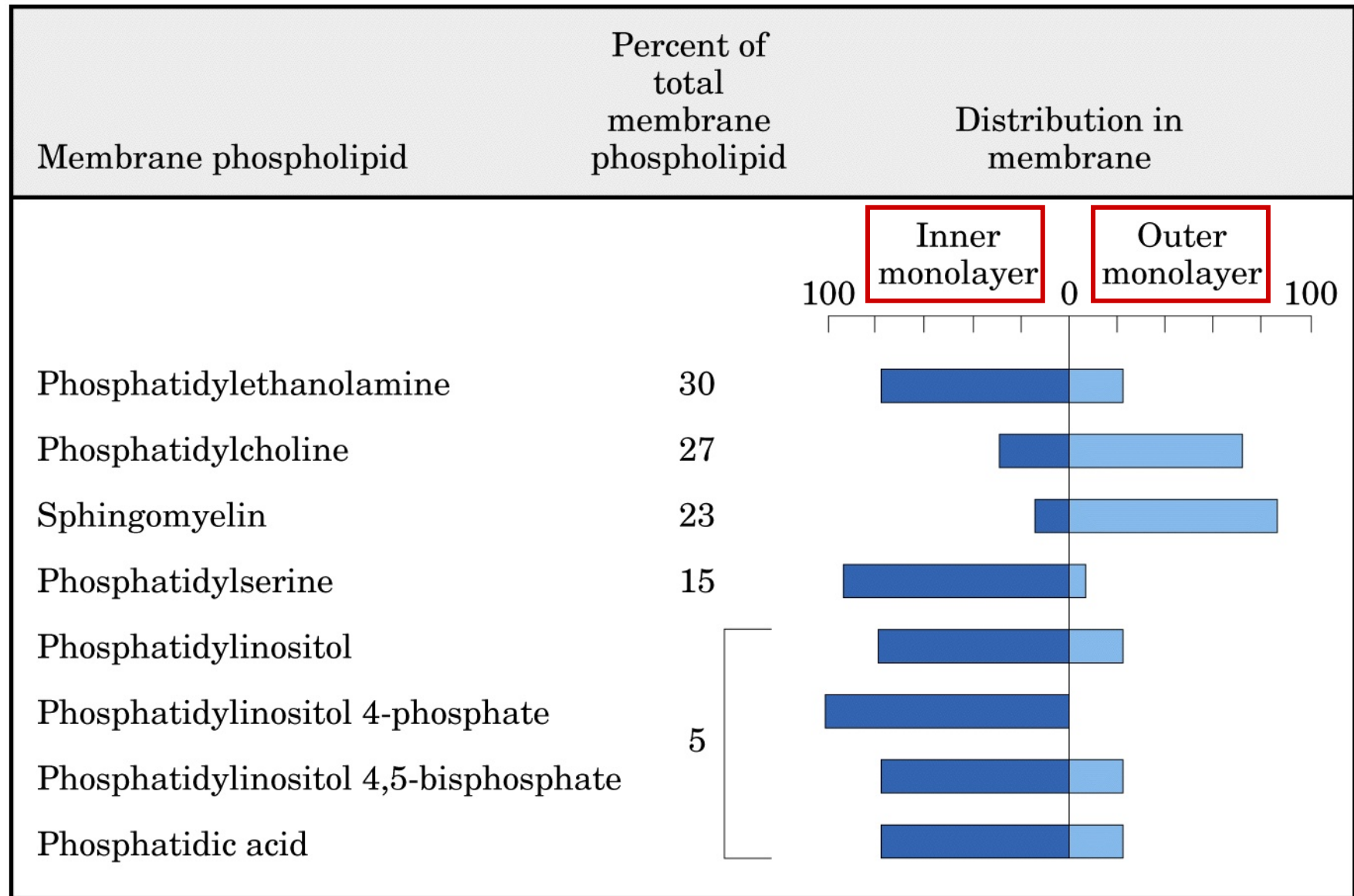


Bilayer
(b)

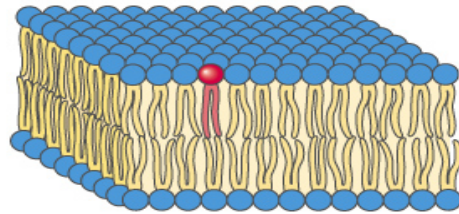
Aqueous
cavity



Liposome
(c)

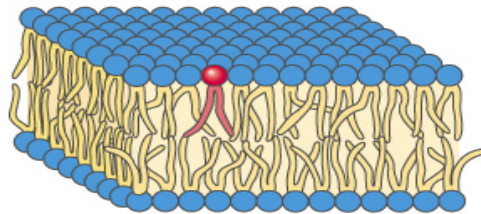


Paracrystalline state (solid)

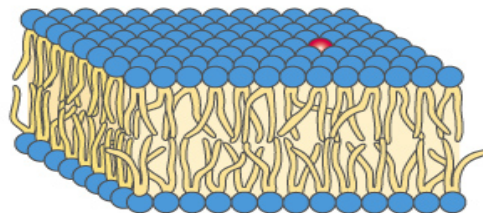


(a)
Heat produces thermal motion of acyl side chains
(solid $\rightarrow$ fluid transition)

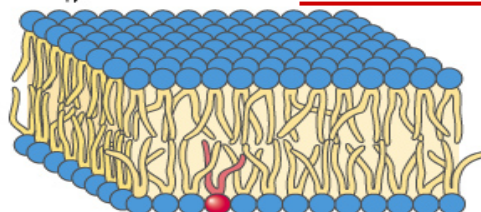
Fluid state



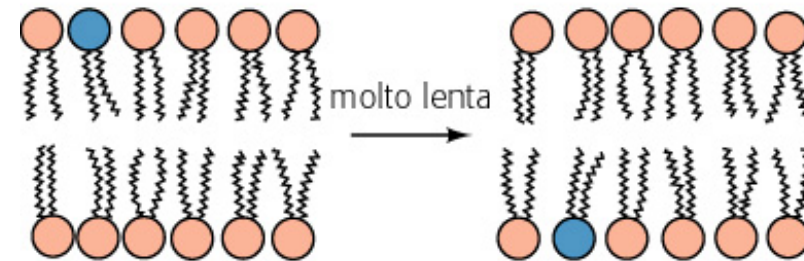
(b)
Lateral diffusion in plane of bilayer



(c)
Transbilayer diffusion ("flip flop")
 $t_{1/2}$ = hours to days (uncatalyzed)
= seconds (flippase catalyzed)



(a) Diffusione trasversale (flip-flop)



(b) Diffusione laterale

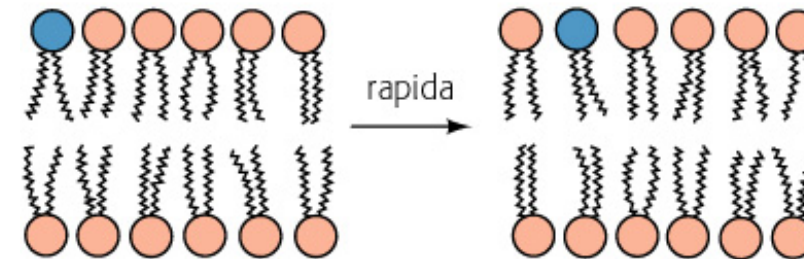


table 12-2

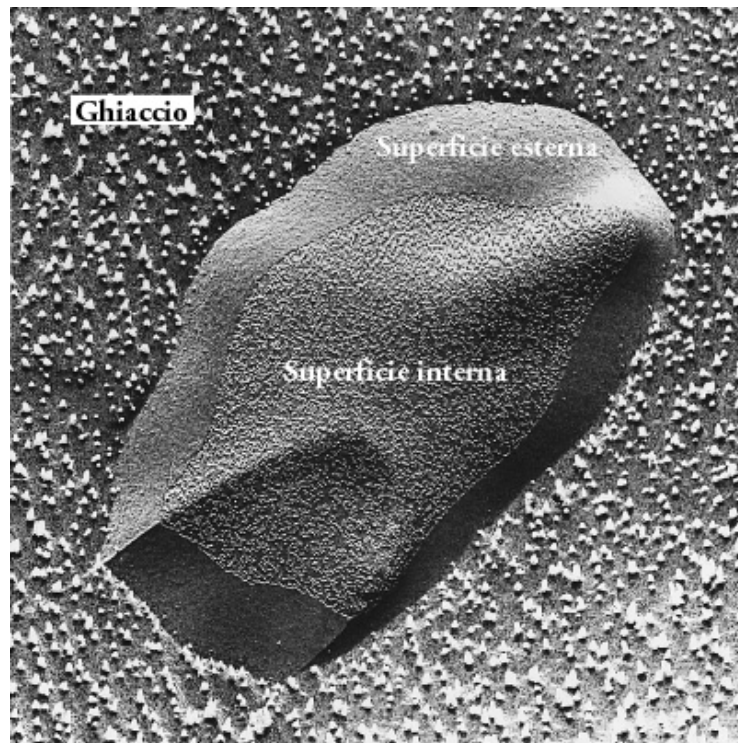
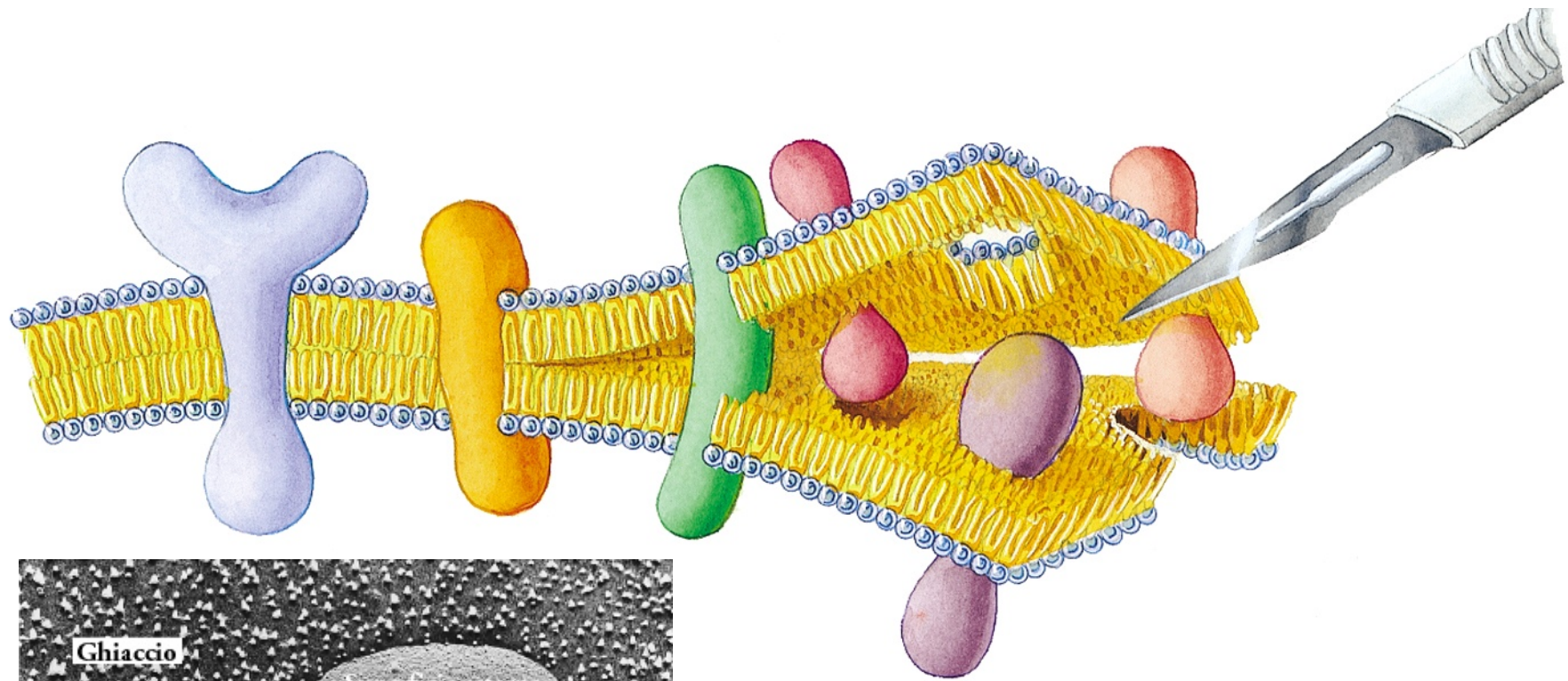
Fatty Acid Composition of *E. coli* Cells Cultured at Different Temperatures

	Percentage of total fatty acids*			
	10 °C	20 °C	30 °C	40 °C
Myristic acid (14:0)	4	4	4	8
Palmitic acid (16:0)	18	25	29	48
Palmitoleic acid (16:1)	26	24	23	9
Oleic acid (18:1)	38	34	30	12
Hydroxymyristic acid	13	10	10	8
Ratio of unsaturated to saturated [†]	2.9	2.0	1.6	0.38

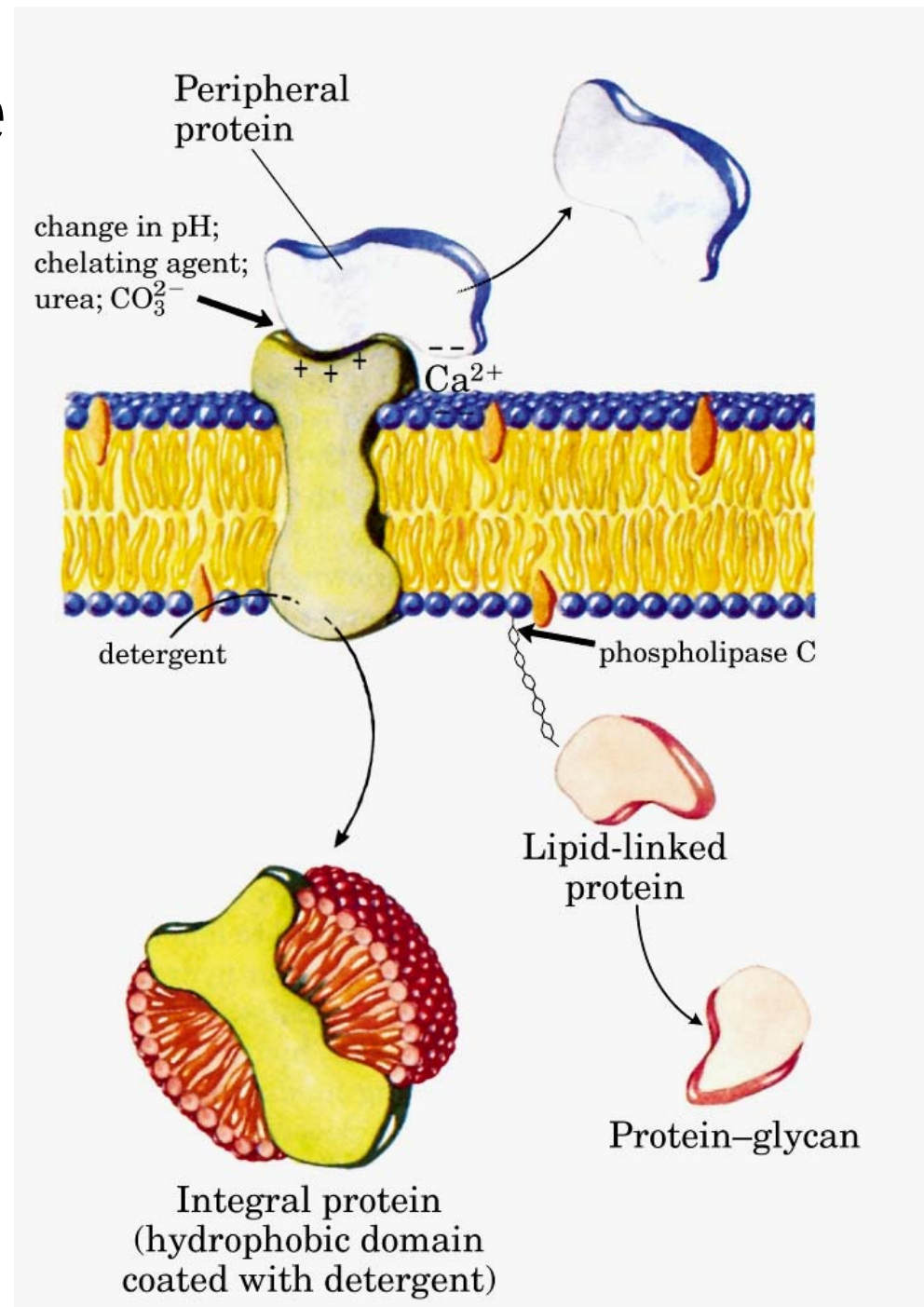
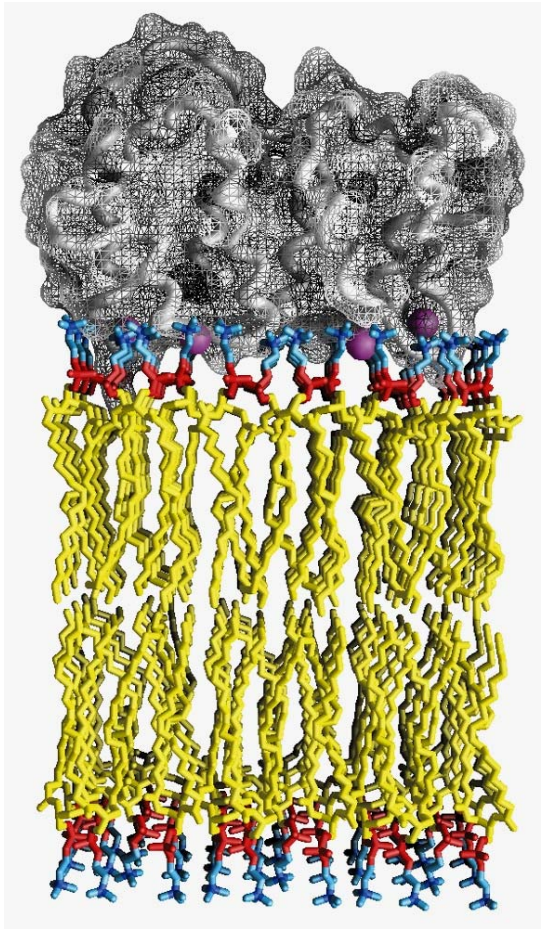
Source: Data from Marr, A.G. & Ingraham, J.L. (1962) Effect of temperature on the composition of fatty acids in *Escherichia coli*. *J. Bacteriol.* **84**, 1260.

*The exact fatty acid composition depends not only on growth temperature but on growth stage and growth medium composition.

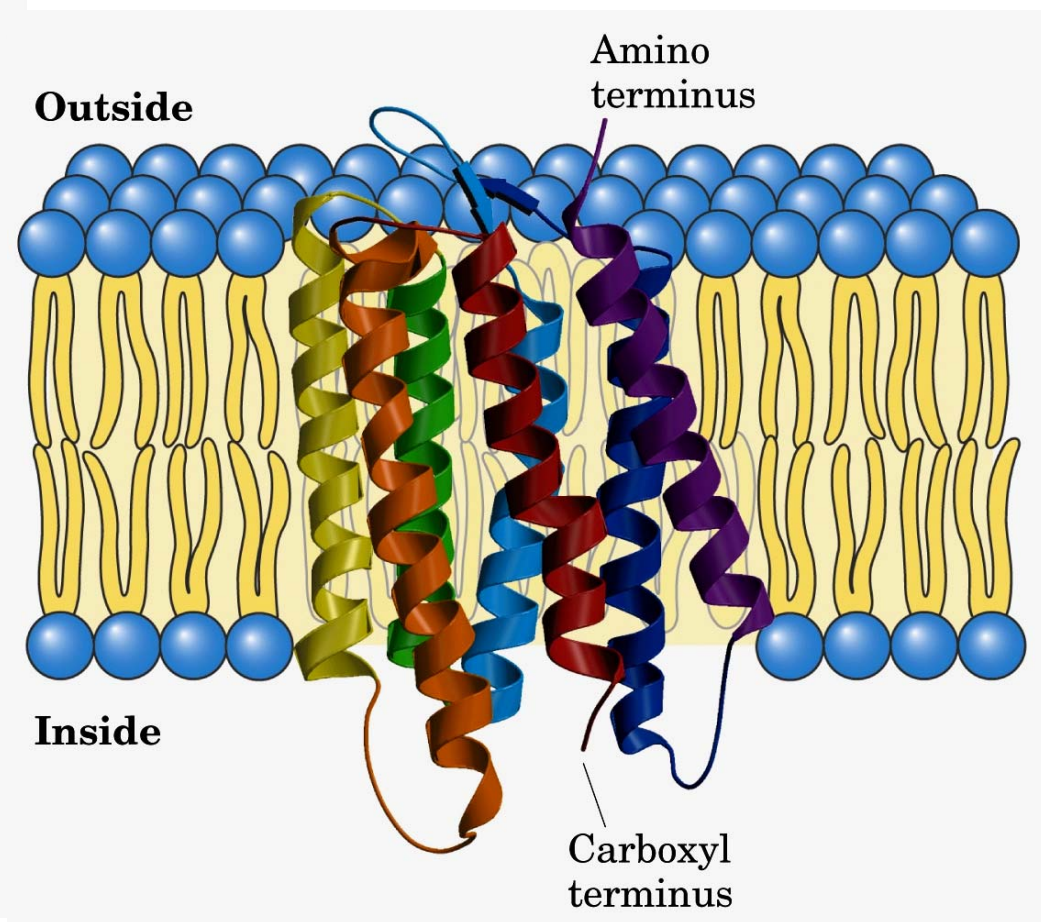
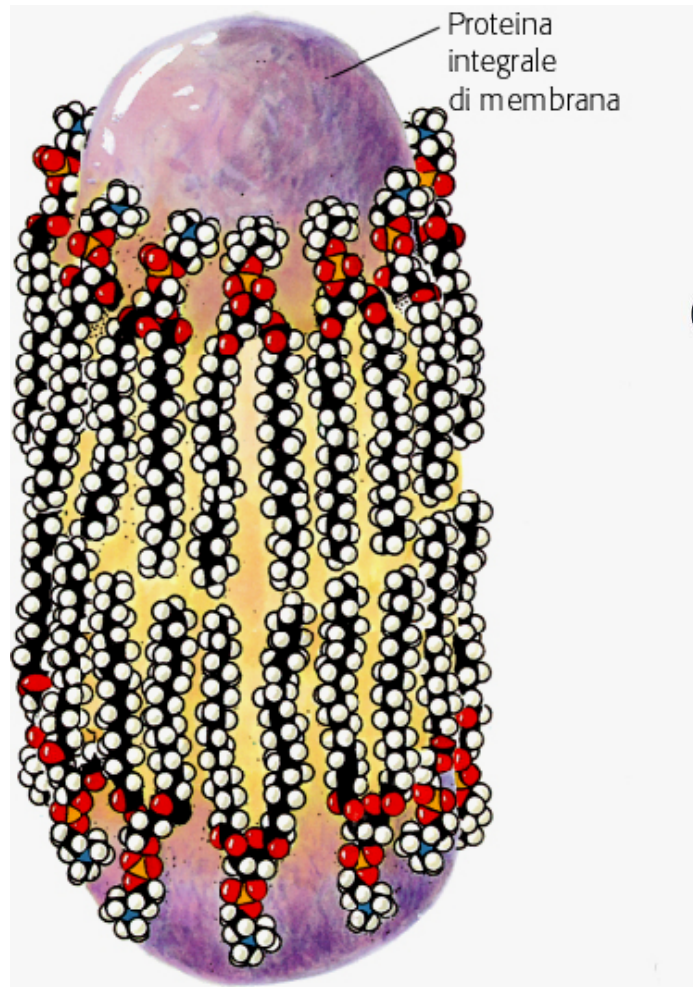
[†]Calculated as the total percentage of 16:1 plus 18:1 divided by the total percentage of 14:0 plus 16:0. Hydroxymyristic acid was omitted from this calculation.



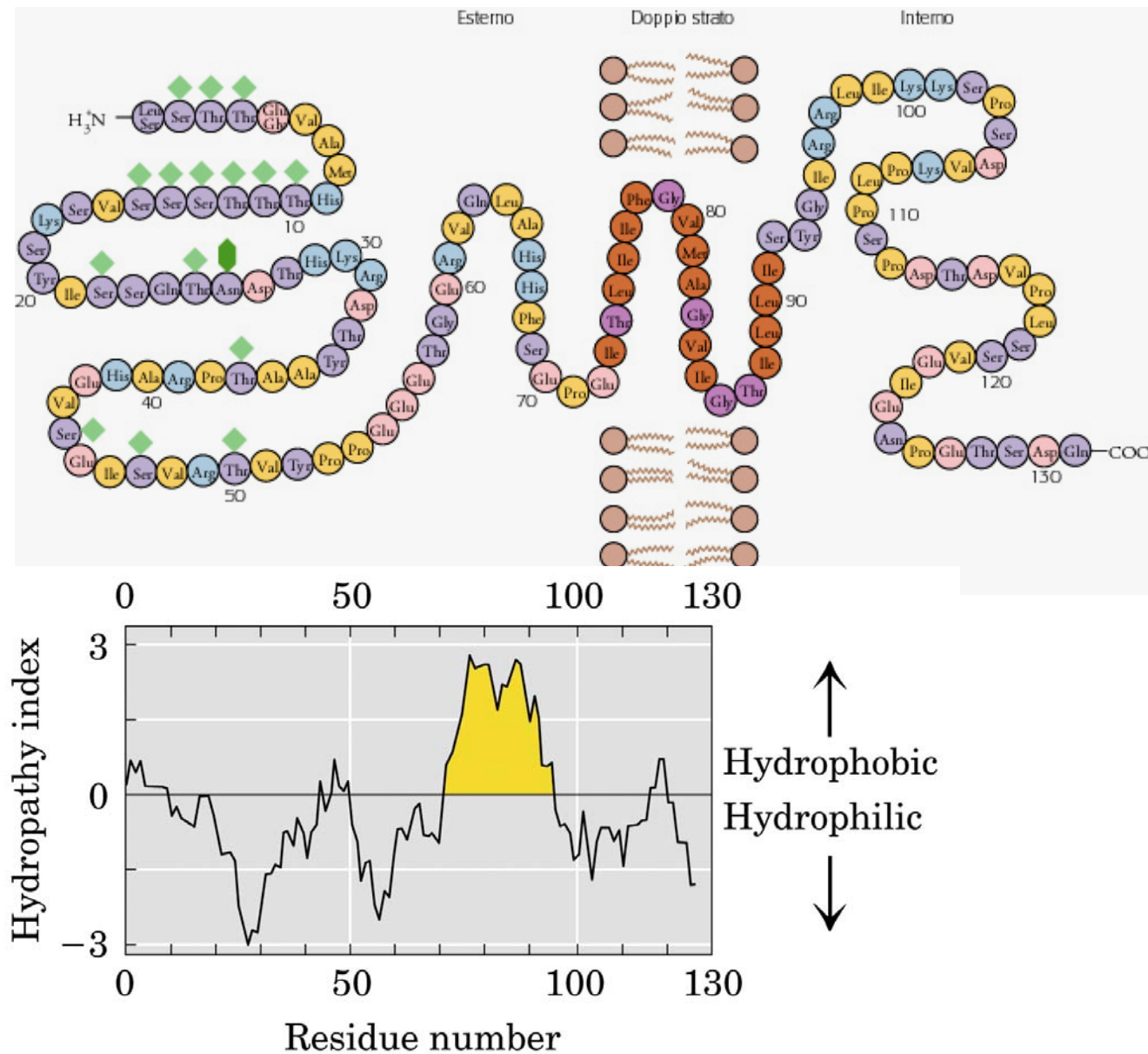
Proteine periferiche e integrali



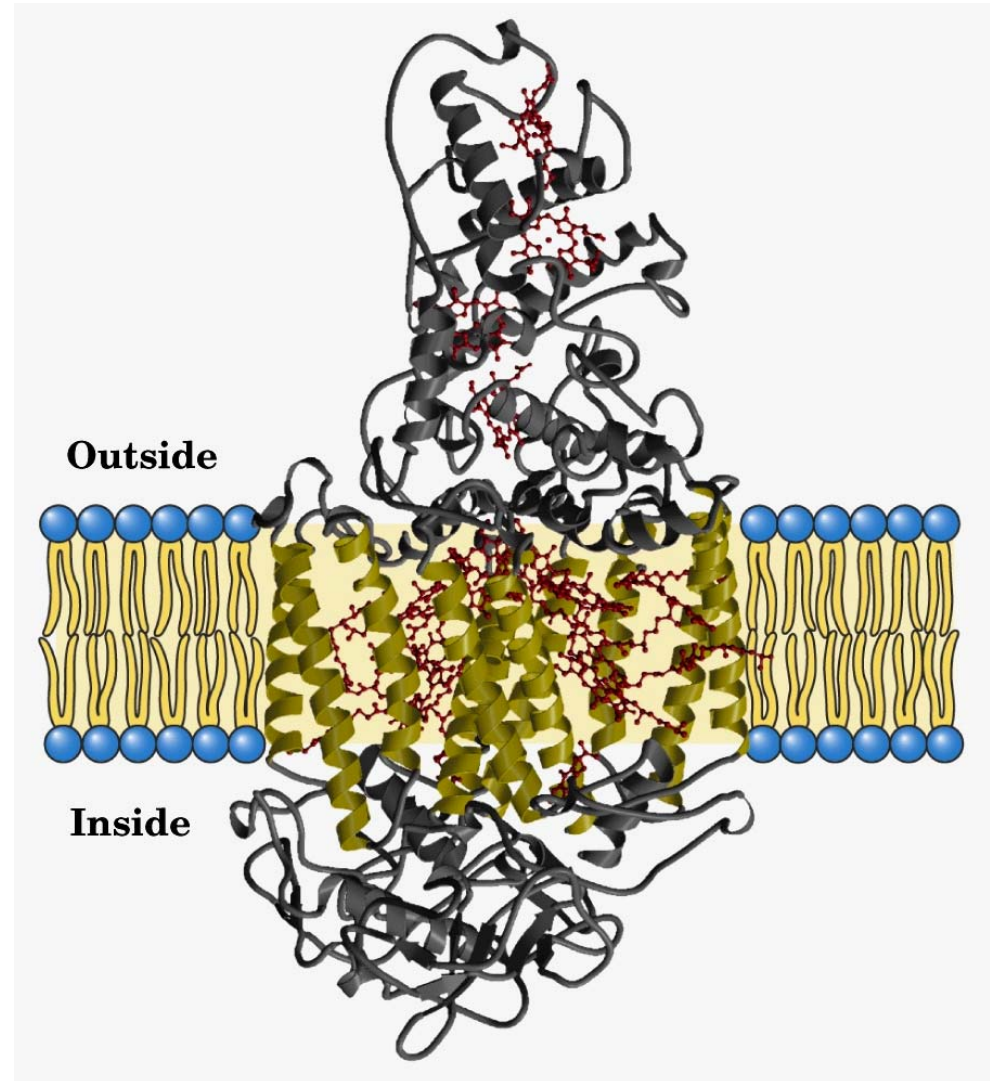
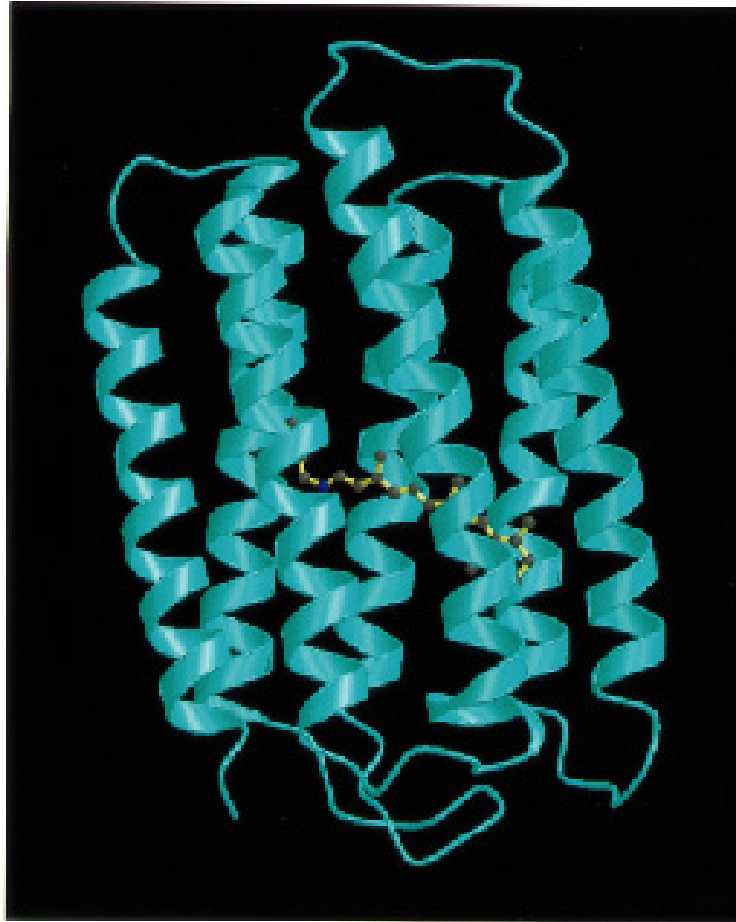
Le proteine integrali

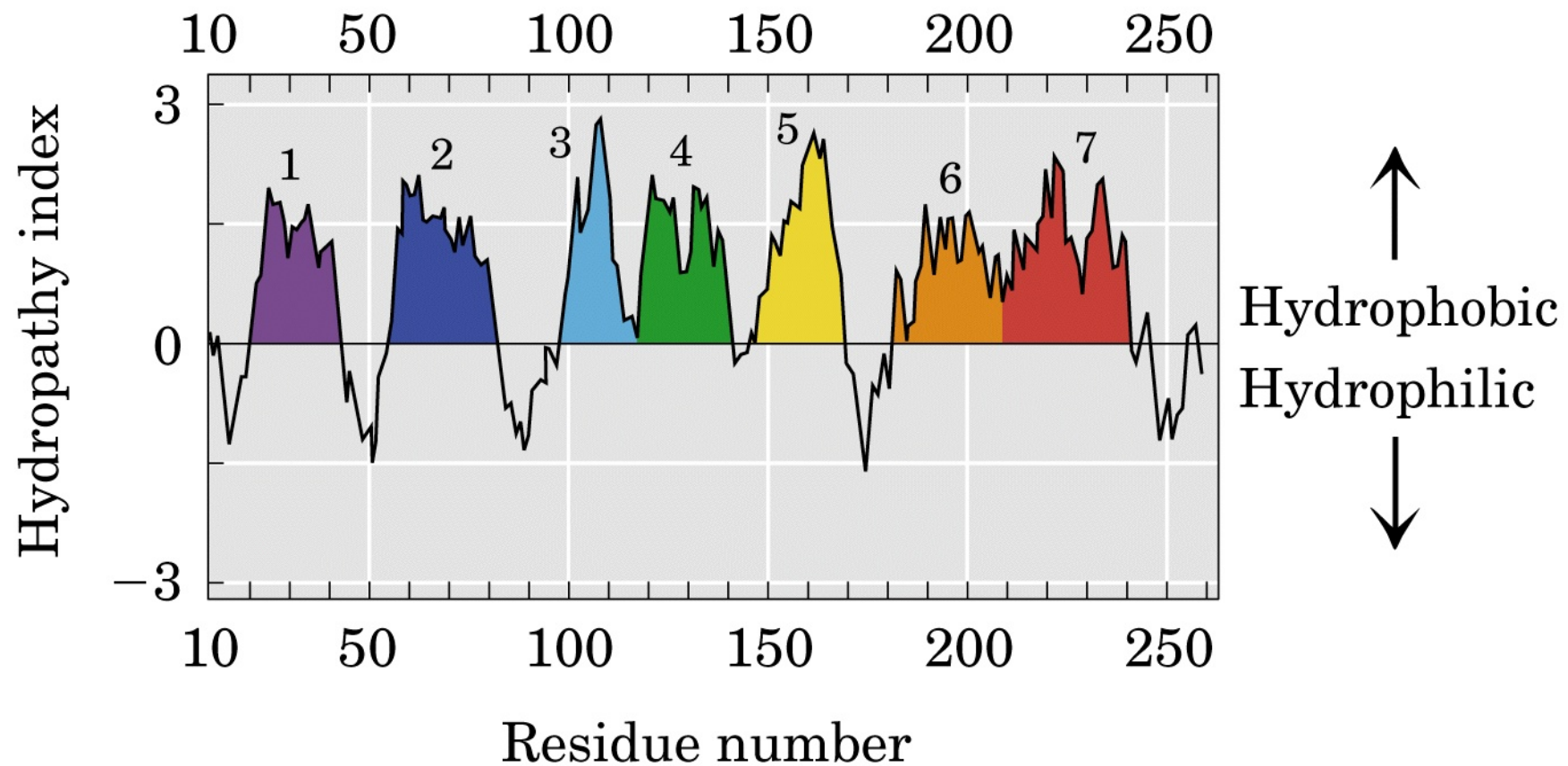


La glicoforina A



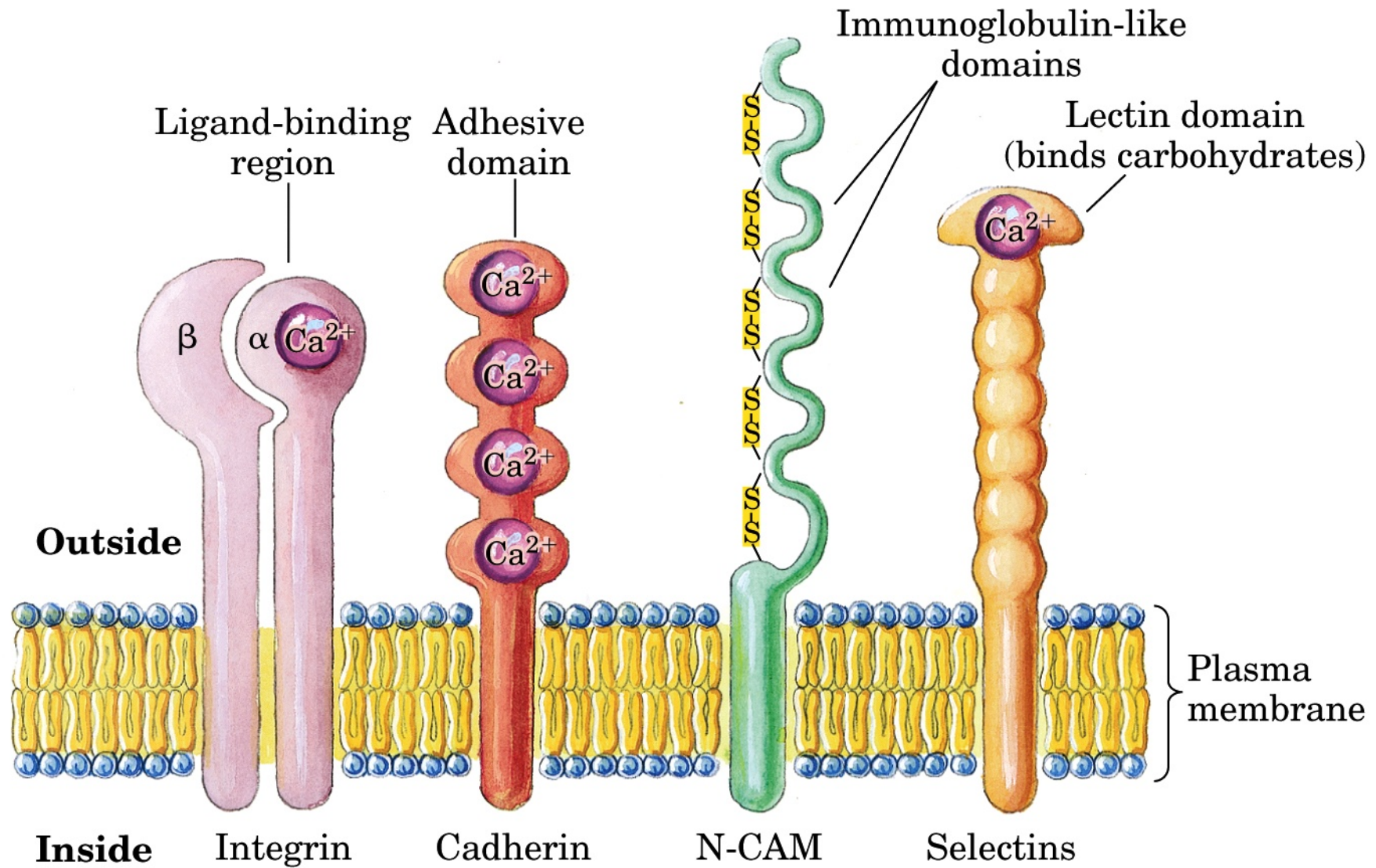
Fasci di eliche transmembrana



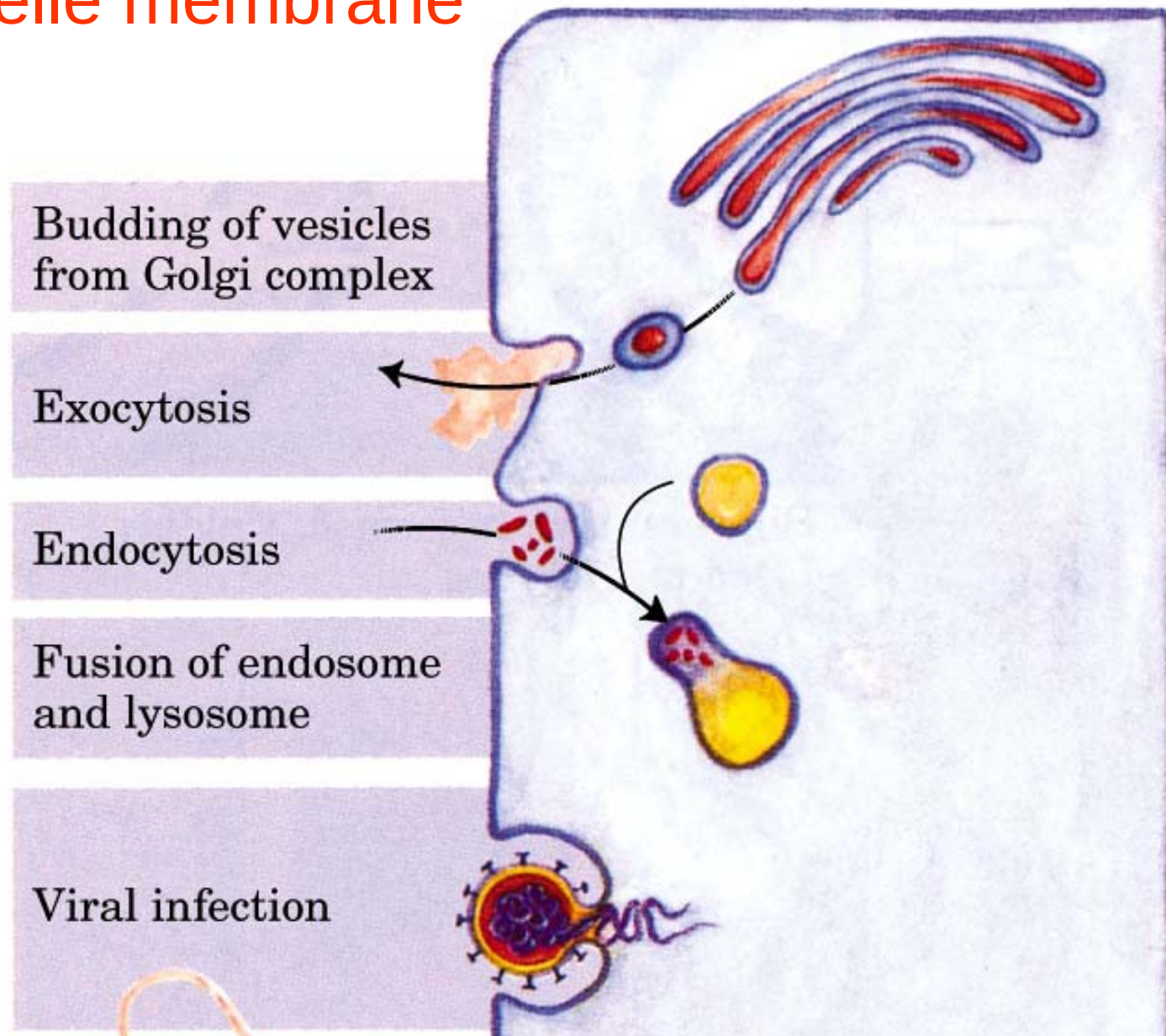


Bacteriorhodopsin

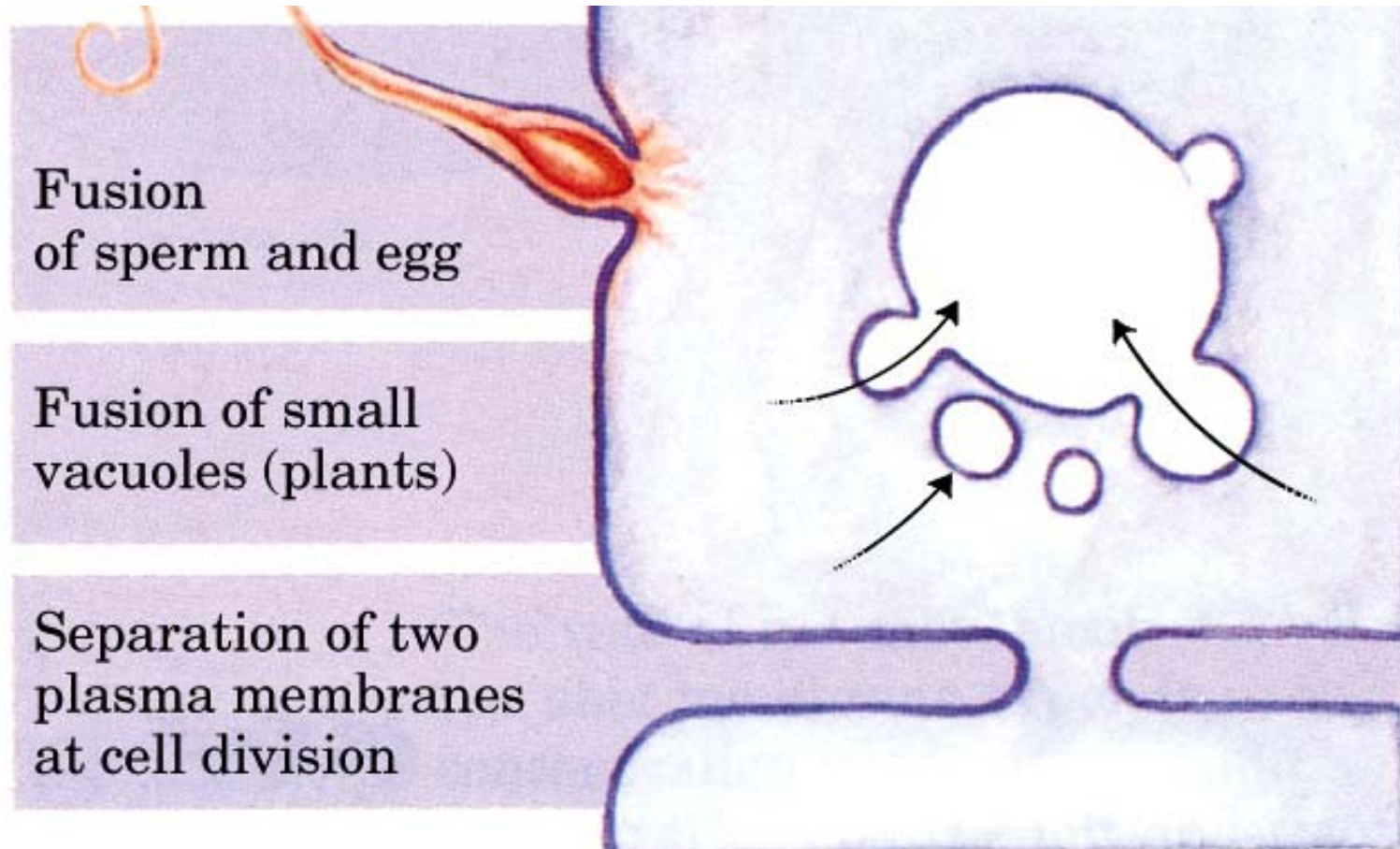
(b)



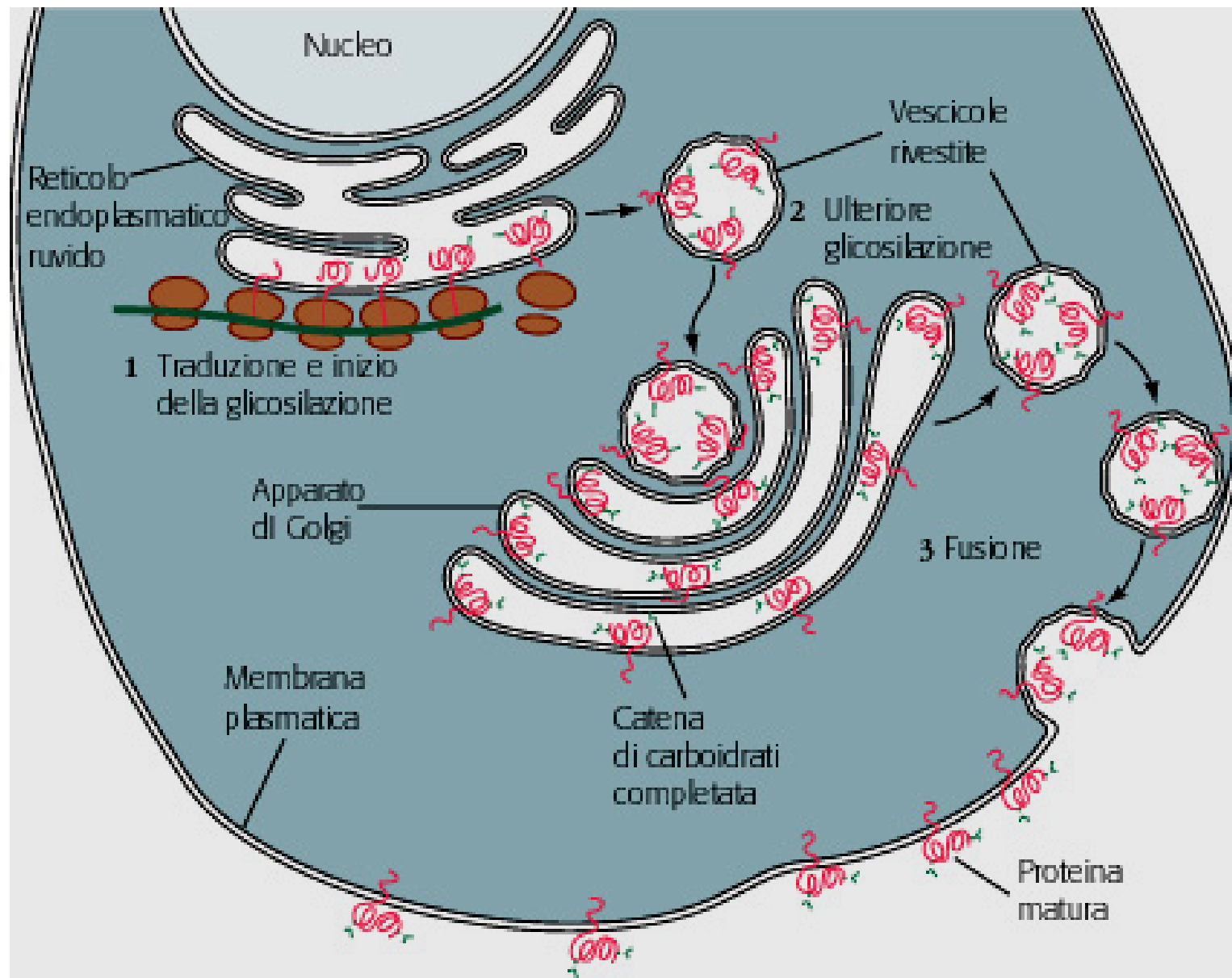
Fusione delle membrane



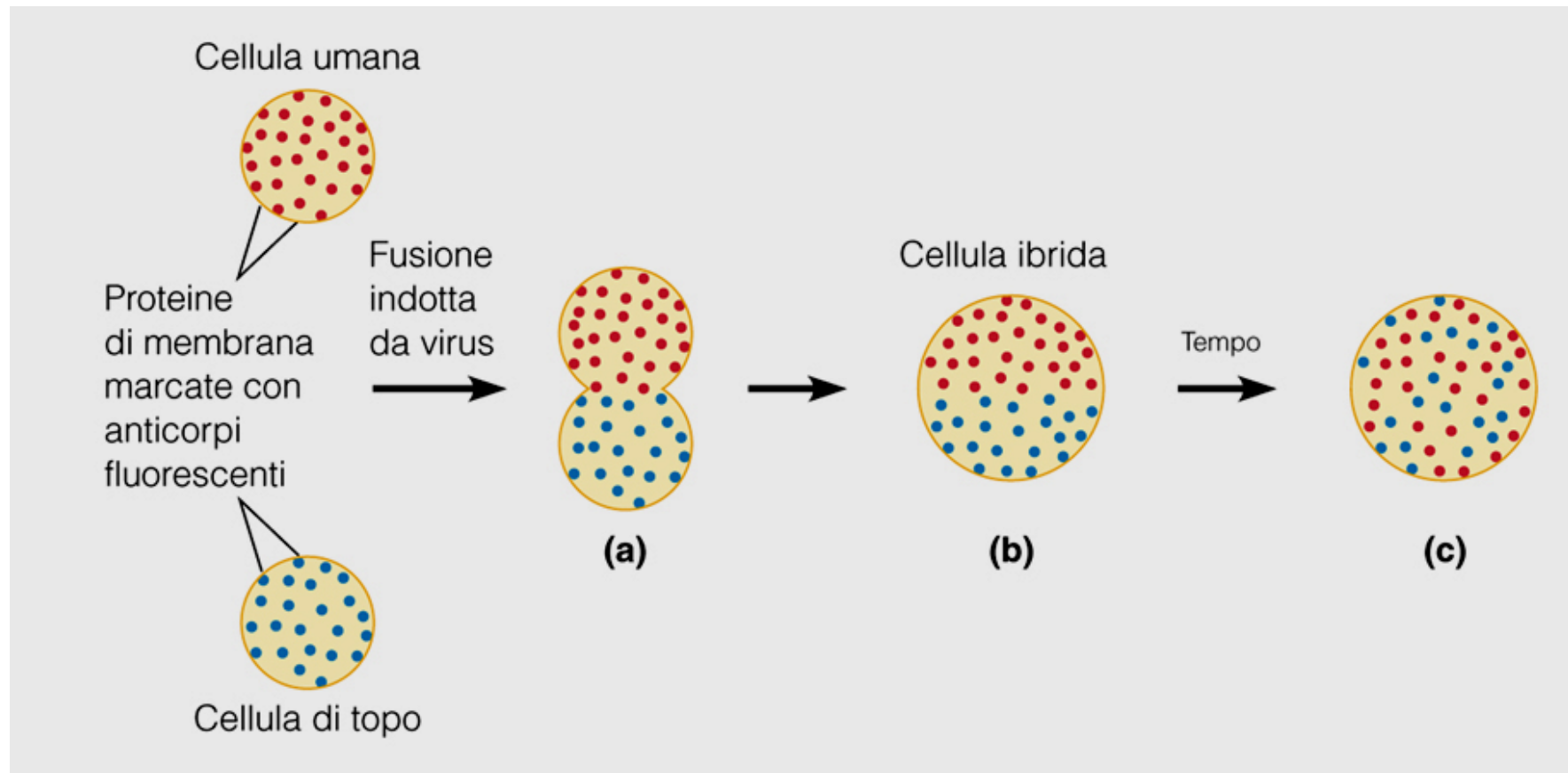
Fusione delle membrane



Trasporto delle proteine sulla plasmamembrana



Dimostrazione sperimentale della **fluidità di membrana**

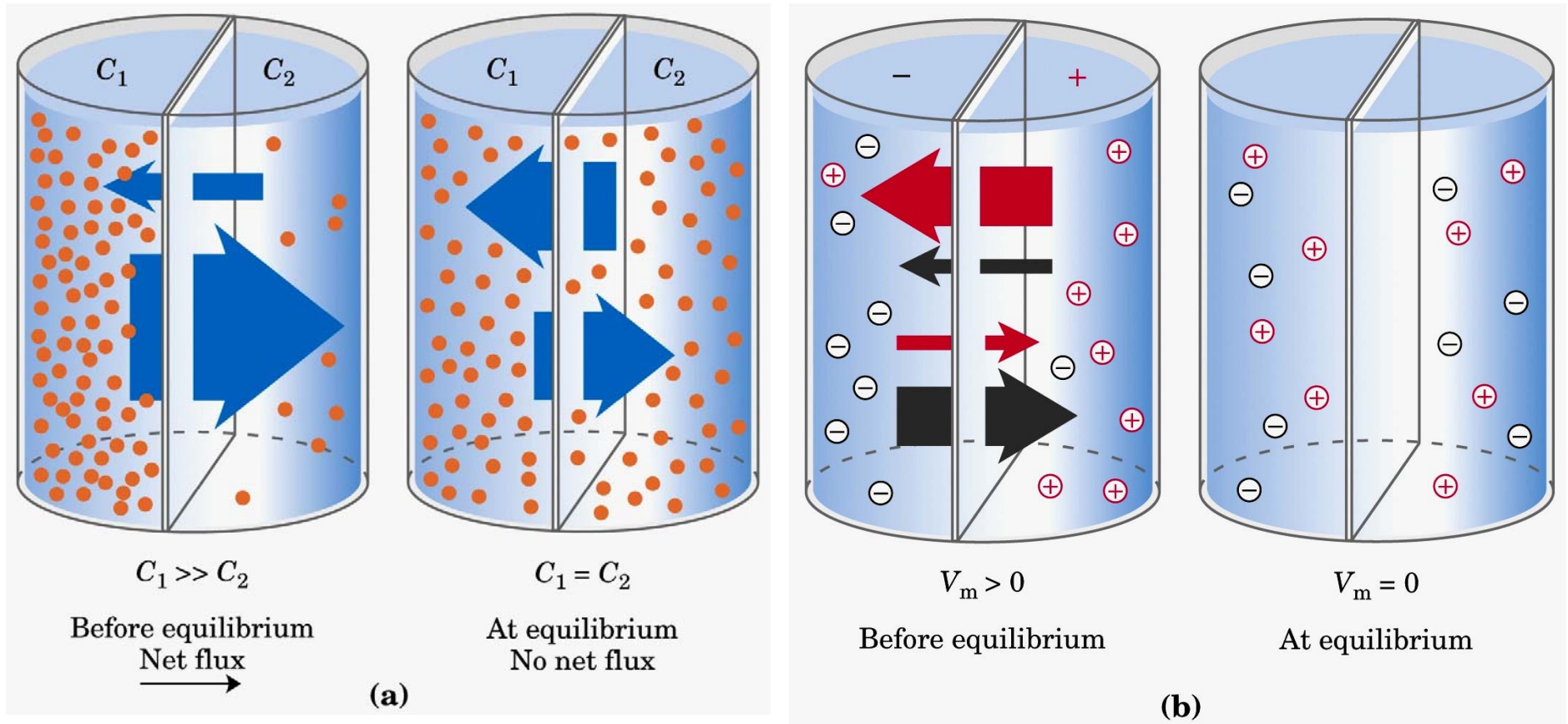


TRASPORTO ATTRAVERSO LE MEMBRANE

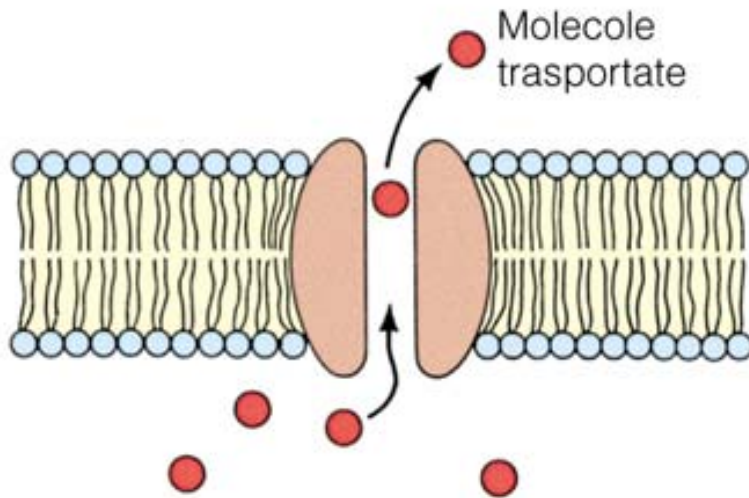
Il trasporto può essere **mediato** o **non mediato**

Il trasporto mediato può essere **passivo** o **attivo**

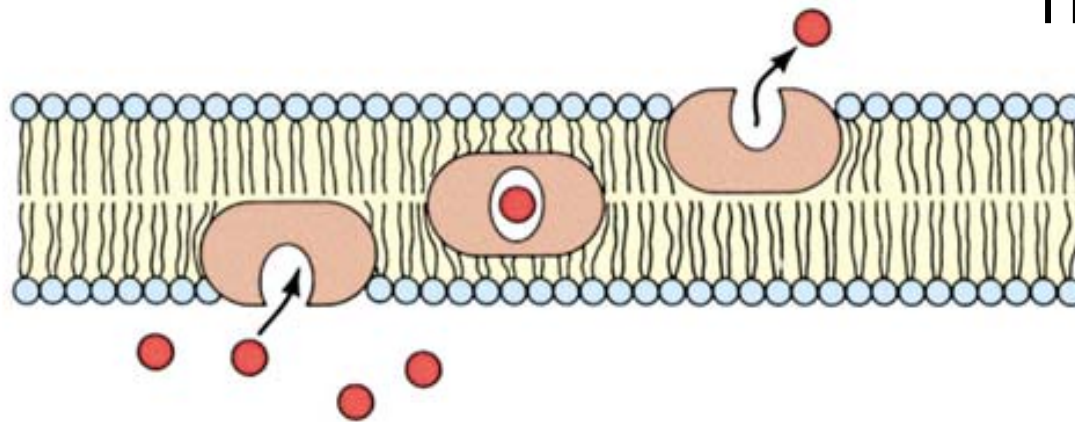
Trasporto passivo (o diffusione passiva)



Trasporto facilitato (o diffusione facilitata)



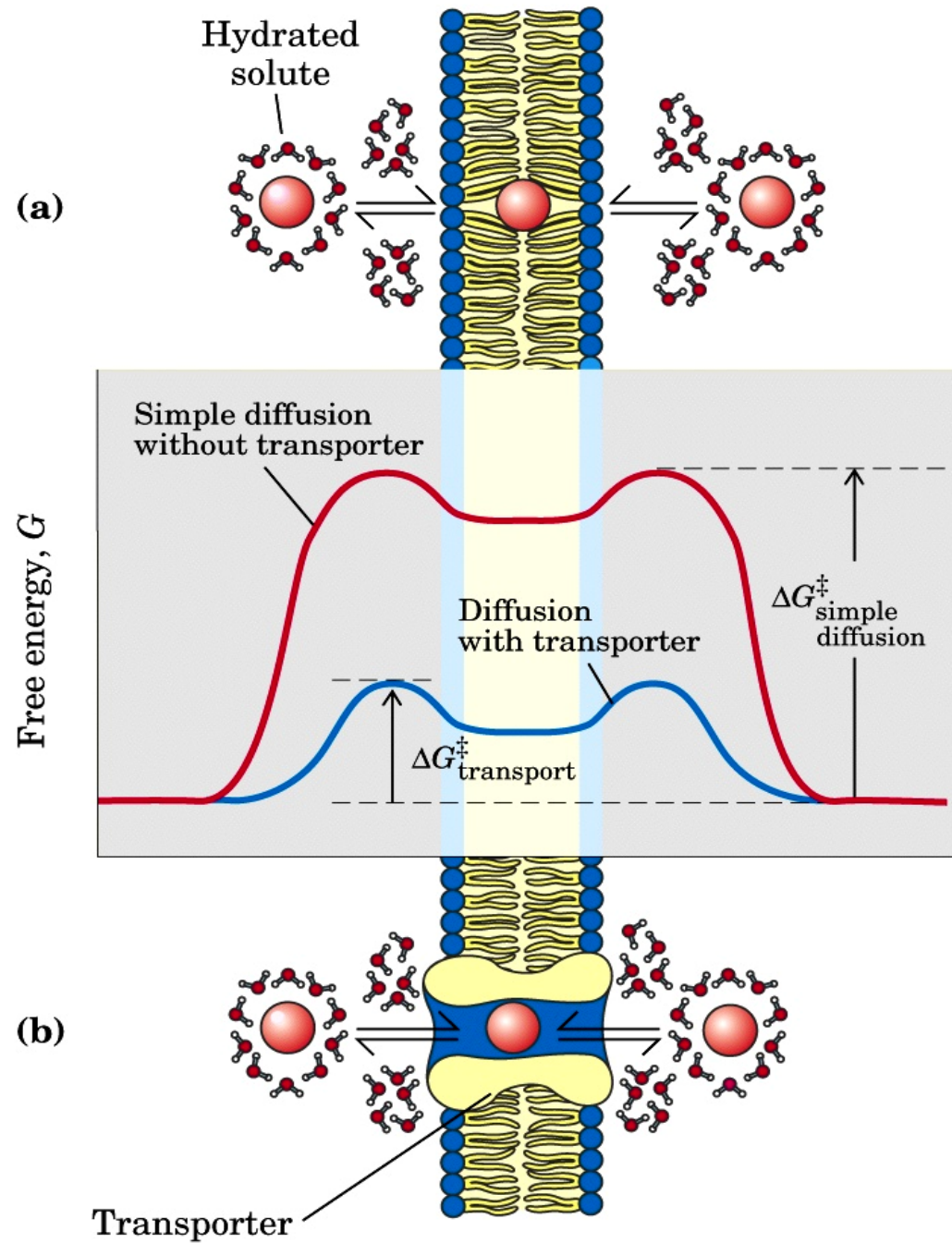
(a) Proteine canale



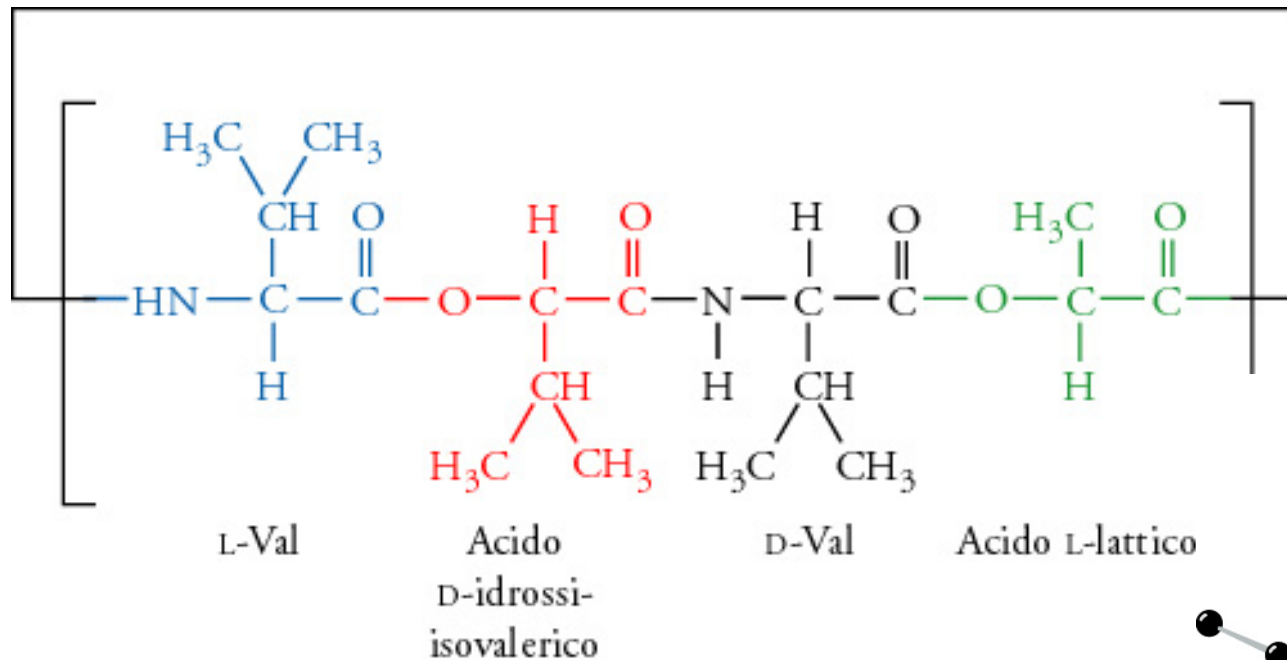
(b) Molecole trasportatrici

Quando il trasporto passivo non è sufficiente a soddisfare le necessità cellulari, ad es. perché il **coefficiente di permeabilità** è troppo basso, vengono impiegati PORI (o canali) oppure **TRASPORTATORI**

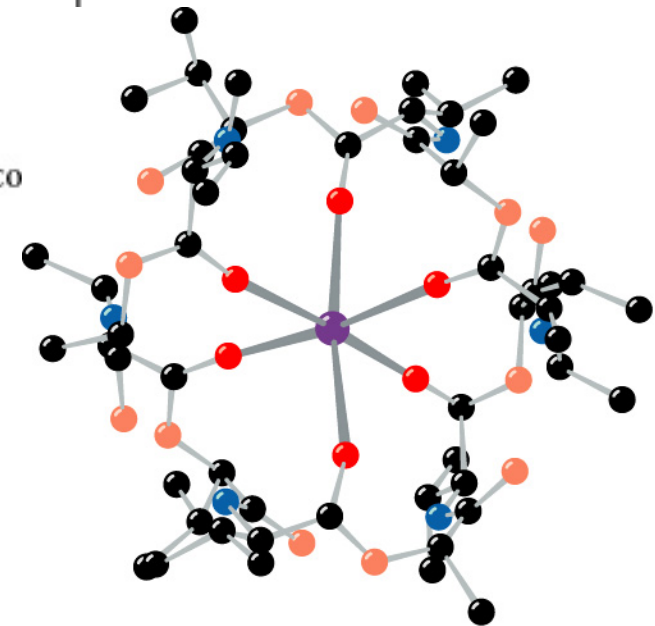
L'uso di un
canale facilitatore
abbassa il ΔG°
del trasporto



Gli **ionofori** sono mediatori di trasporto facilitato di ioni attraverso le membrane



Valinomicina (un antibiotico)



Casi in cui l'equilibrio NON corrisponde alla situazione di uguale concentrazione

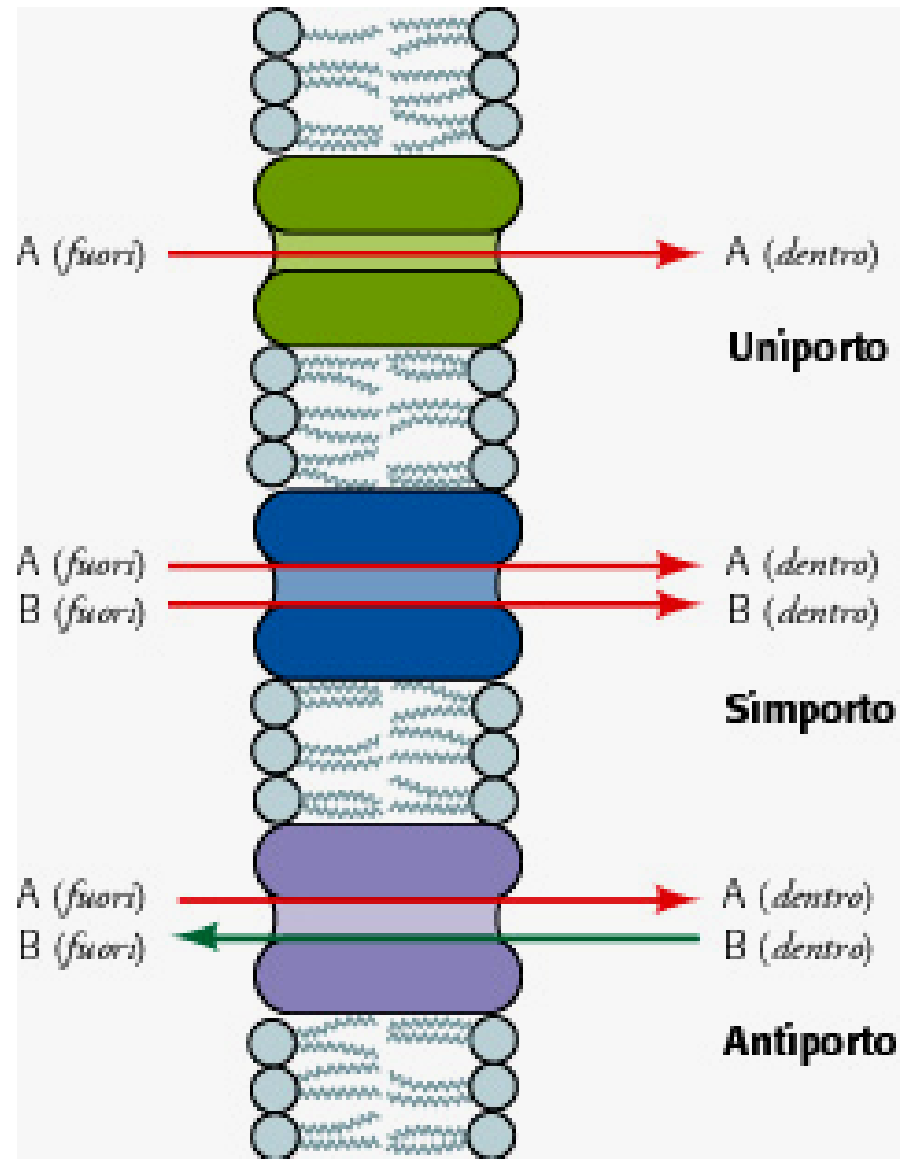
1. Una sostanza può trovarsi sia **libera** che **legata** ad una macromolecola confinata da una parte della membrana (es. ossigeno-emoglobina)
2. La presenza di un **potenziale elettrico** attraverso la membrana influenza la distribuzione di ioni (ad es. membrana mitocondriale)
3. Se il trasporto è **accoppiato** ad un processo termodinamicamente favorito (ad es. trasporto attivo)

Trasporto attivo

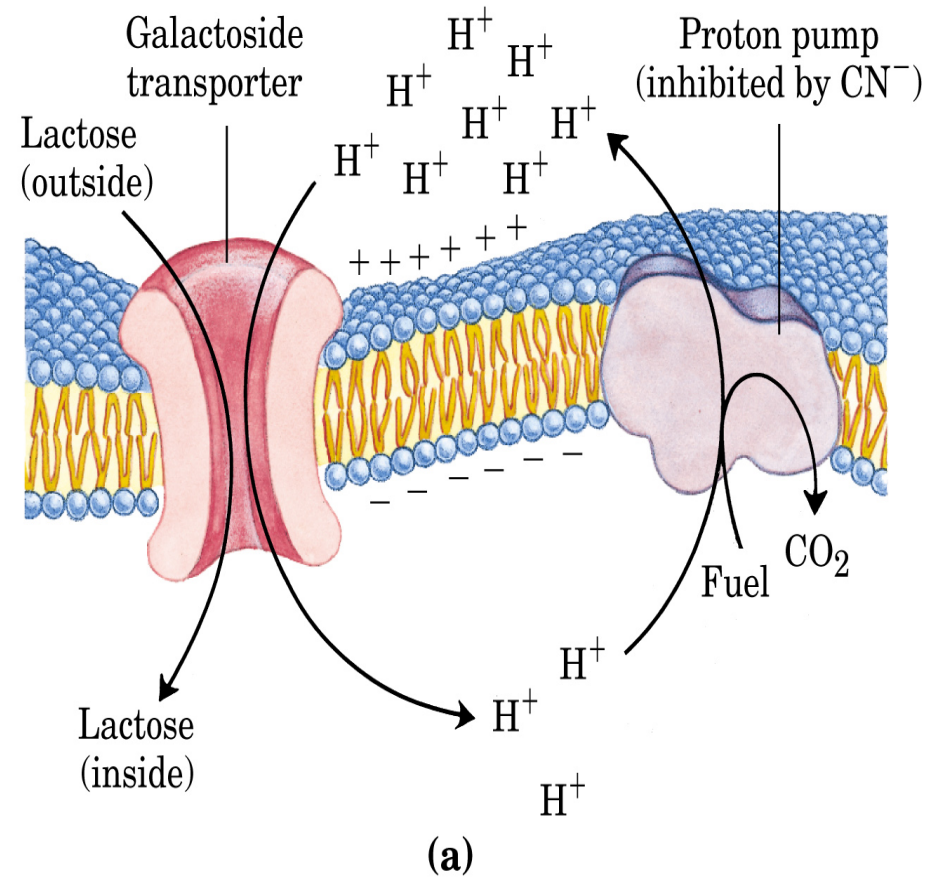
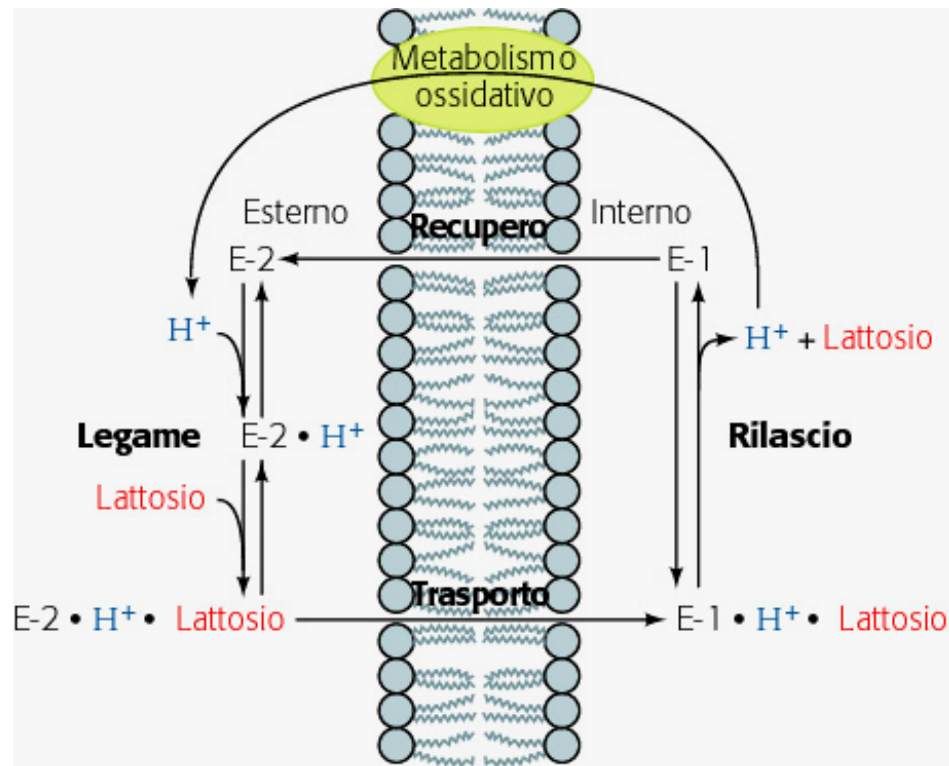
Nel trasporto attivo le sostanze si muovono
attraverso la membrana
CONTRO un gradiente di concentrazione.

Per questo tipo di trasporto è necessario
impiegare **ENERGIA**

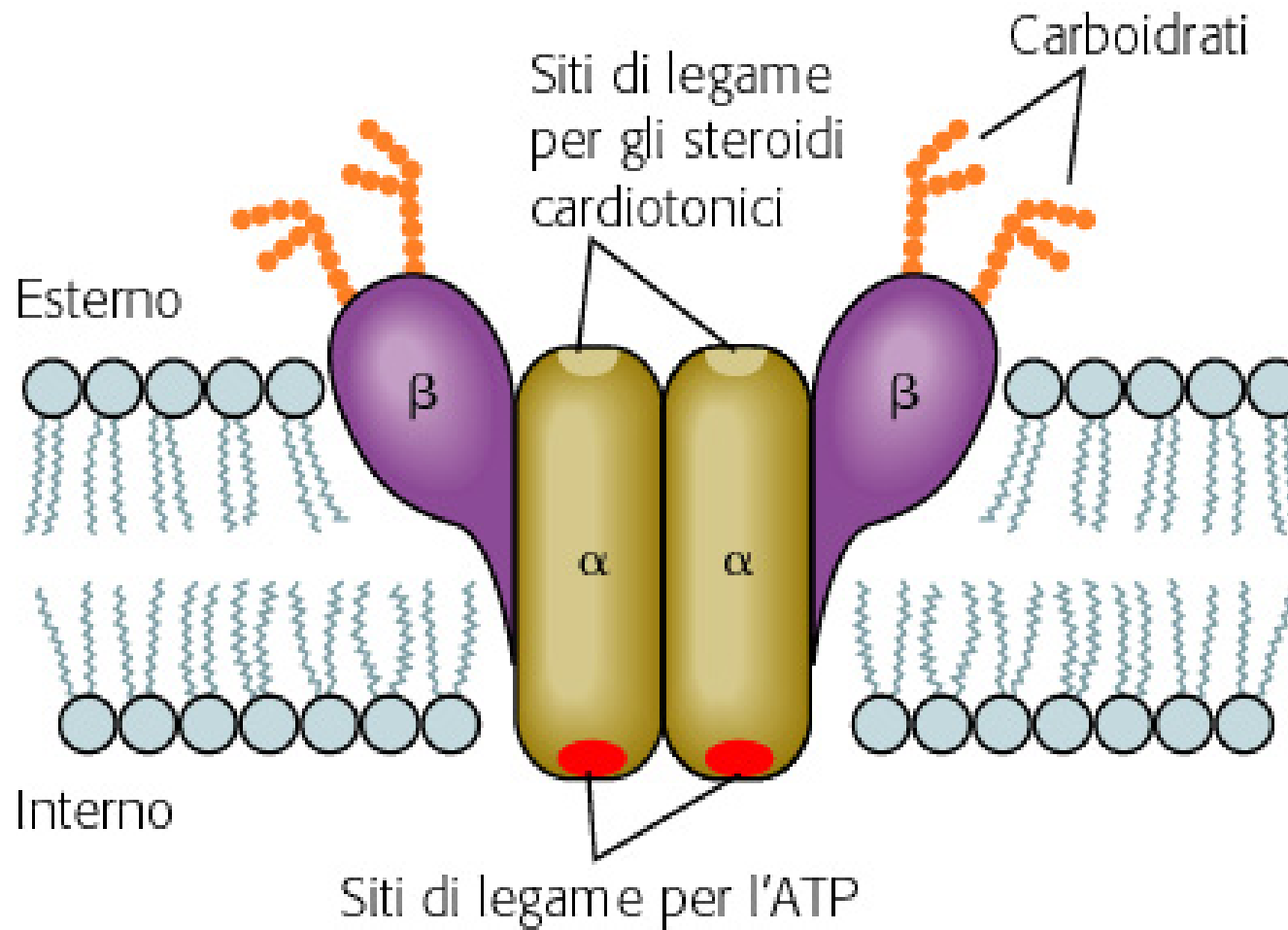
I sistemi di traslocazione sono di diversi tipi



Trasporto guidato dal gradiente ionico



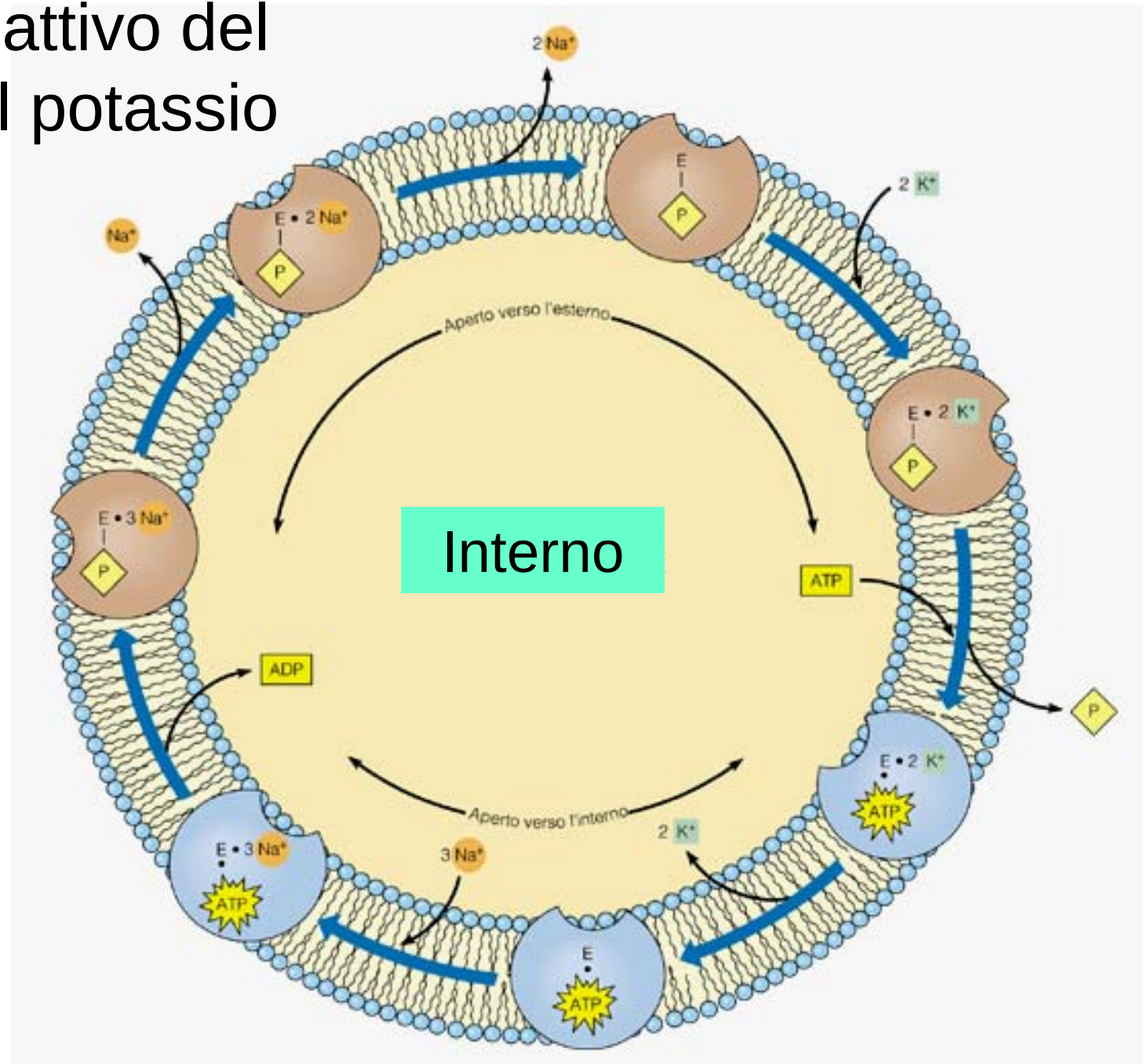
La $(\text{Na}^+\text{K}^+)\text{ATPasi}$

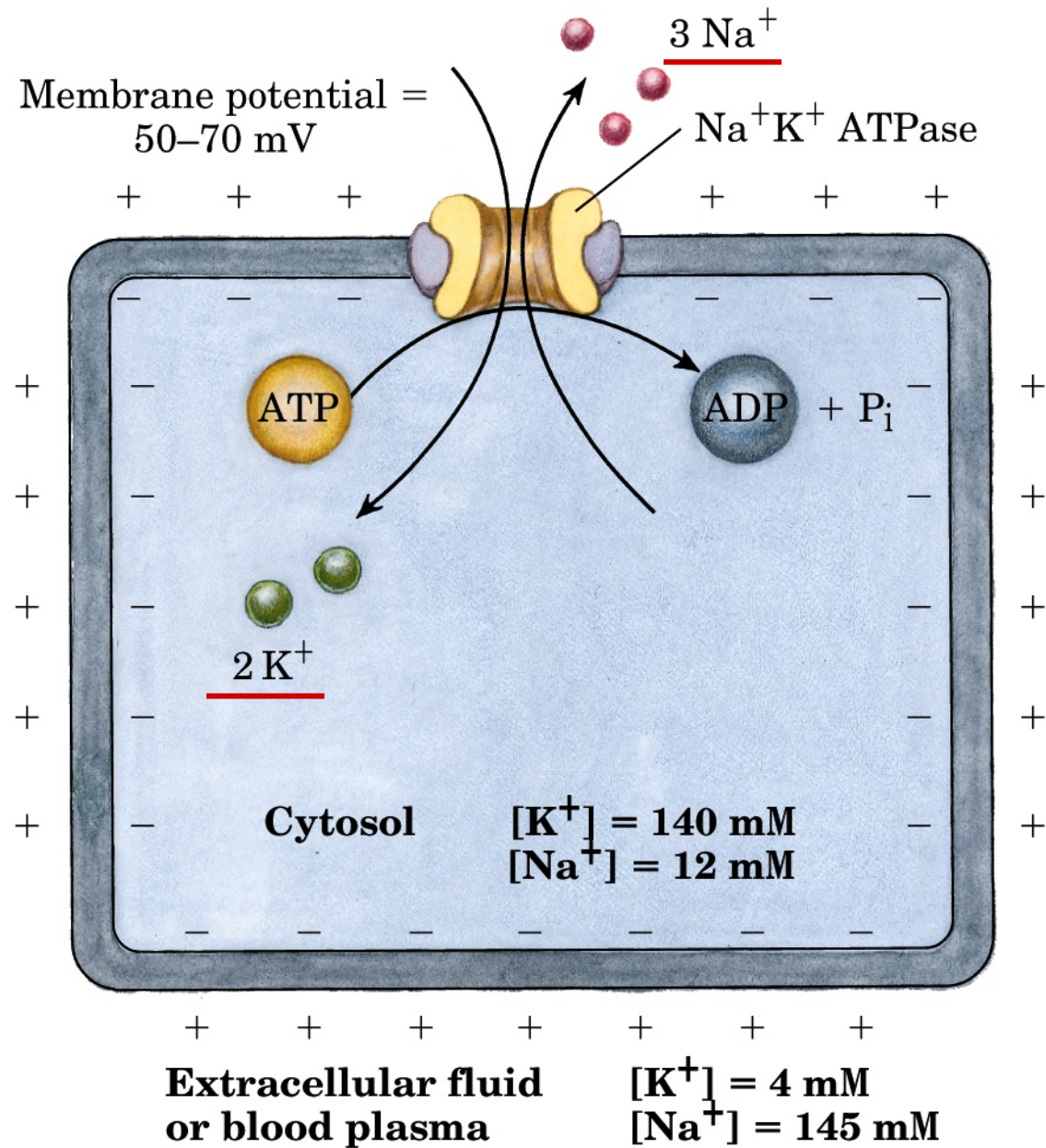


Trasporto attivo del sodio e del potassio

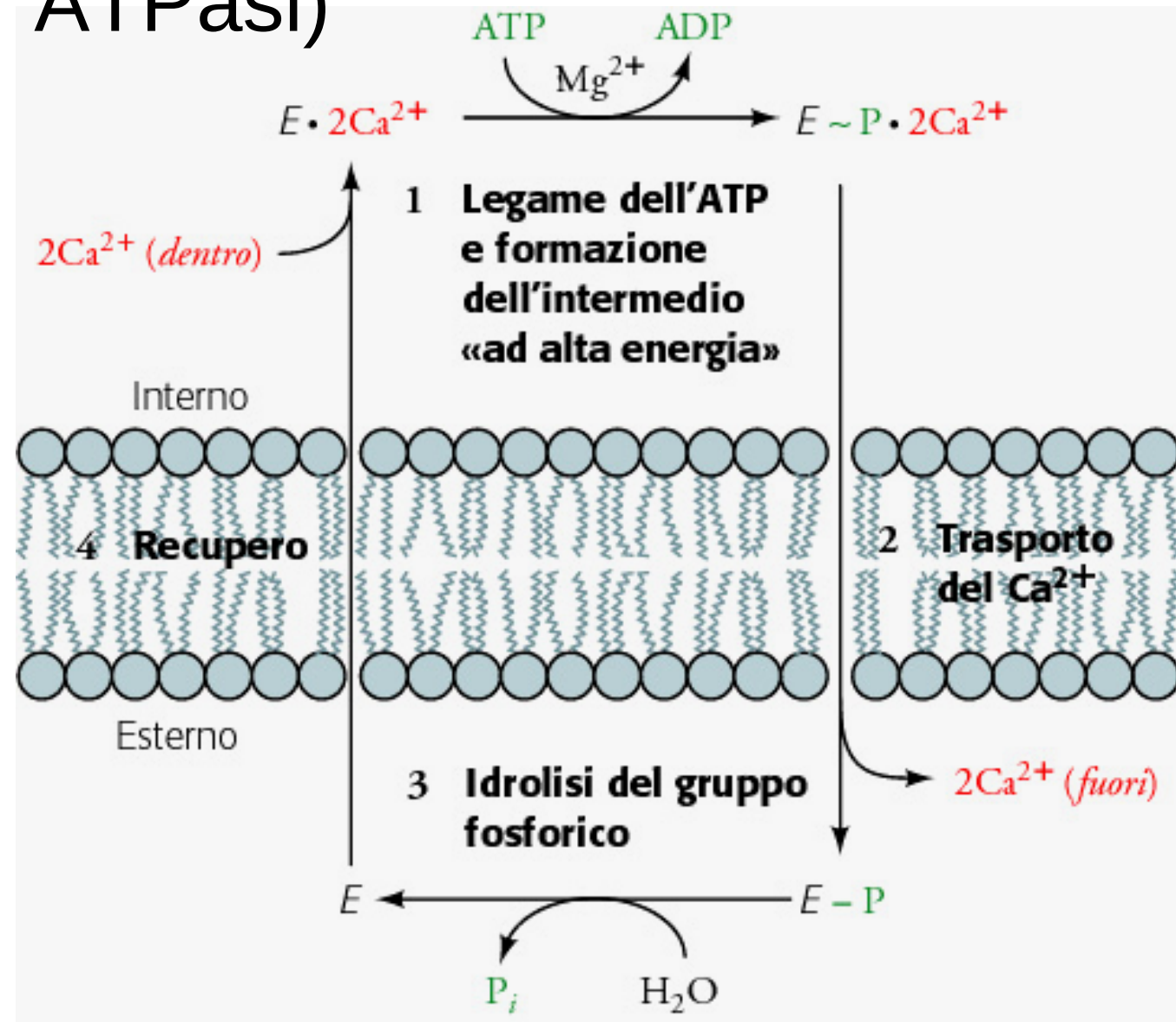
3 x Na⁺ ●

2 x K⁺ ■



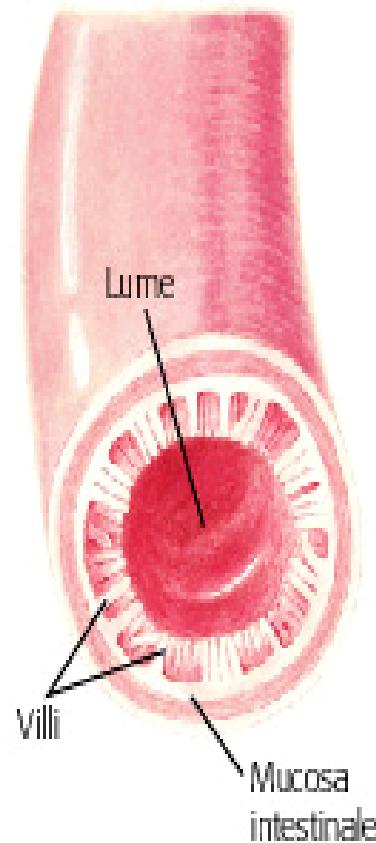


La pompa del calcio (Ca^{2+} ATPasi)

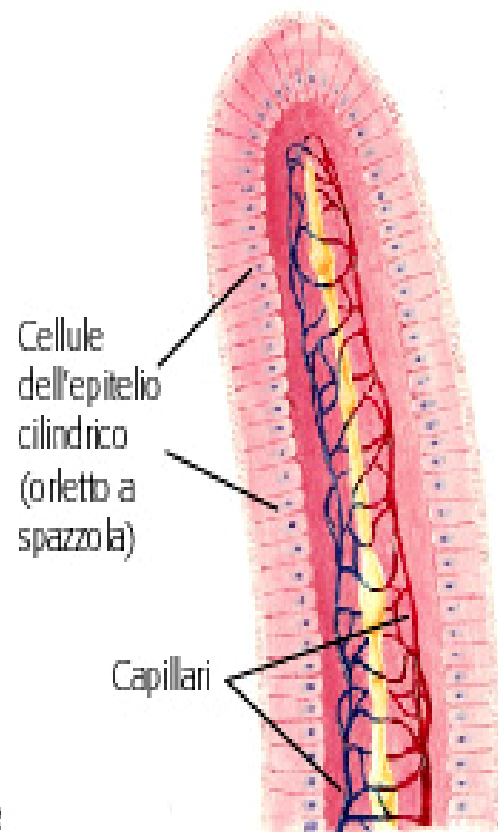


Trasporto del glucosio nell'epitelio intestinale

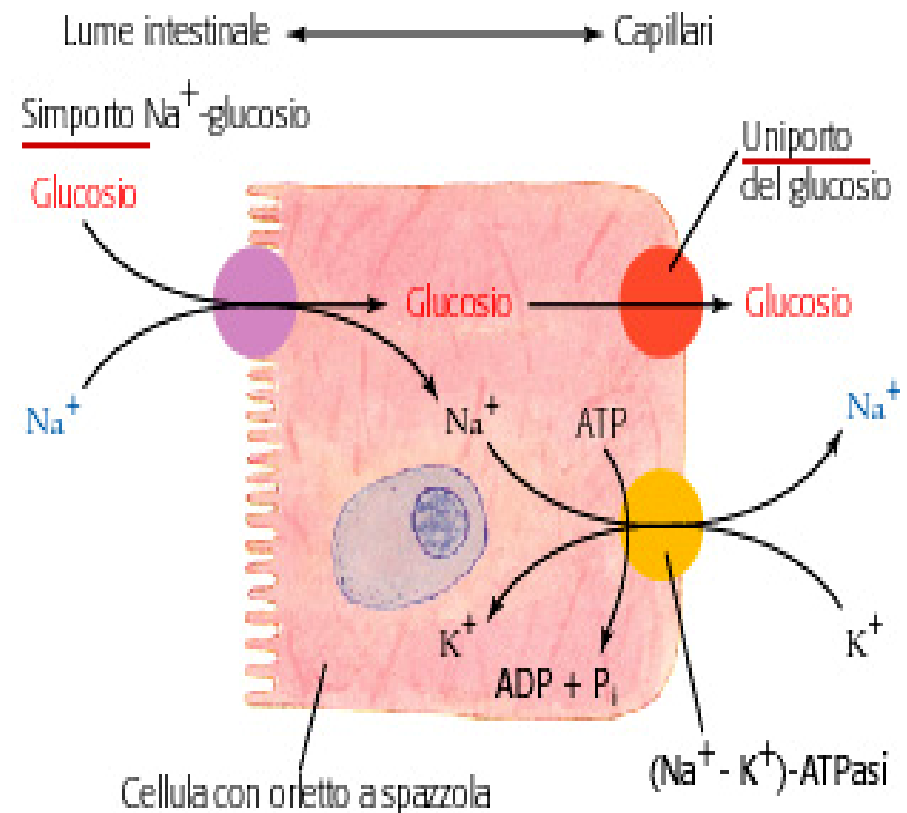
(a) Intestino tenue



(b) Villo



(c) Trasporto del glucosio



Modello per il trasporto del glucosio (uniporto)

