

B. Sacchetti

Testo consigliato

P.J. Pinel, *Psicobiologia*, Il Mulino

ORARIO DI RICEVIMENTO

Mercoledì dalle 14.00 alle 16.00

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**[http://hal9000.cisi.unito.it/wf/DIPARTIMEN/Neuroscien/
Fisiologia/Corsi/Neuroscien/index.htm](http://hal9000.cisi.unito.it/wf/DIPARTIMEN/Neuroscien/Fisiologia/Corsi/Neuroscien/index.htm)**

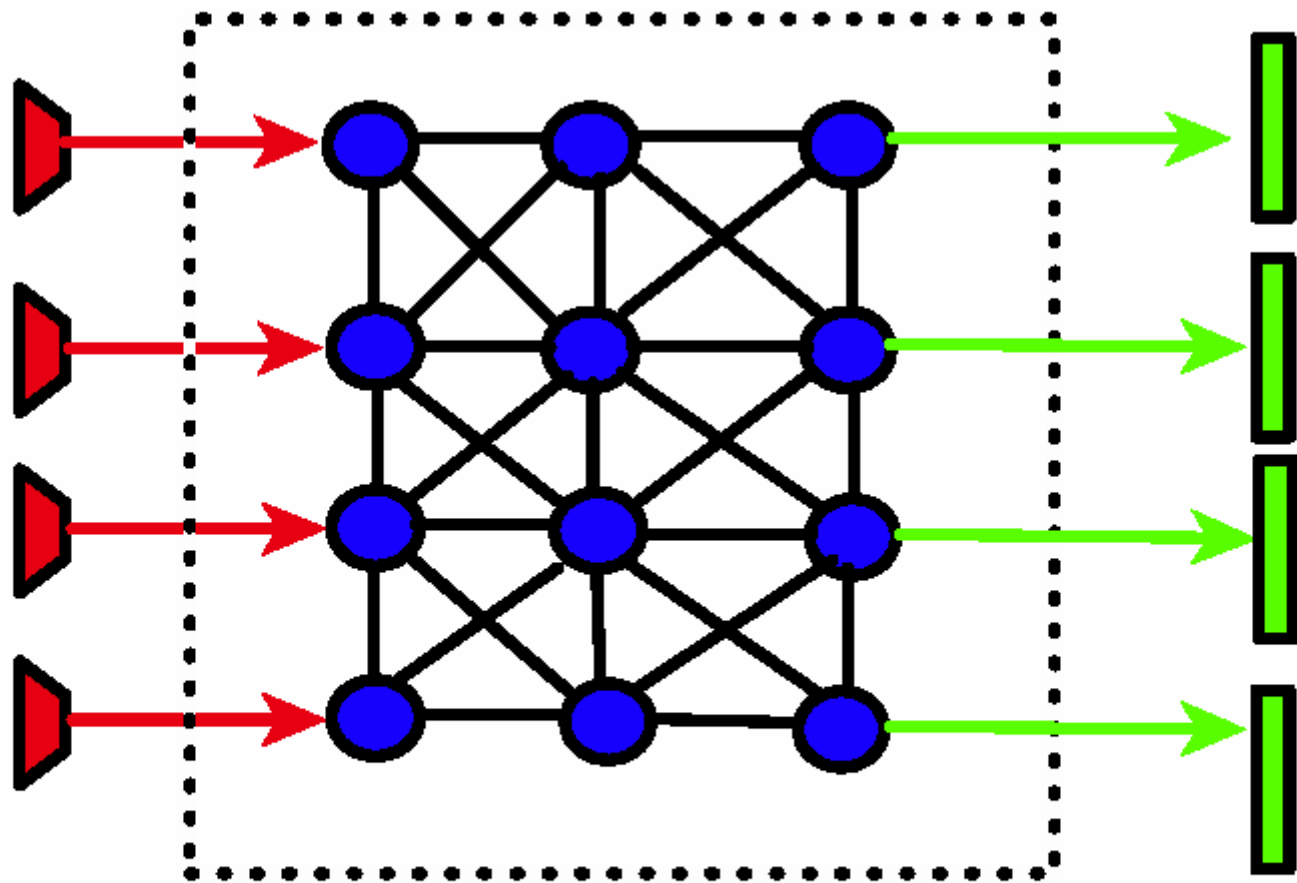
ambiente

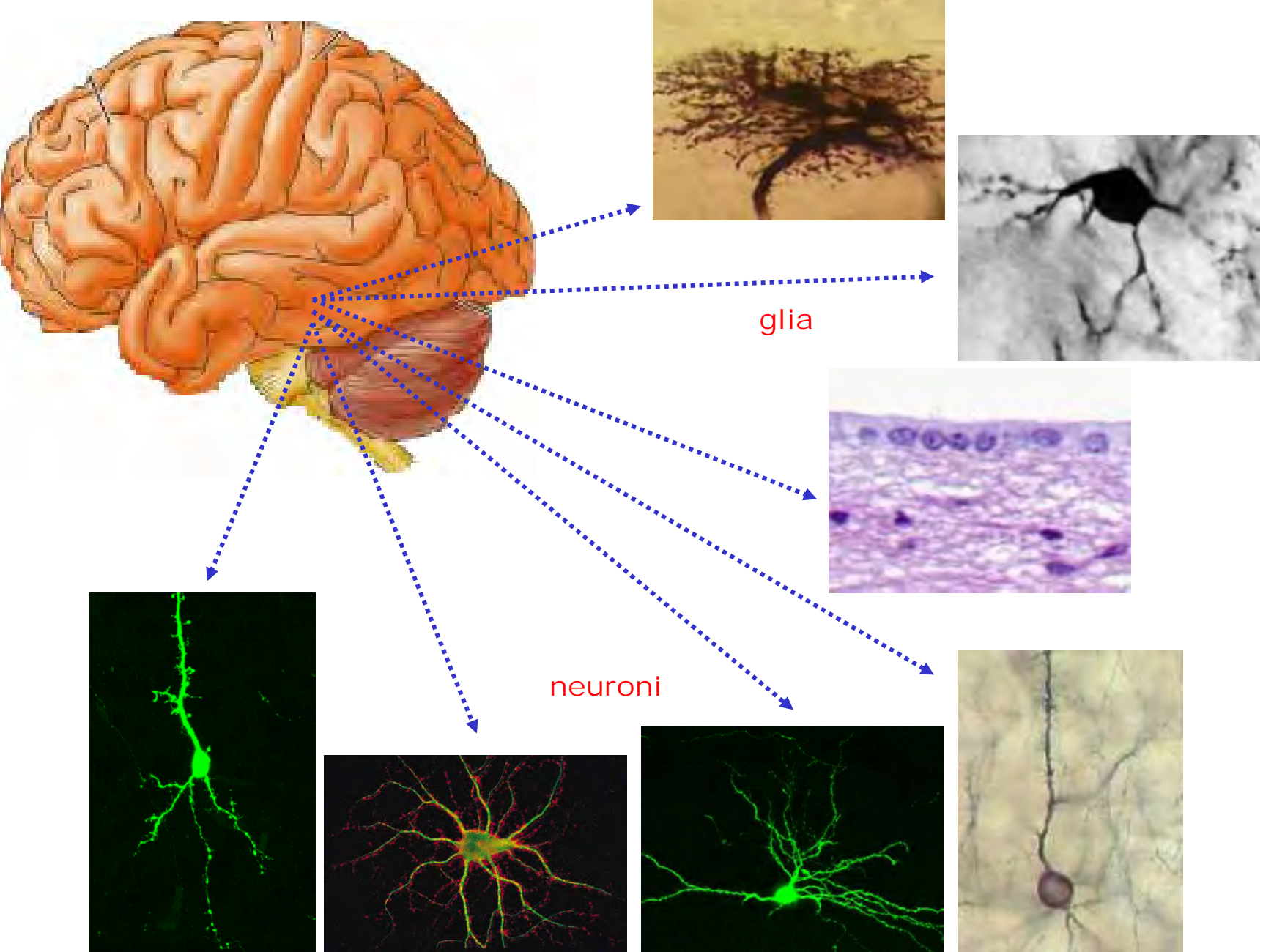
sensori

sistema nervoso

effettori

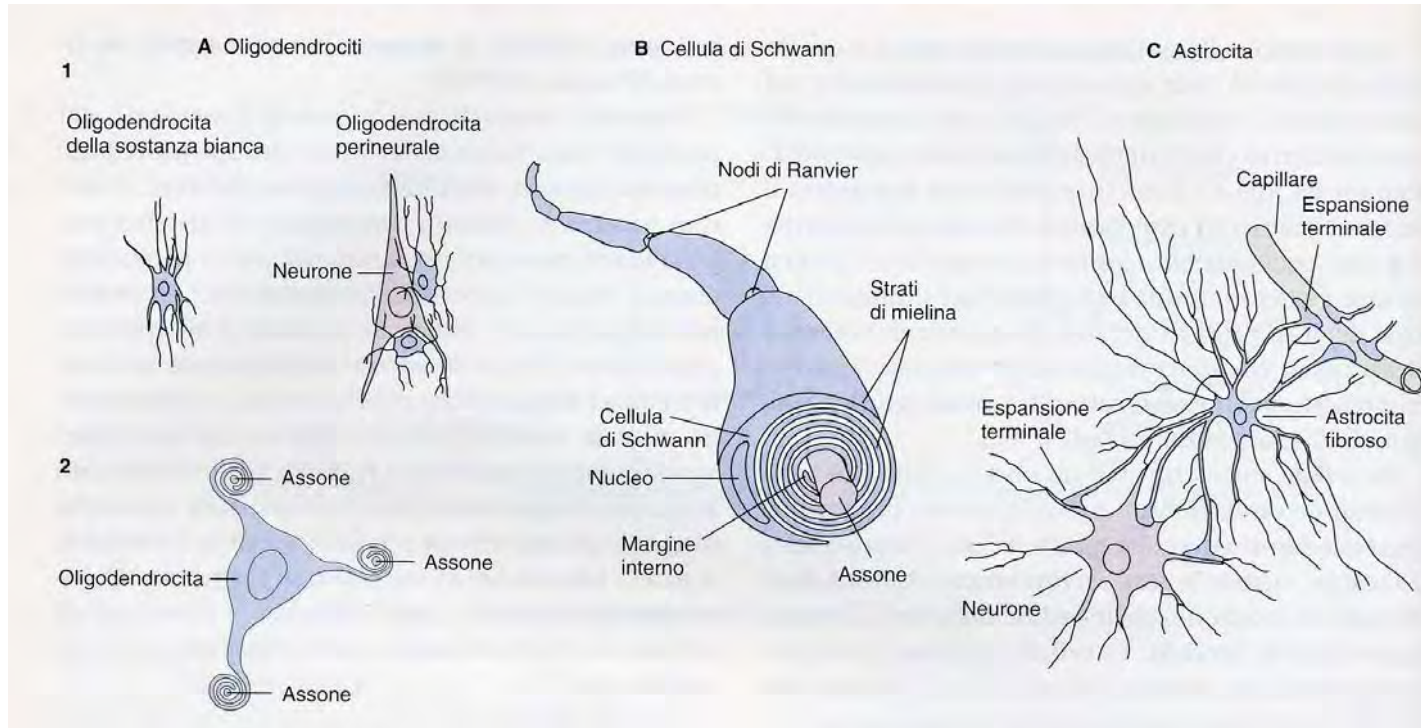
comportamento





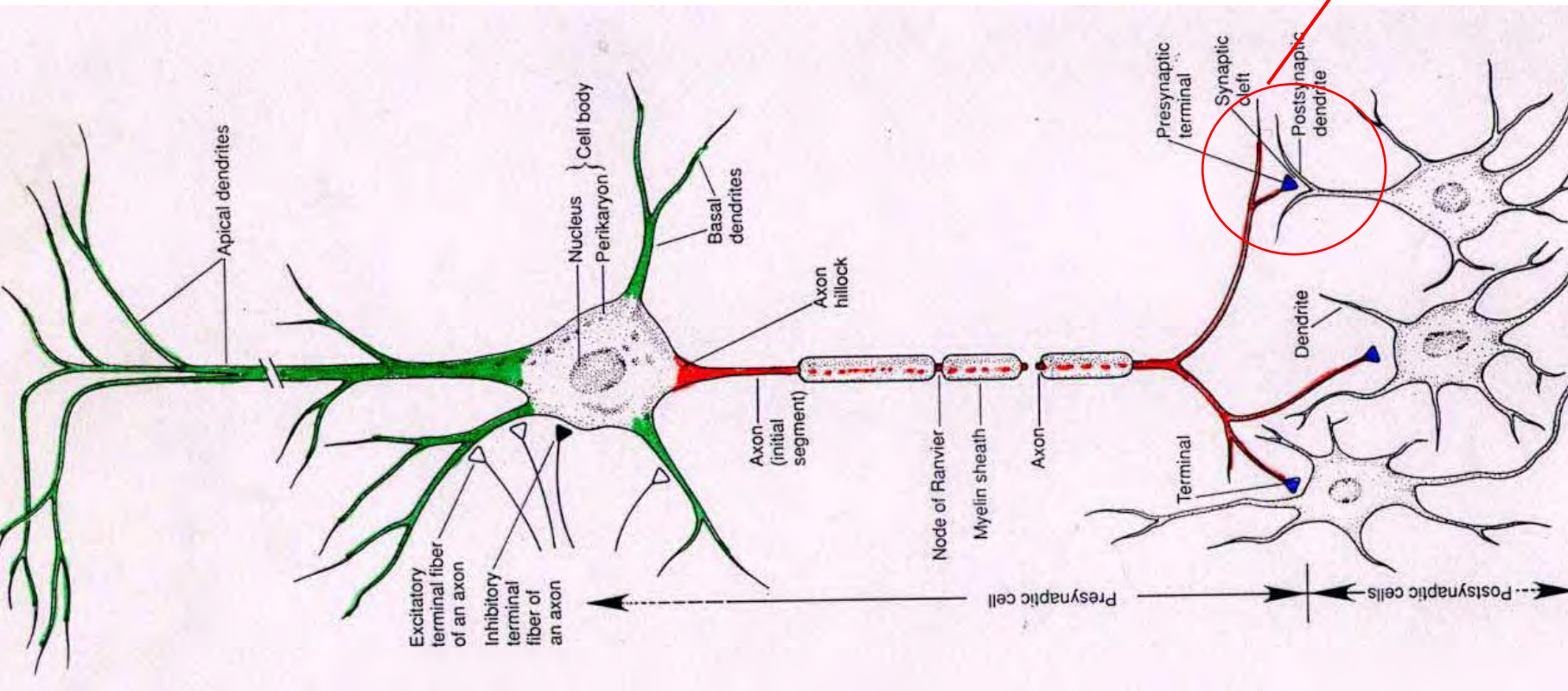
CELLULE GLIALI

- Sostegno
- Formare guaina mielinica (oligodendrociti, cellule di Schwann)
- Captare e smaltire molecole
- 3 Tipi:



Il neurone

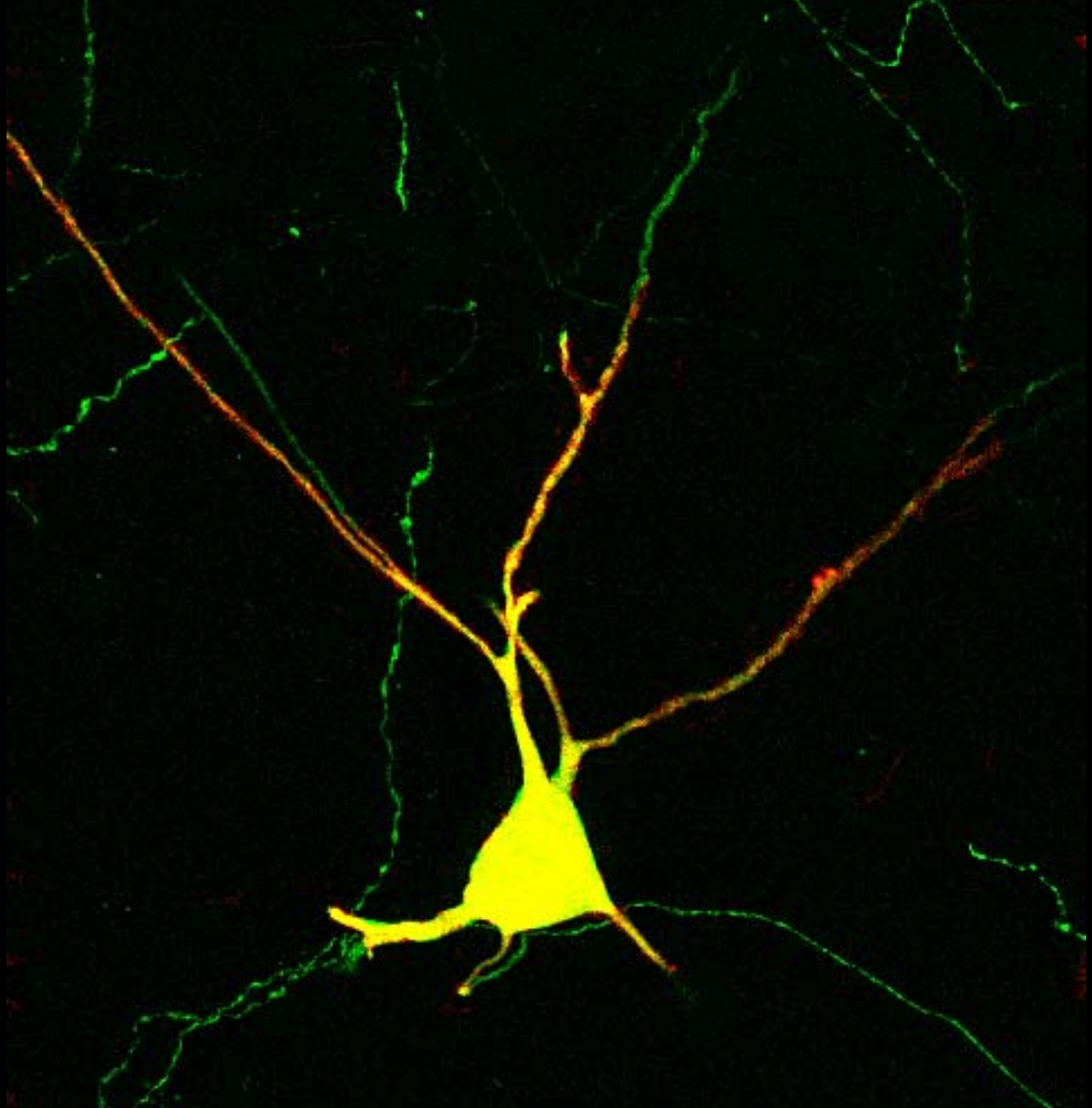
sinapsi



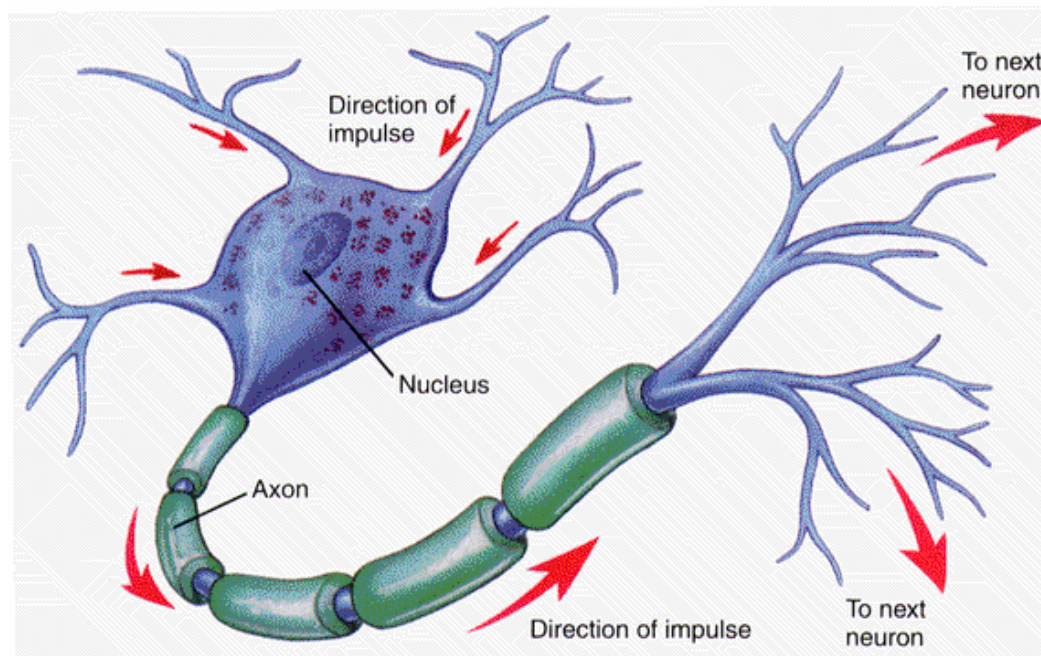
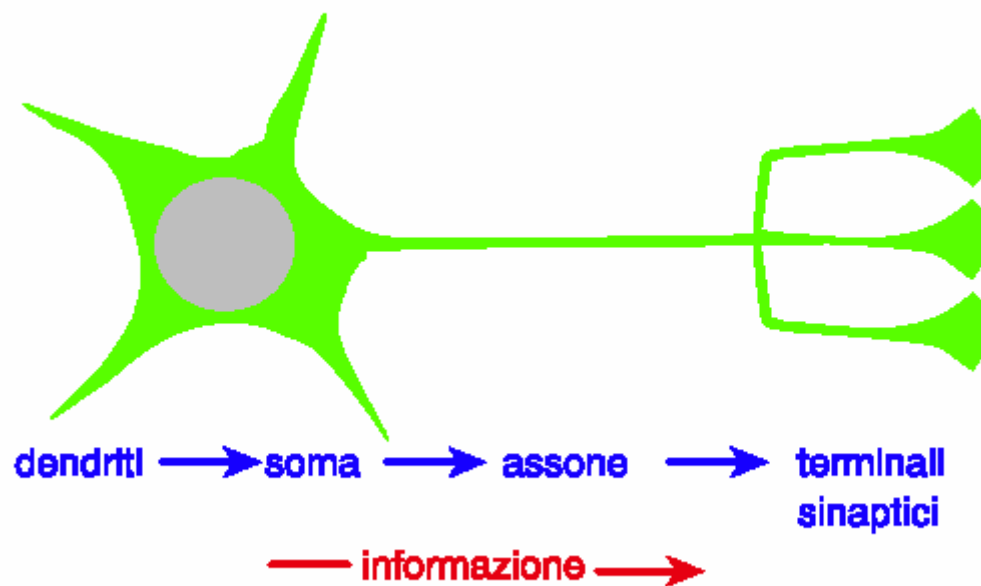
dendriti

corpo cellulare
(soma)

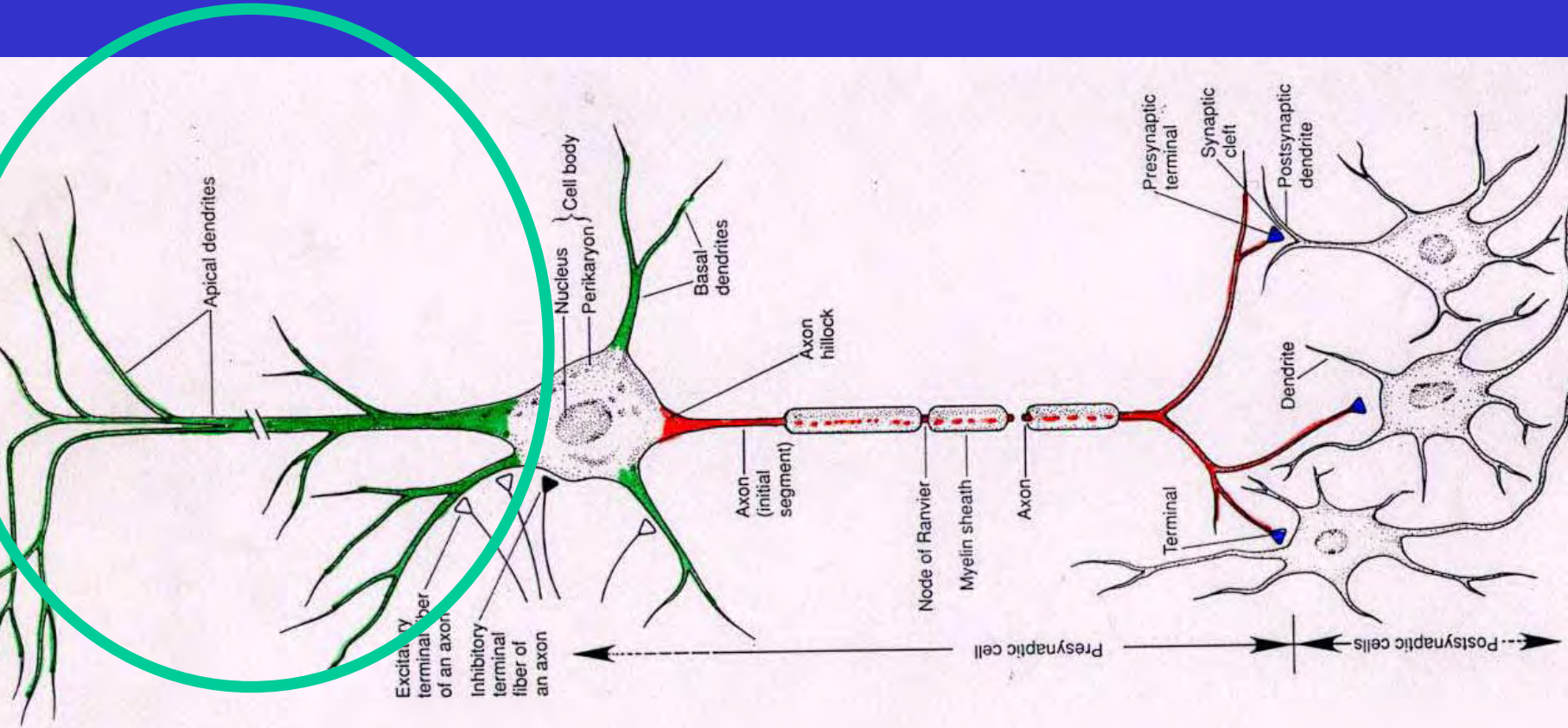
assone



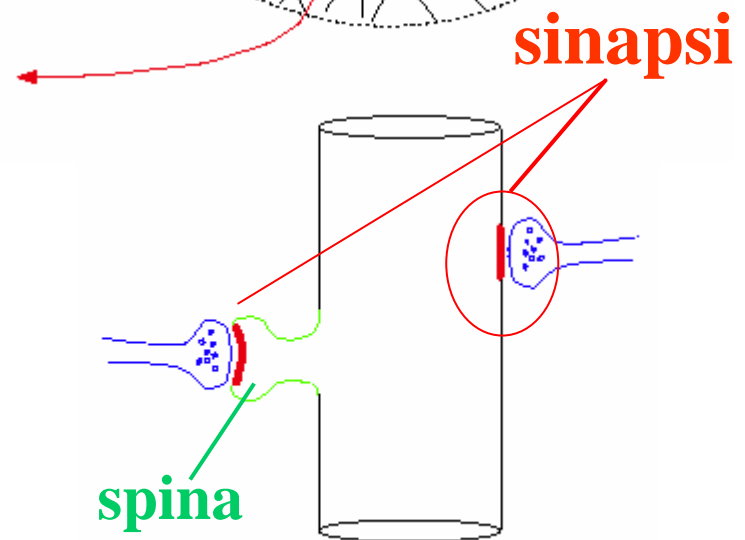
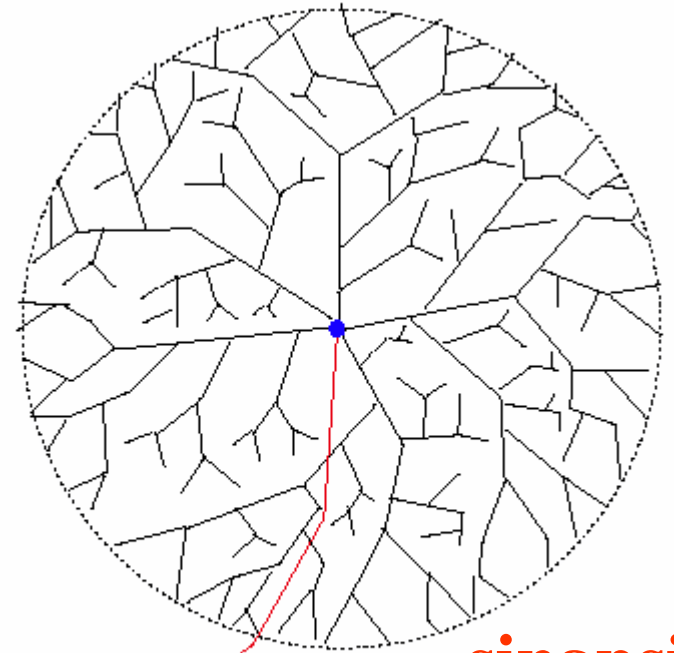
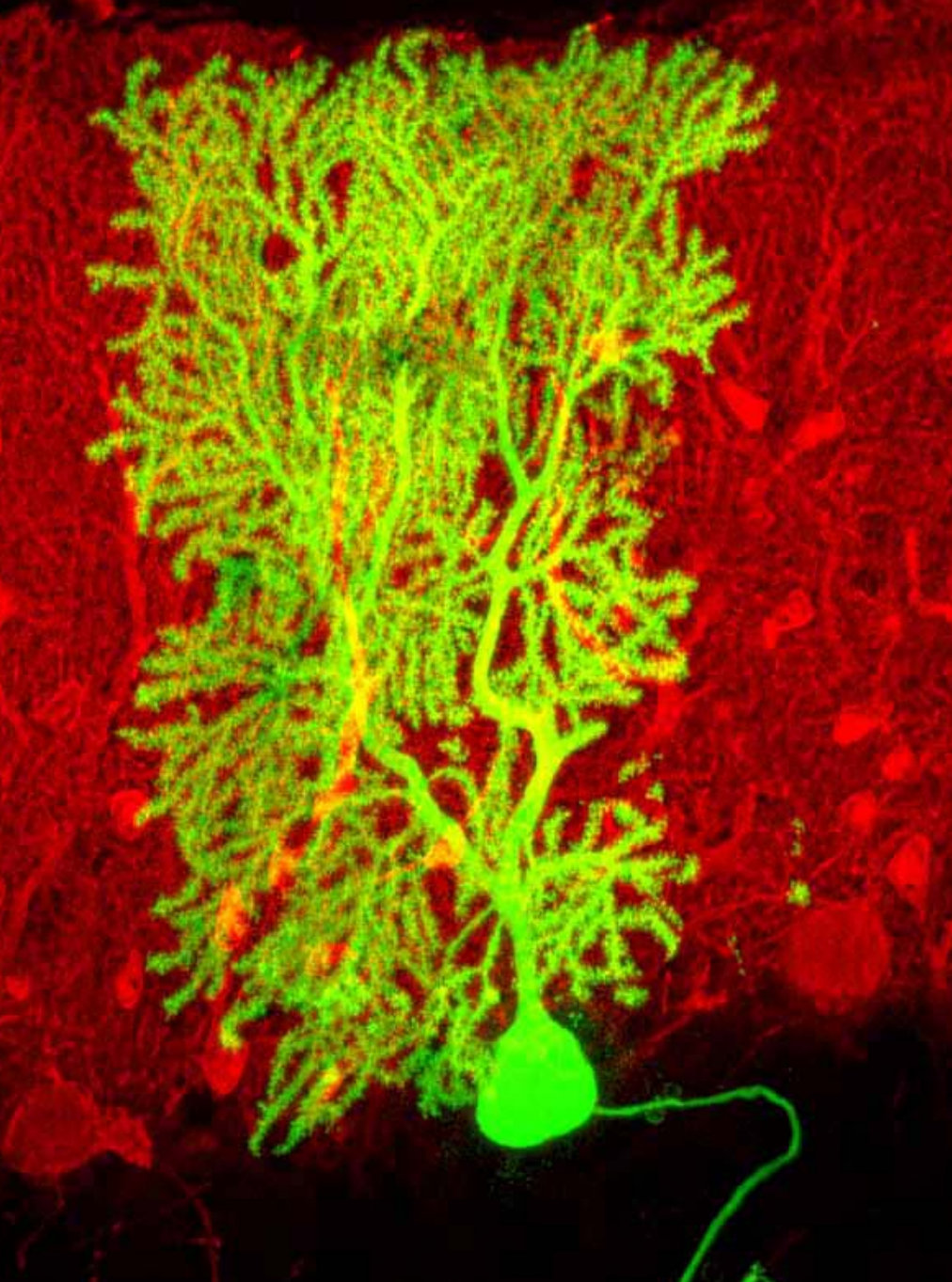
principio della polarizzazione dinamica

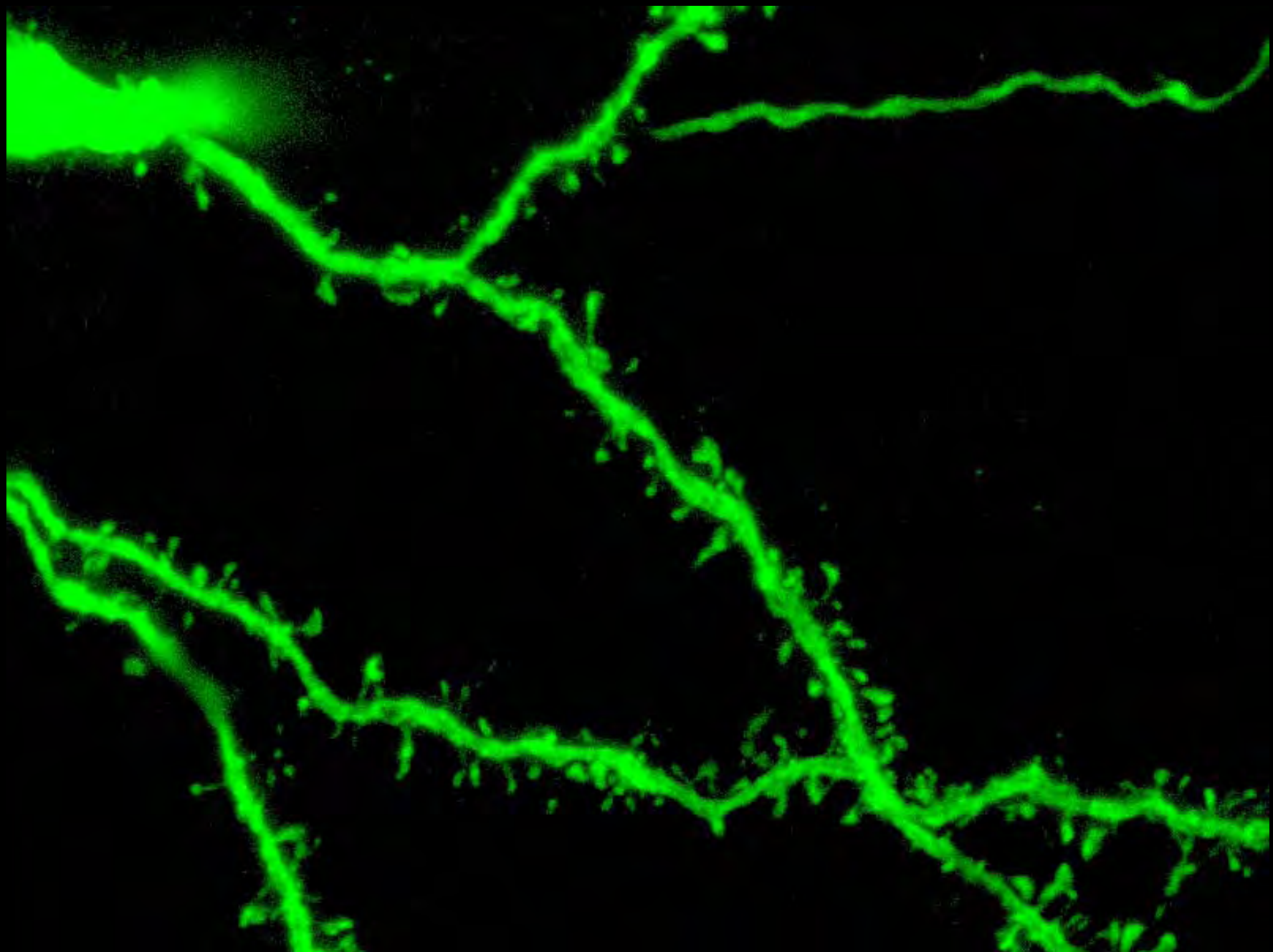


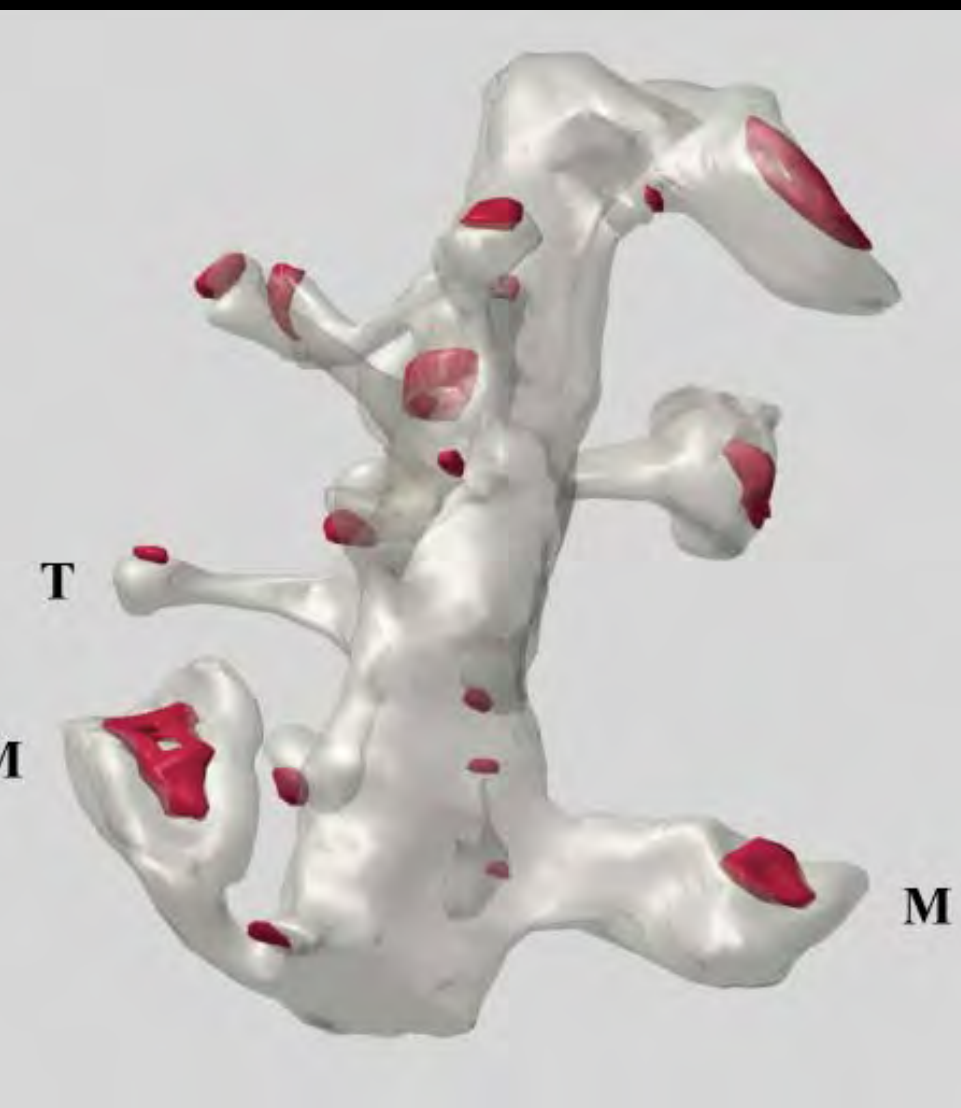
dendrite



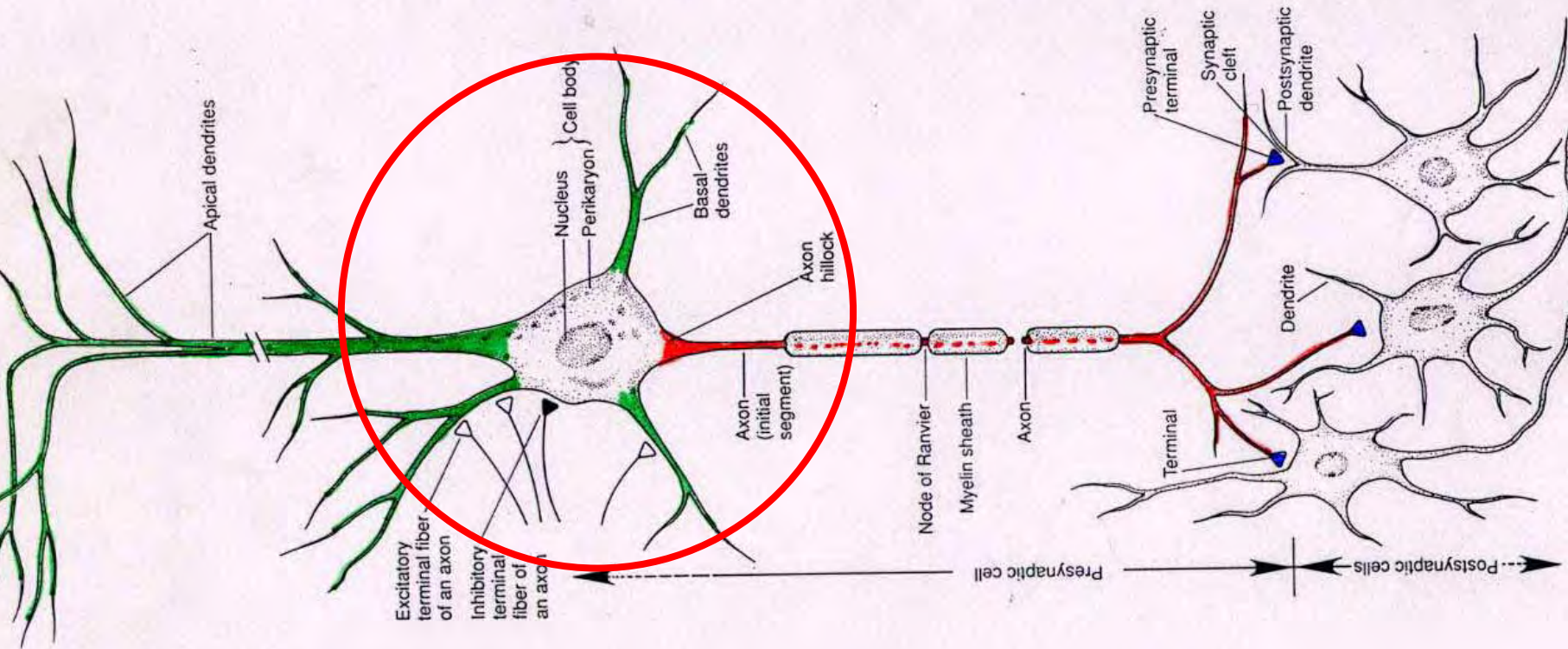
δενδρον: **albero**

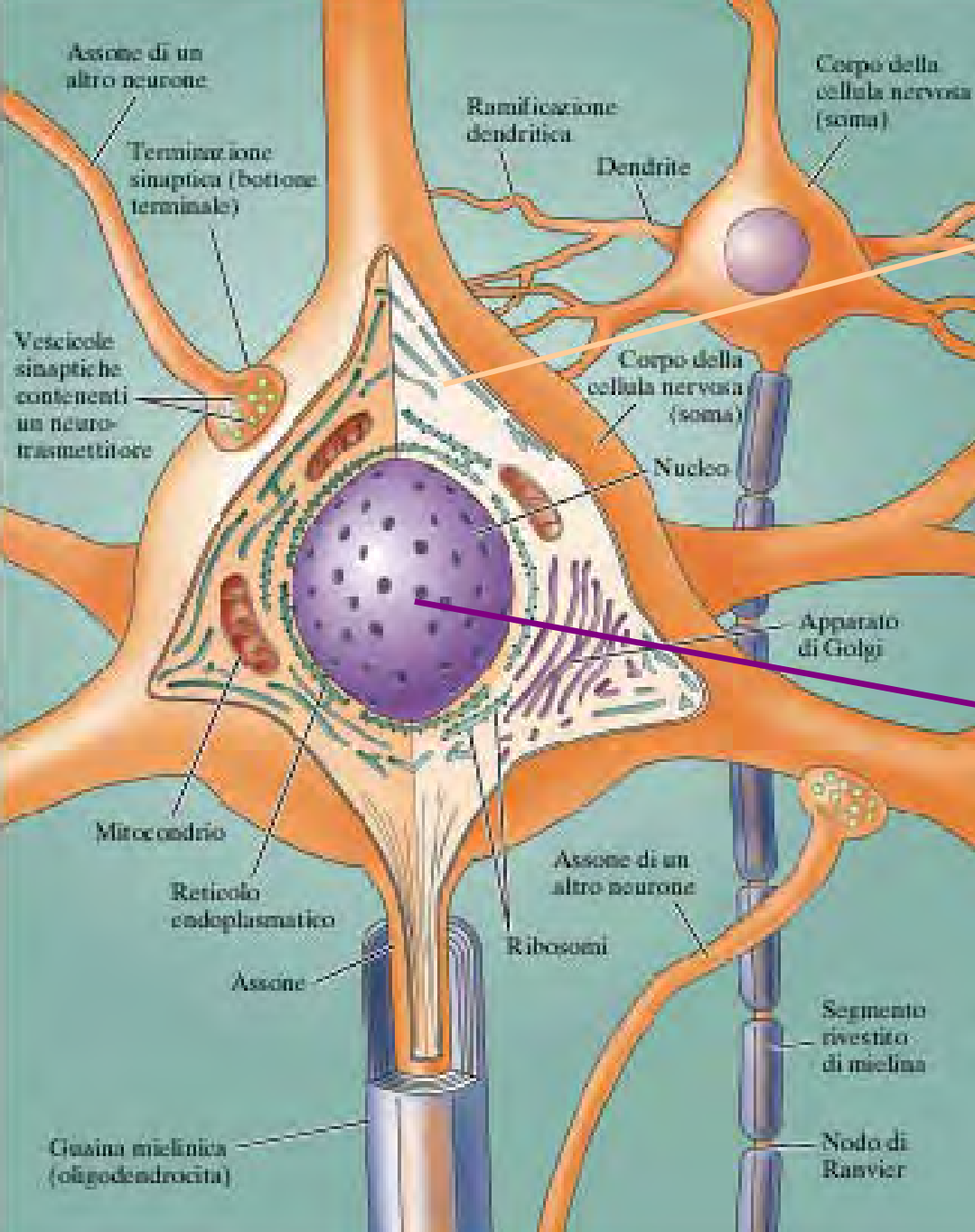






Corpo cellulare



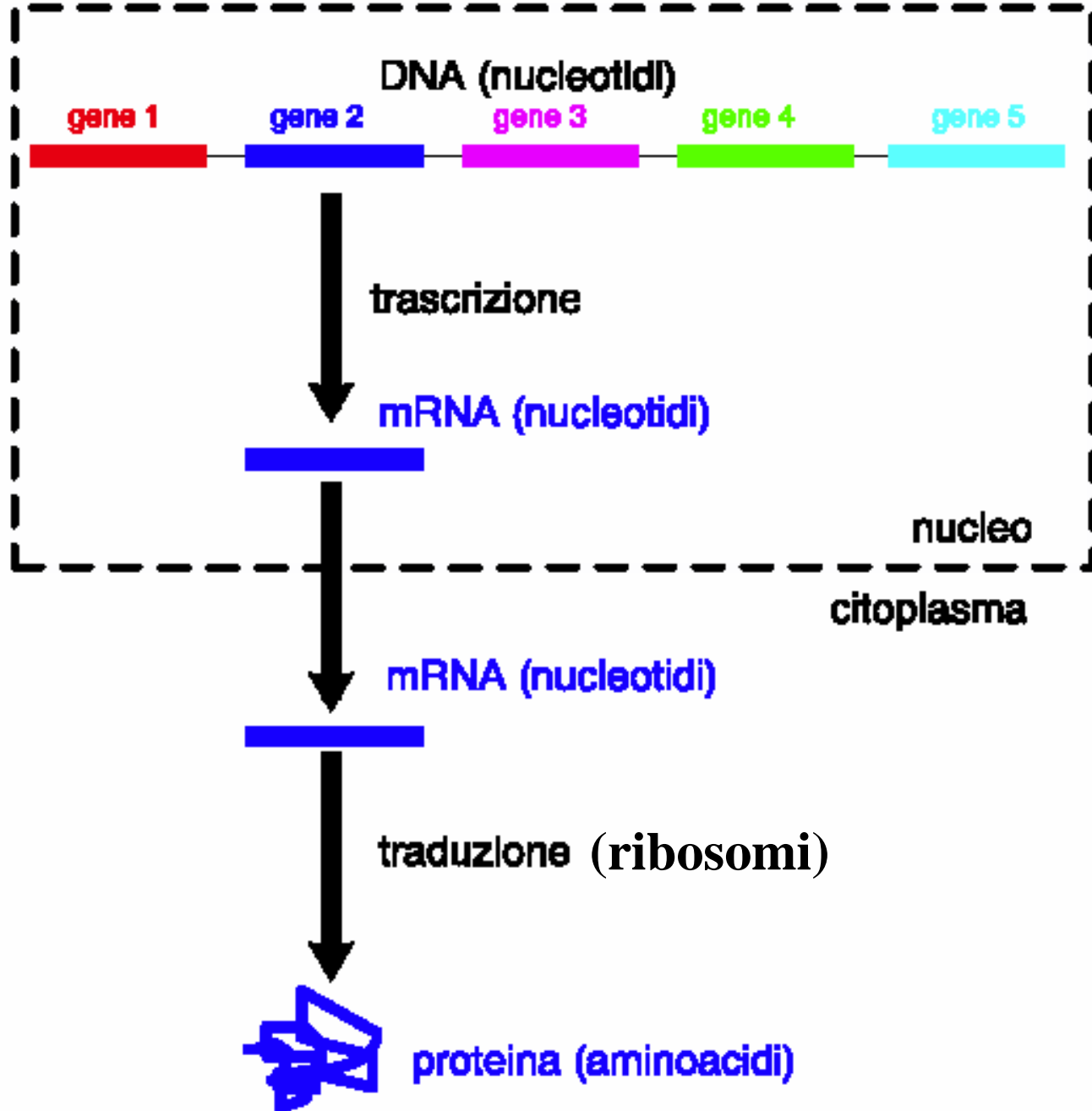


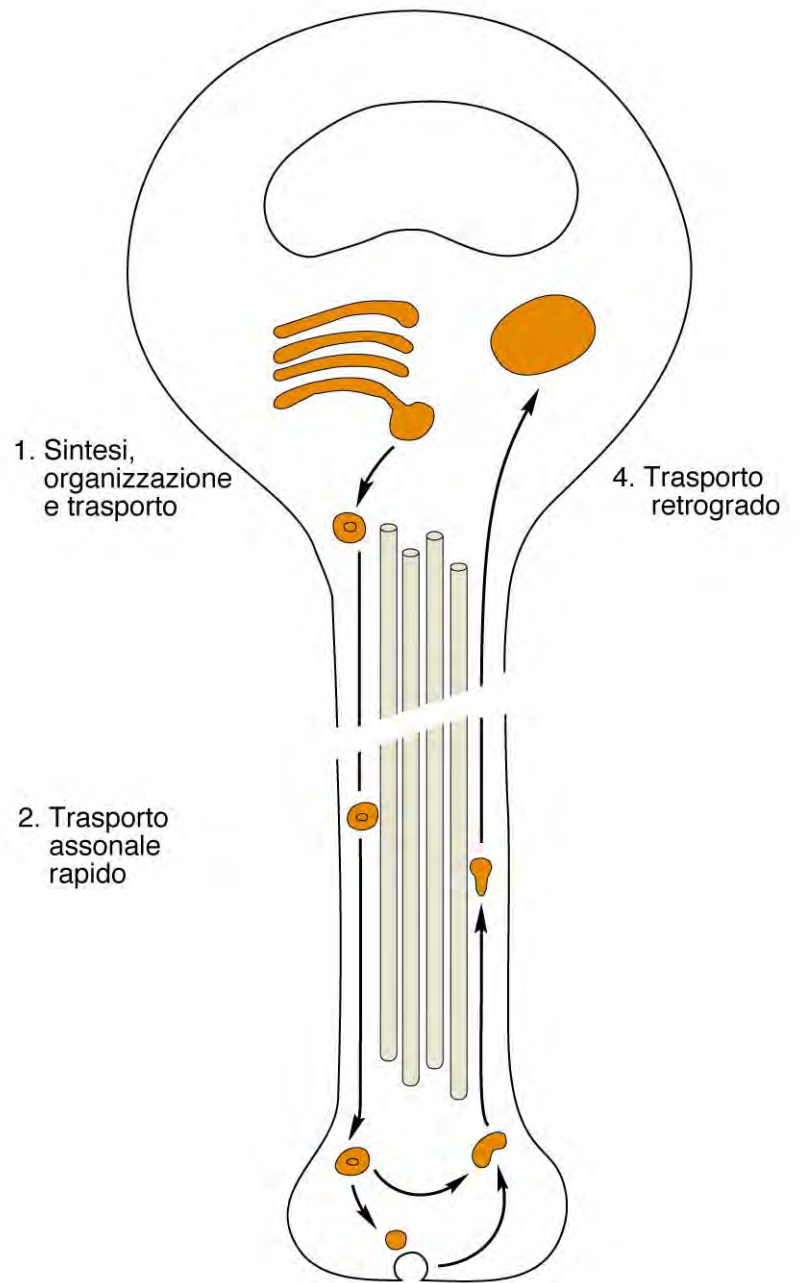
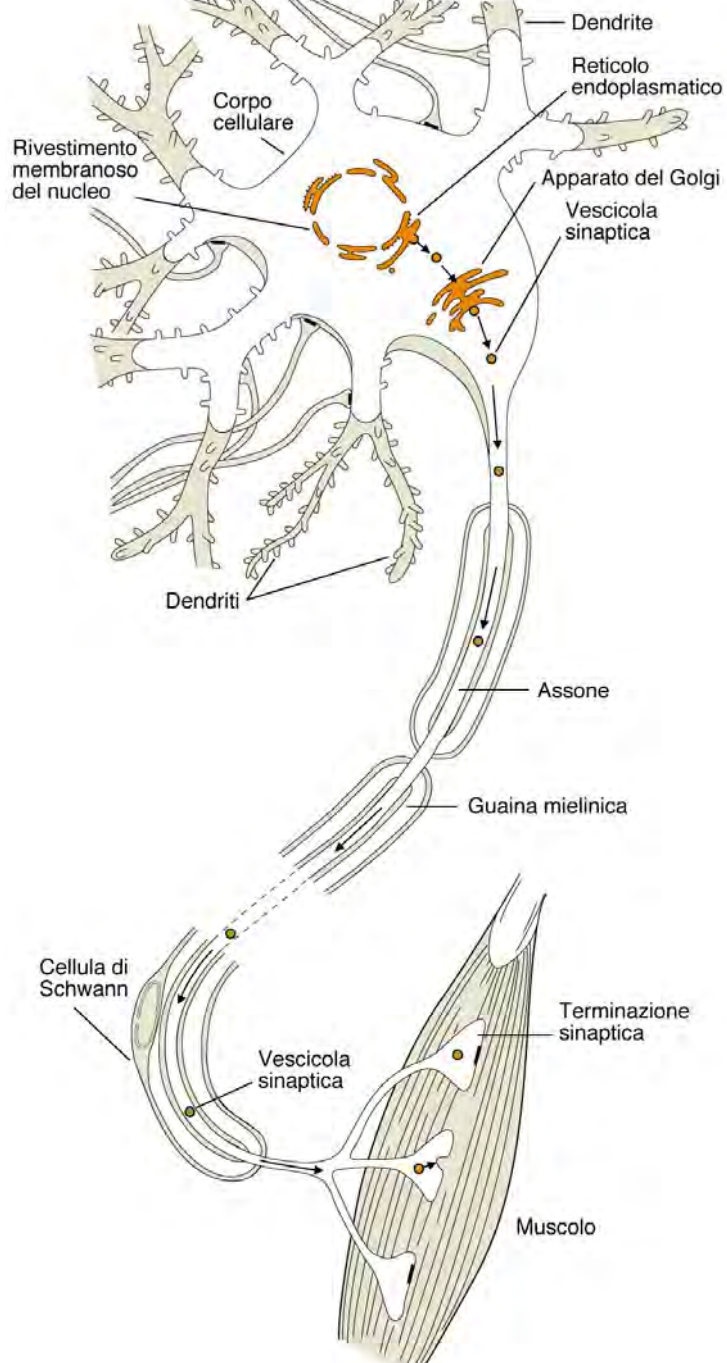
Citoplasma:
(mitocondri,
per fornire energia;
ribosomi e apparato di
Golgi
per la sintesi delle
proteine)

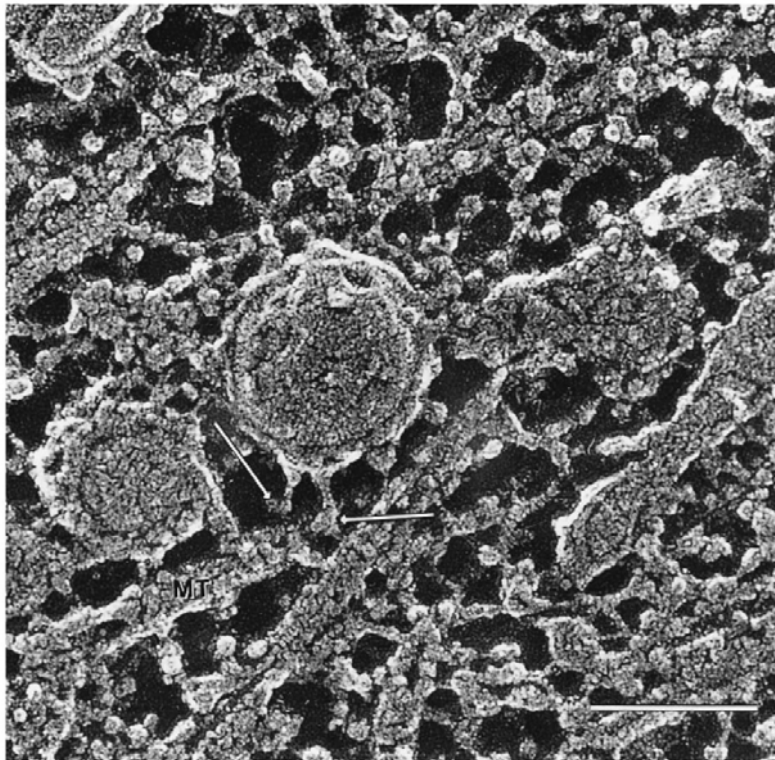
Nucleo:



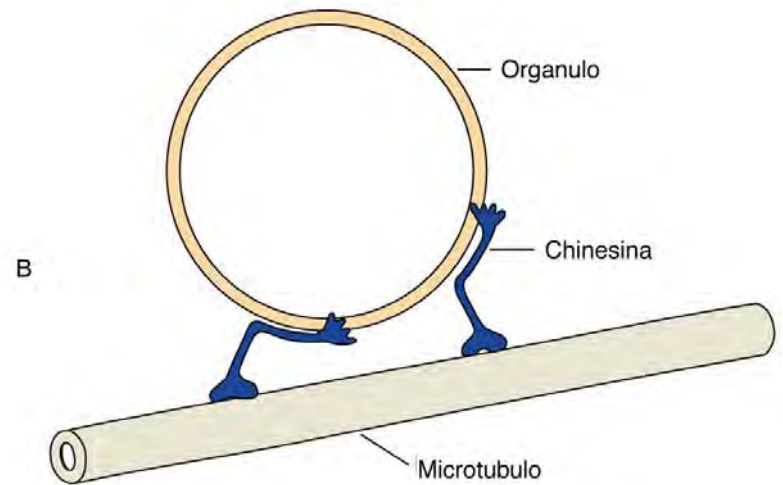
DNA





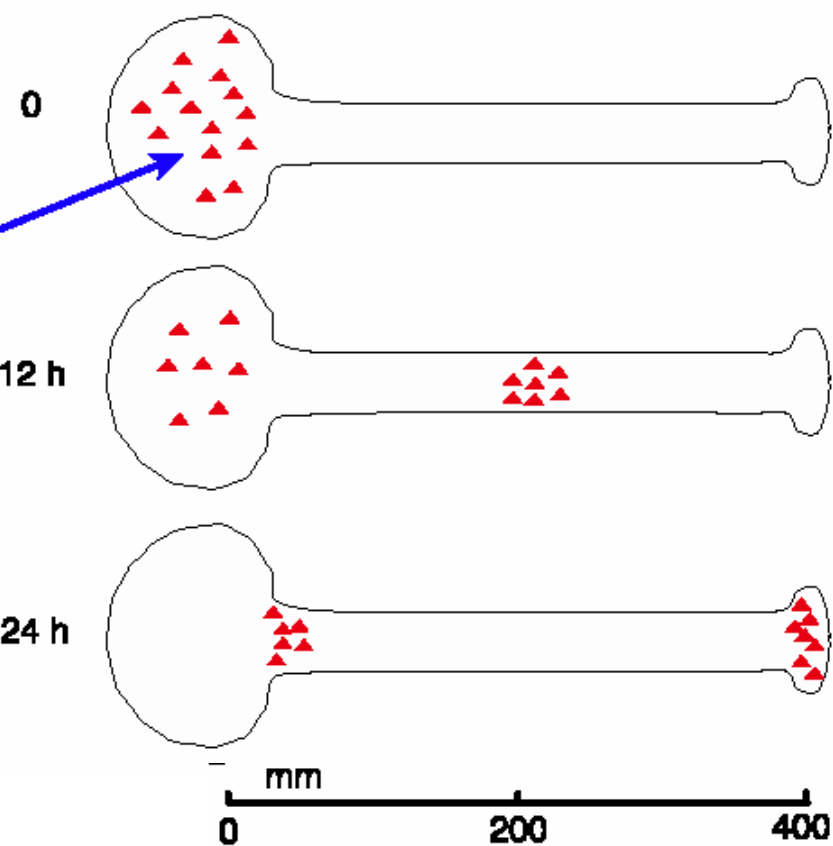


A

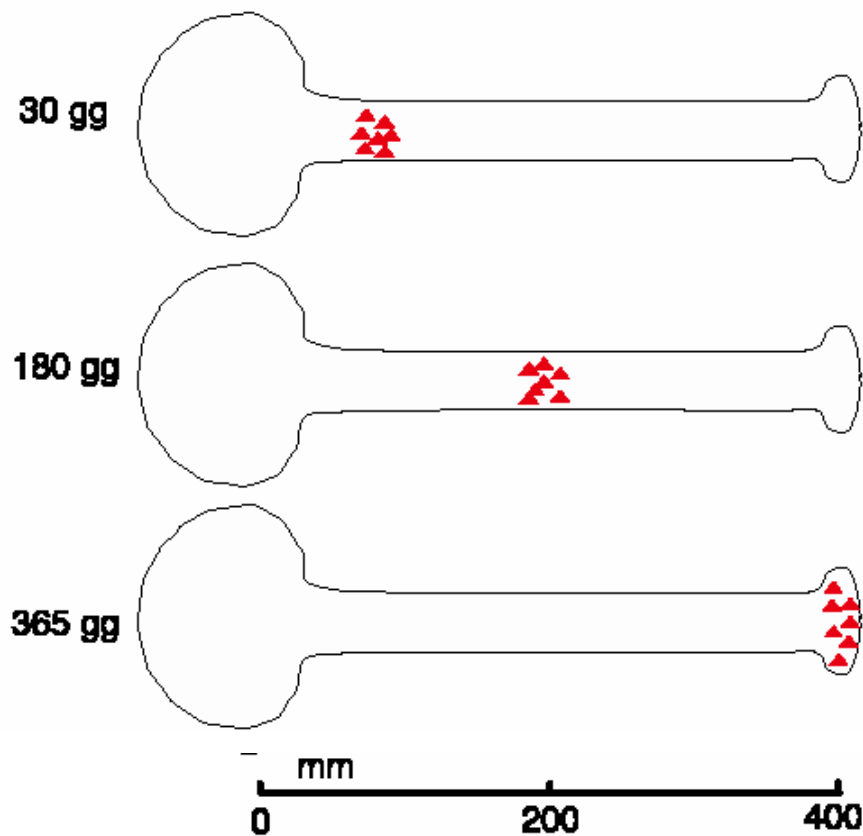


B

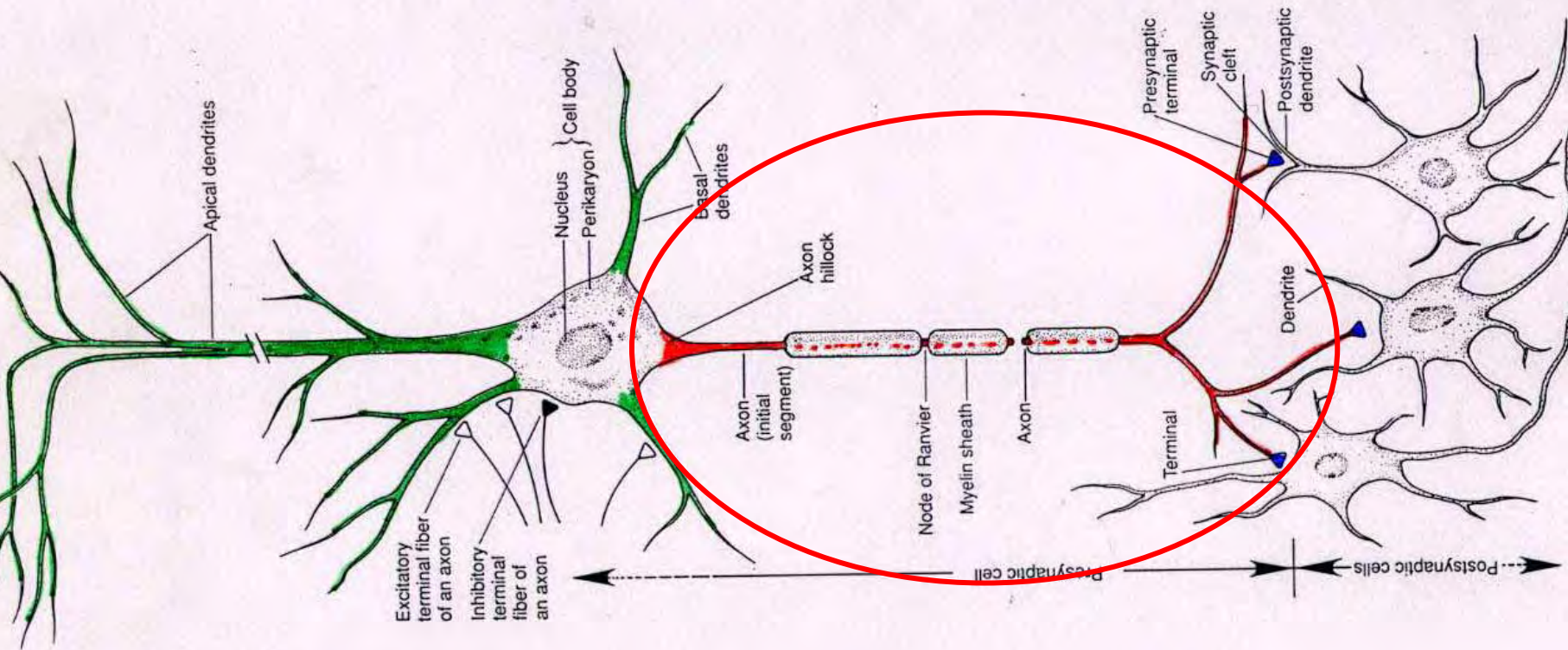
Trasporto rapido (40 cm/giorno)

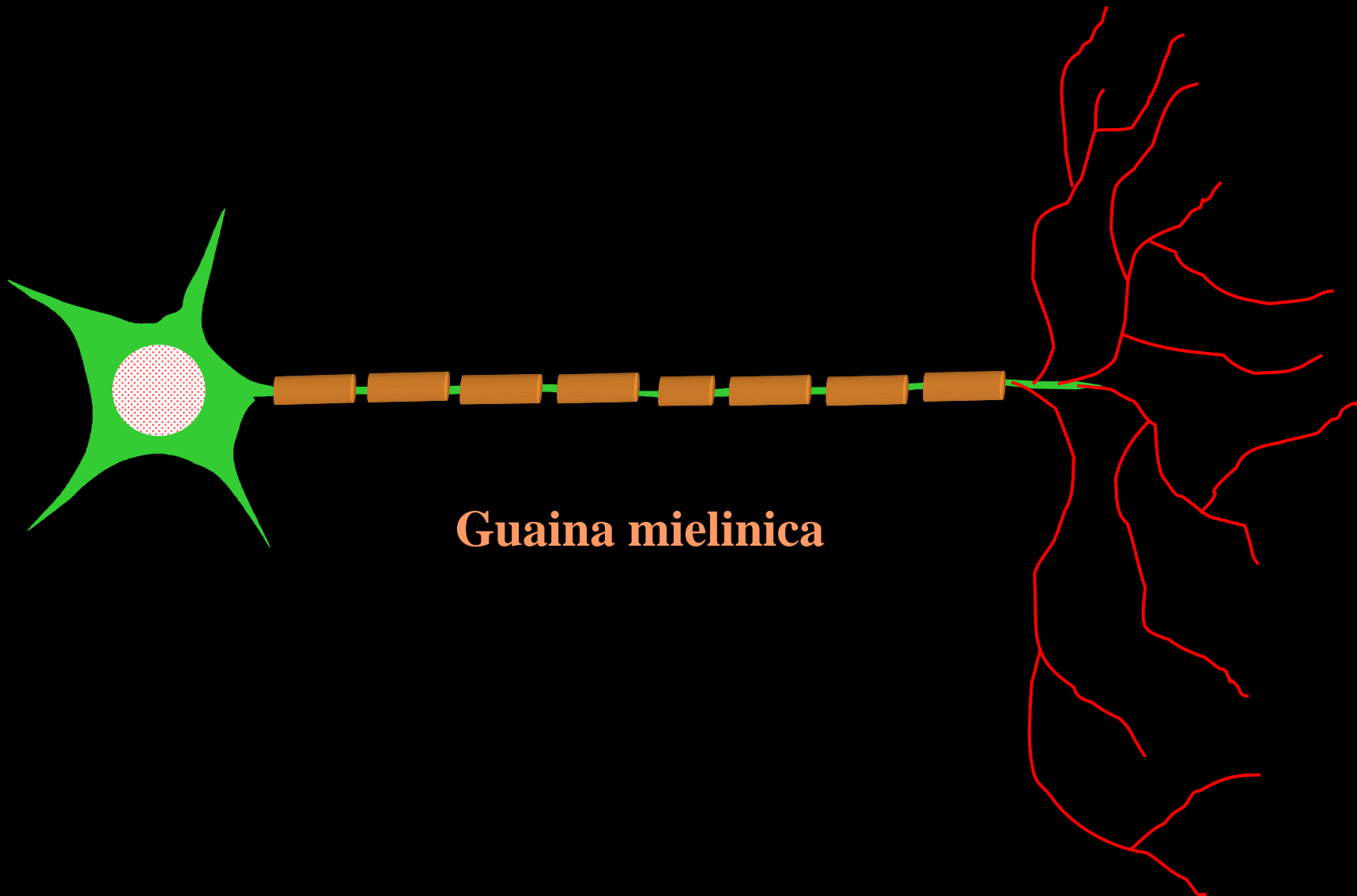


Trasporto lento (1 mm/giorno)

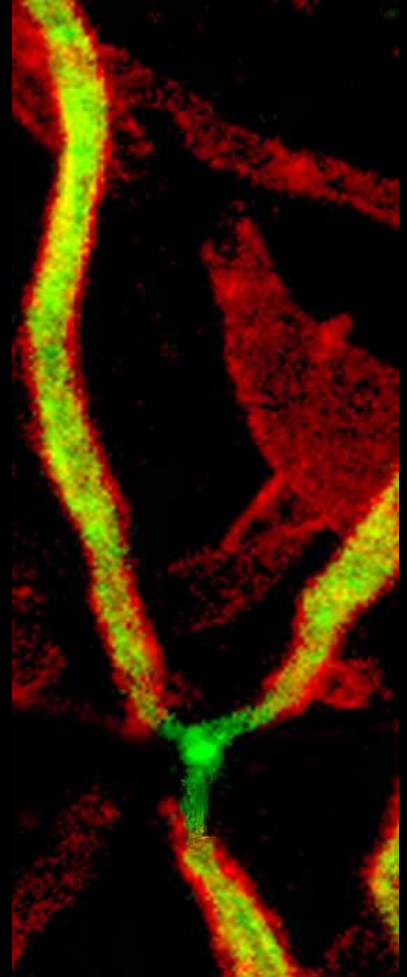
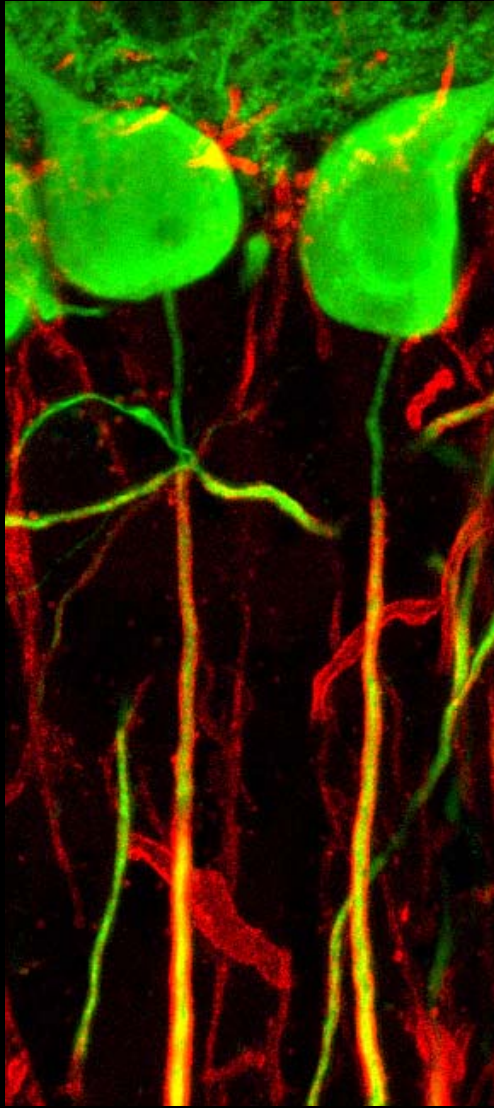


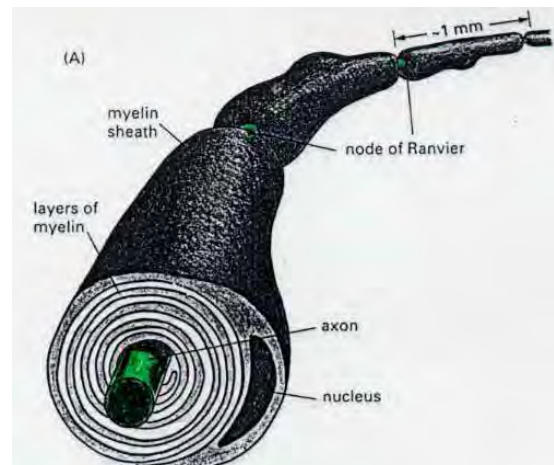
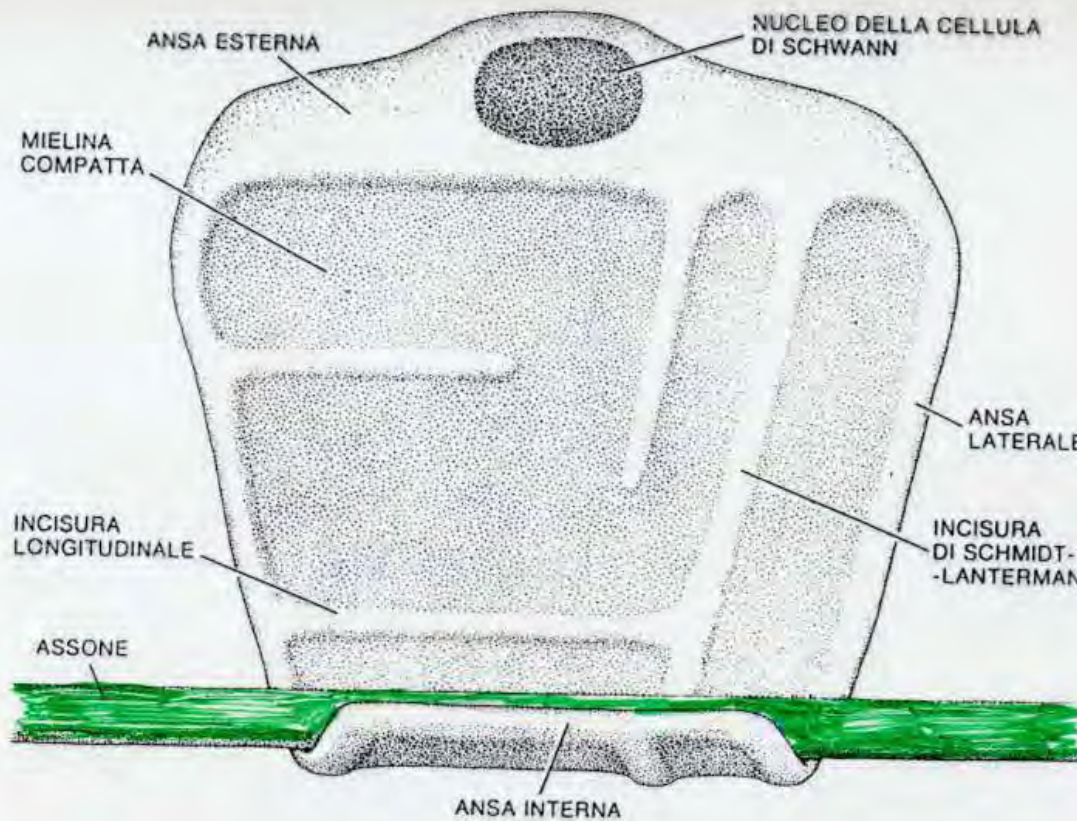
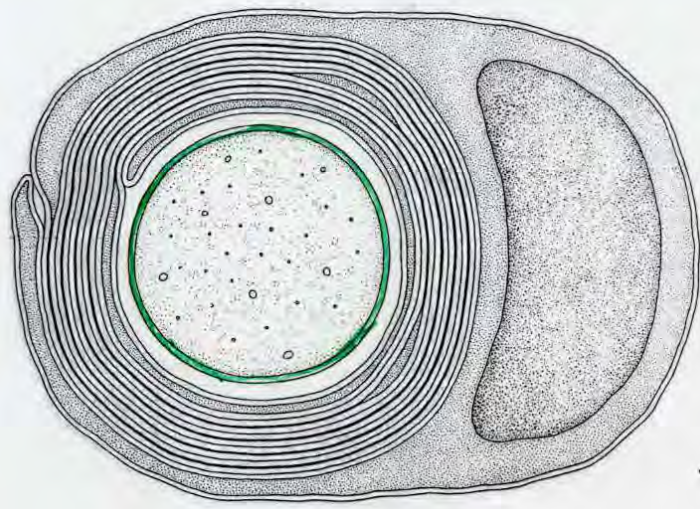
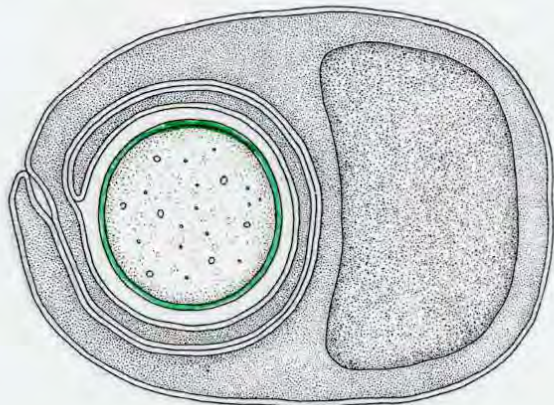
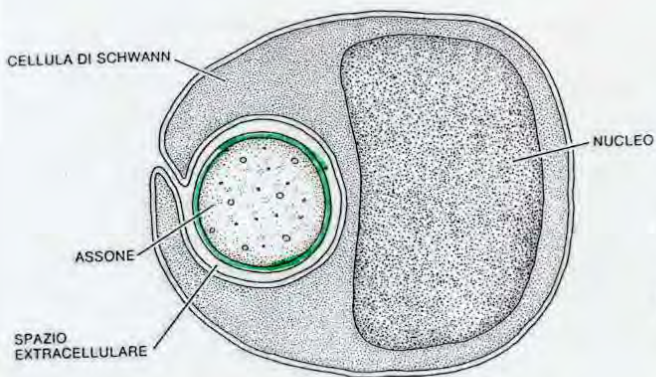
assone

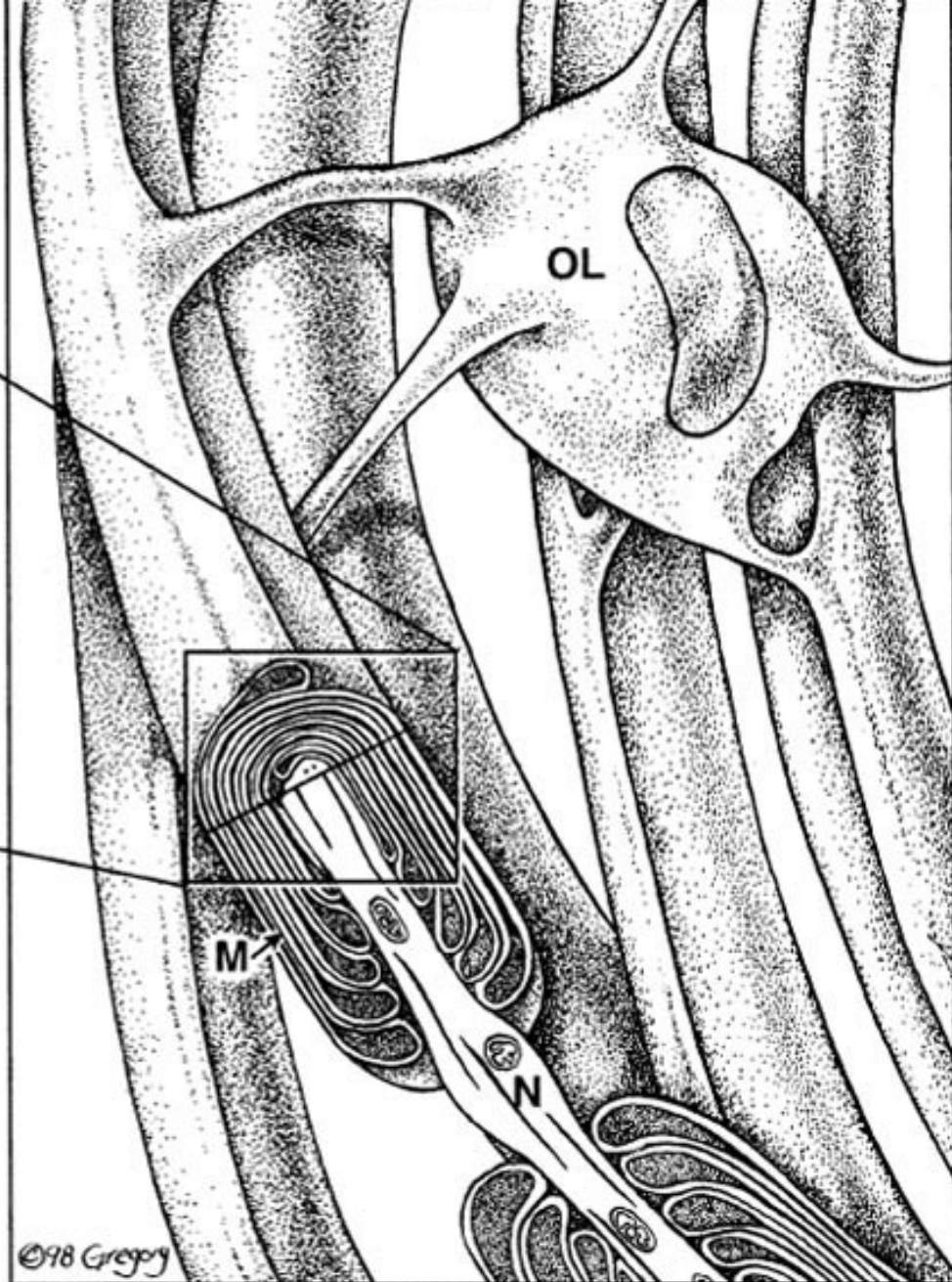
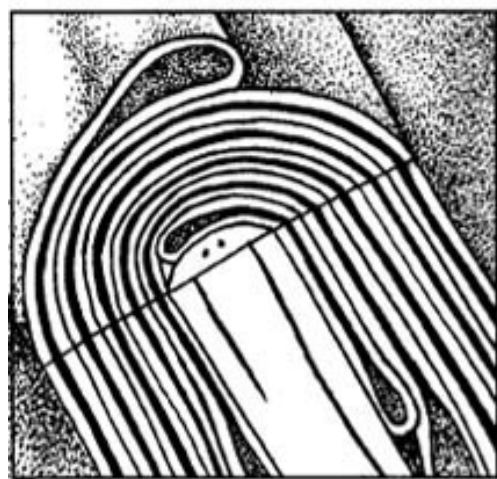




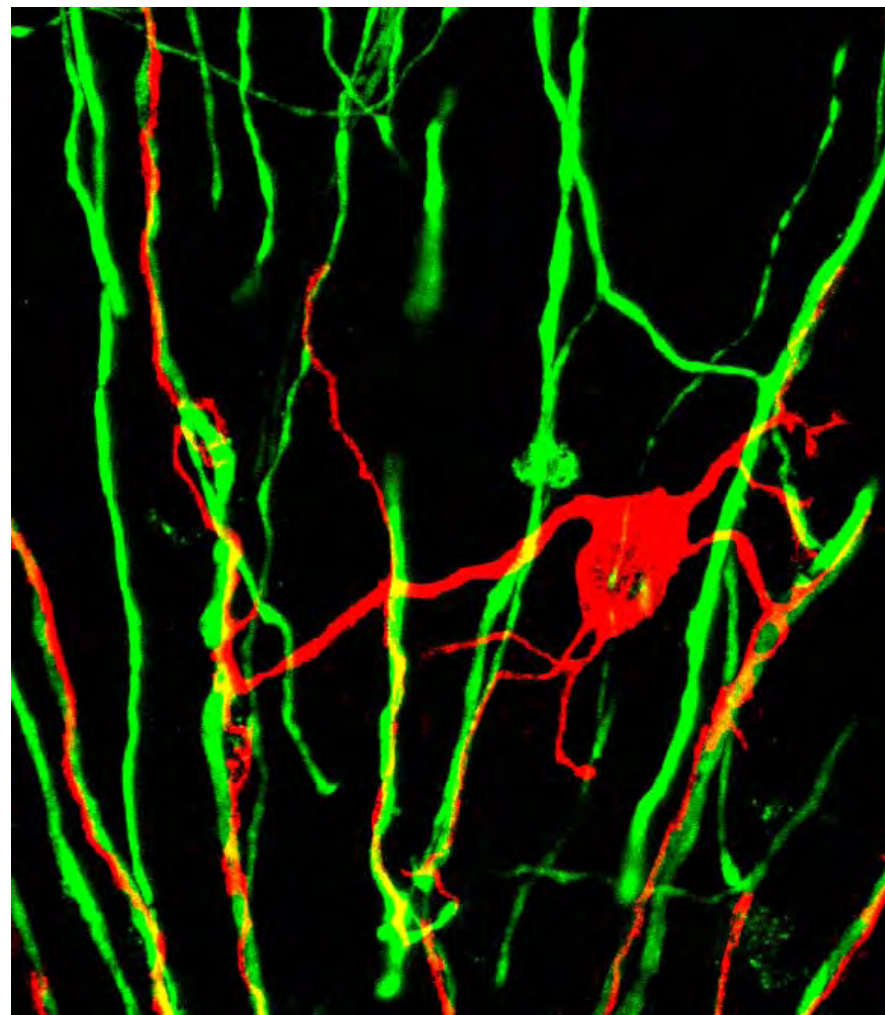
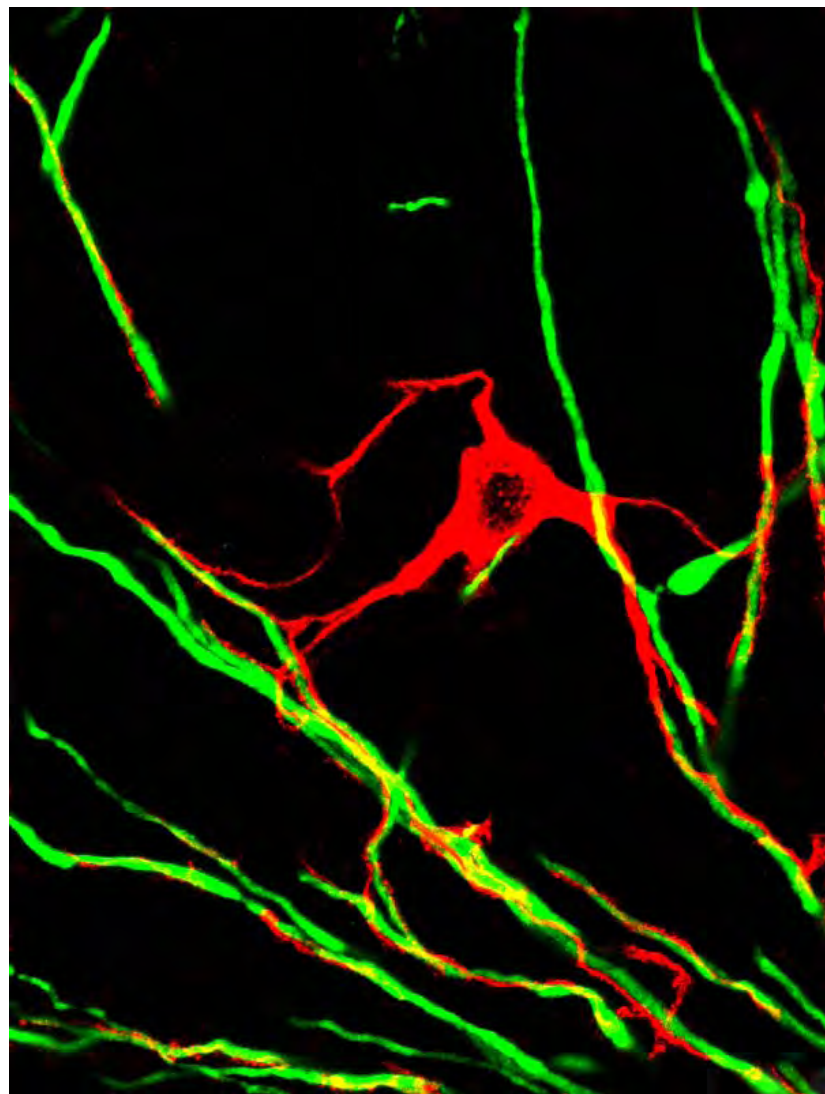
Guaina mielinica

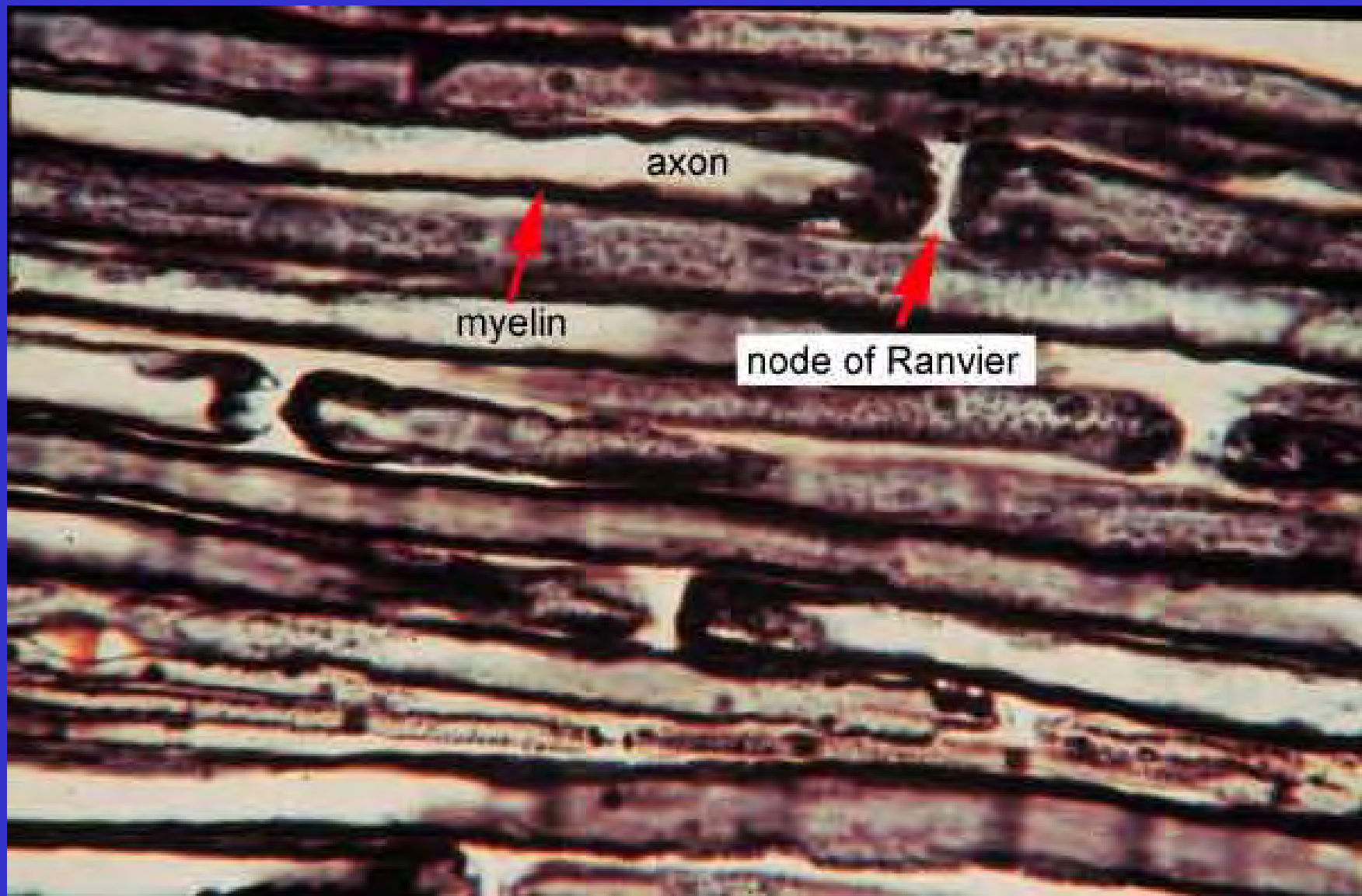




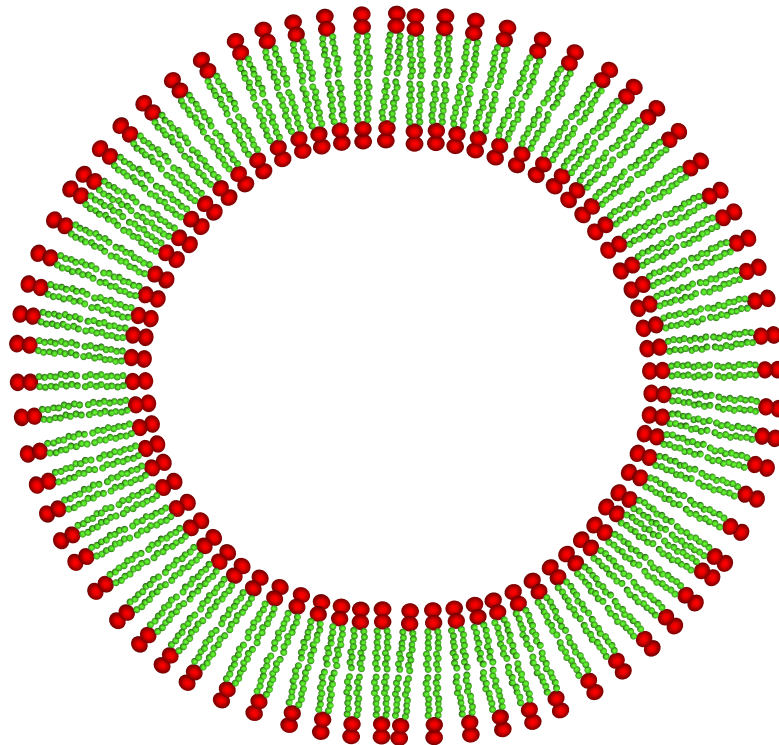


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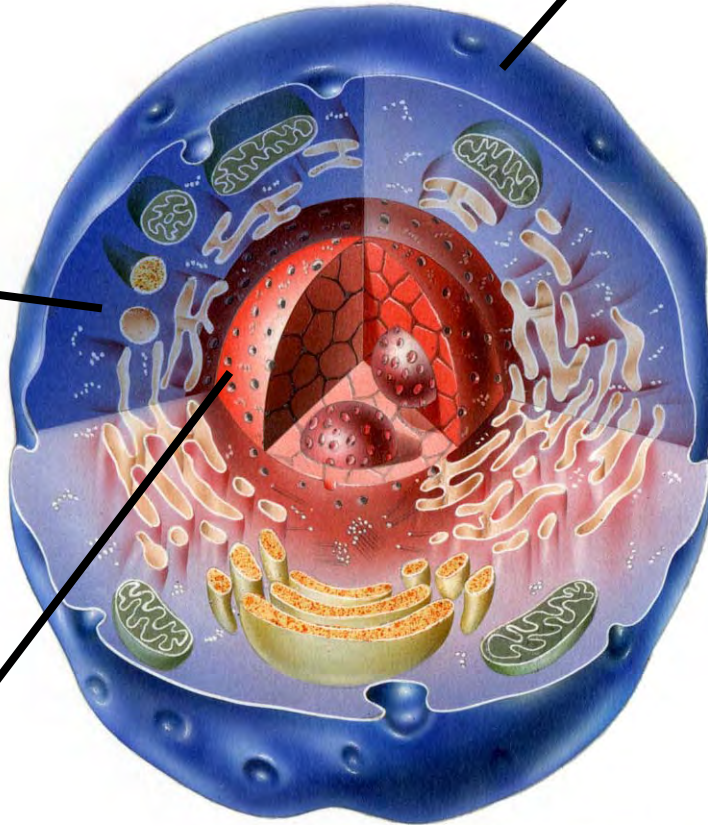
Passaggio di sostanze attraverso la membrana cellulare

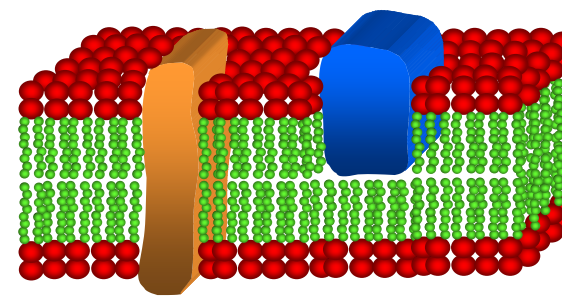
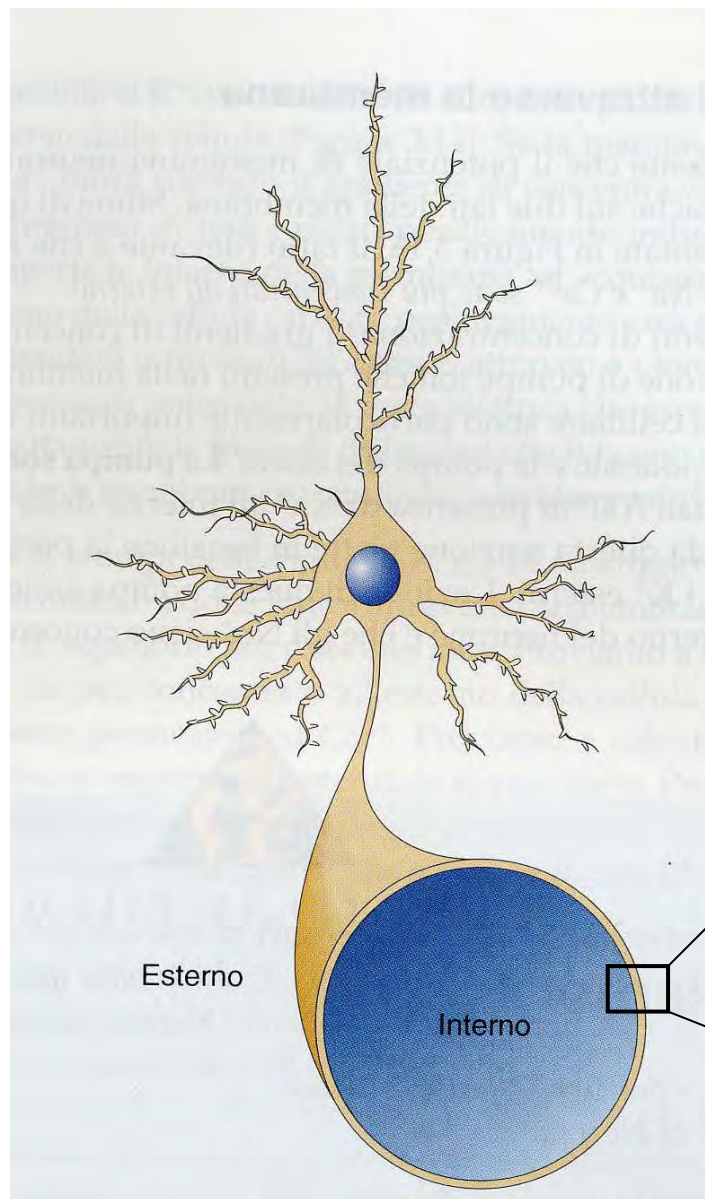


**Membrana
cellulare**

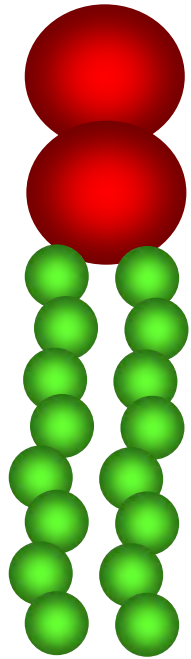
Citoplasma

Nucleo





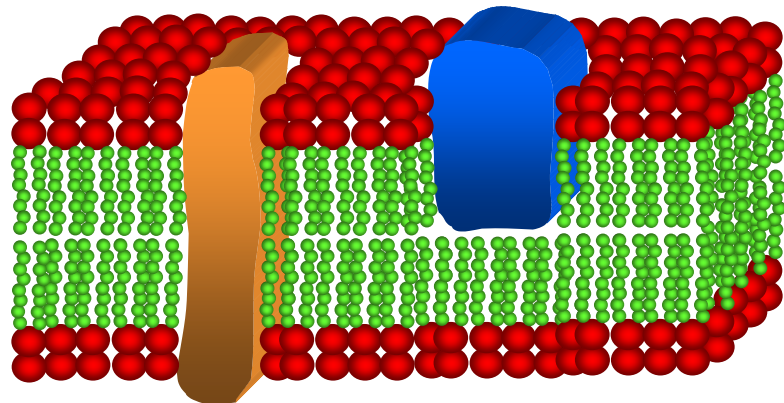
fosfolipide



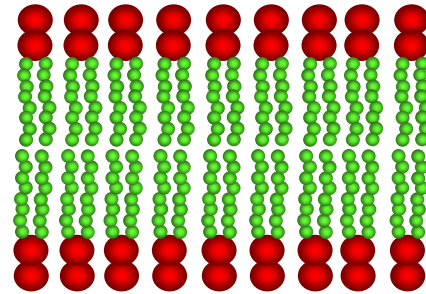
testa polare

sostanza amfipatica

coda apolare



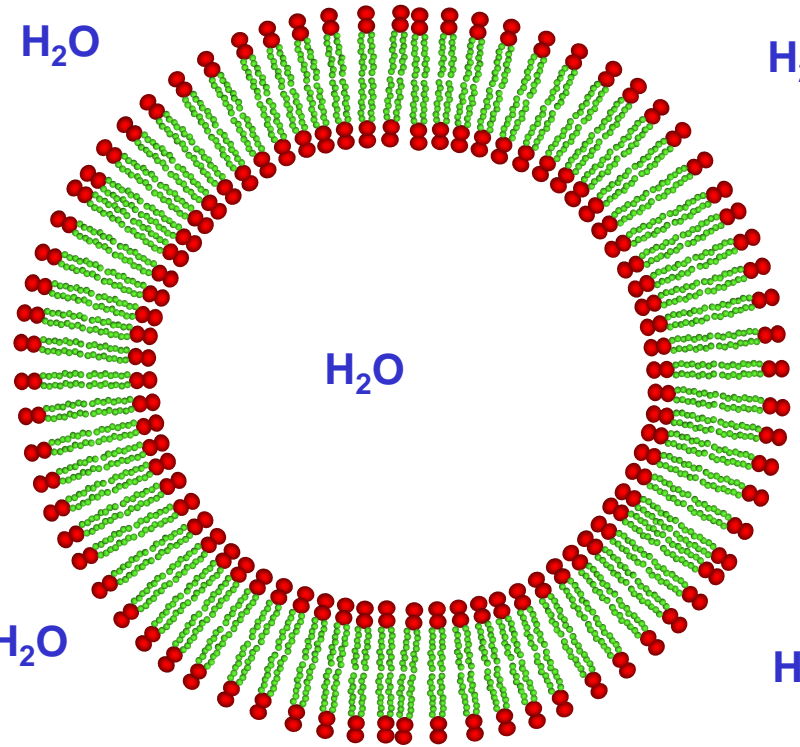
H₂O



H₂O

H₂O

H₂O



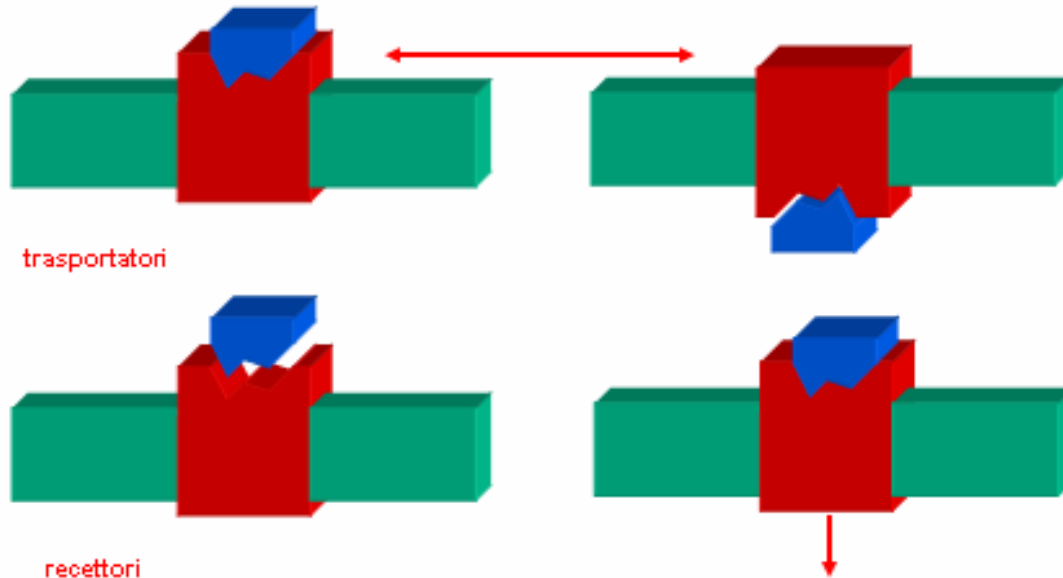
H₂O

H₂O

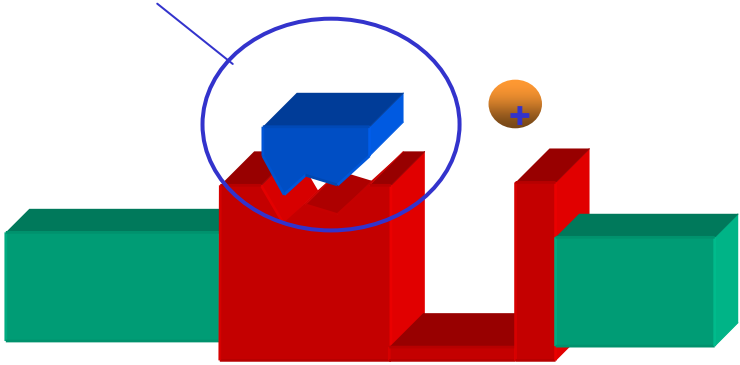
H₂O

Passaggio di sostanze attraverso la membrana

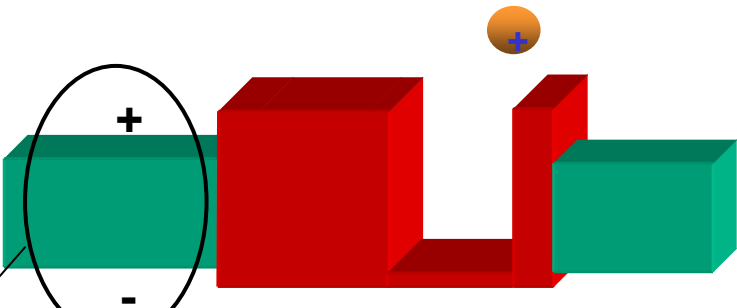
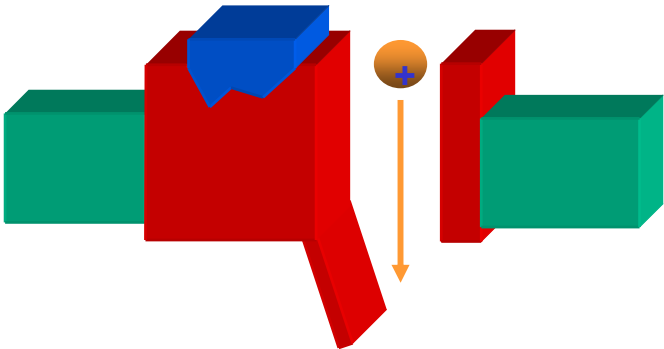
proteine di membrana



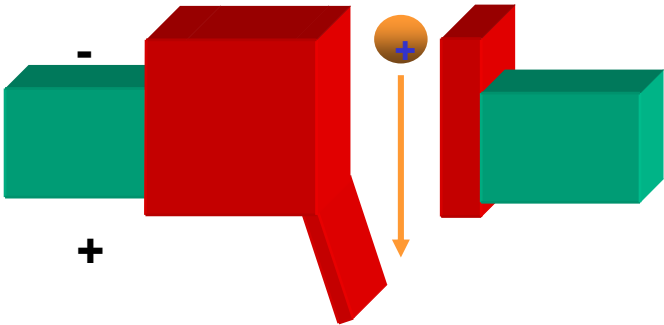
Sostanza chimica



canali ionici a porta chimica



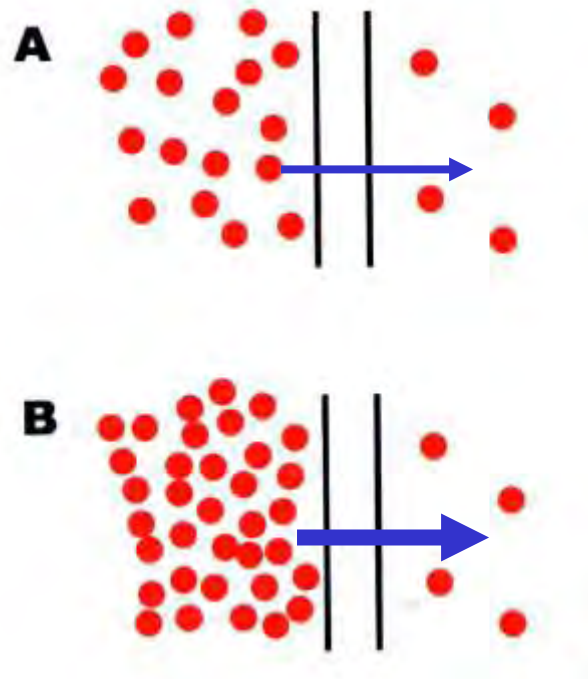
canali ionici a porta elettrica



Stimolo elettrico (corrente)

1) Diffusione semplice :

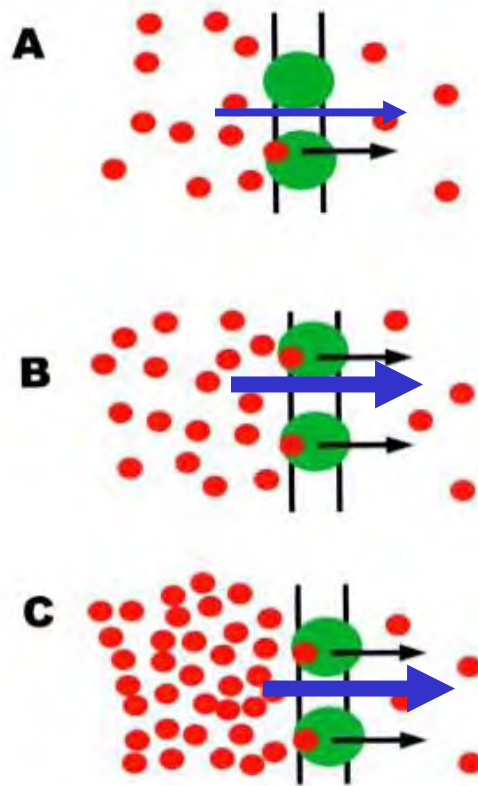
secondo il gradiente di concentrazione della sostanza



NON richiede il consumo di energia

2) Diffusione facilitata :

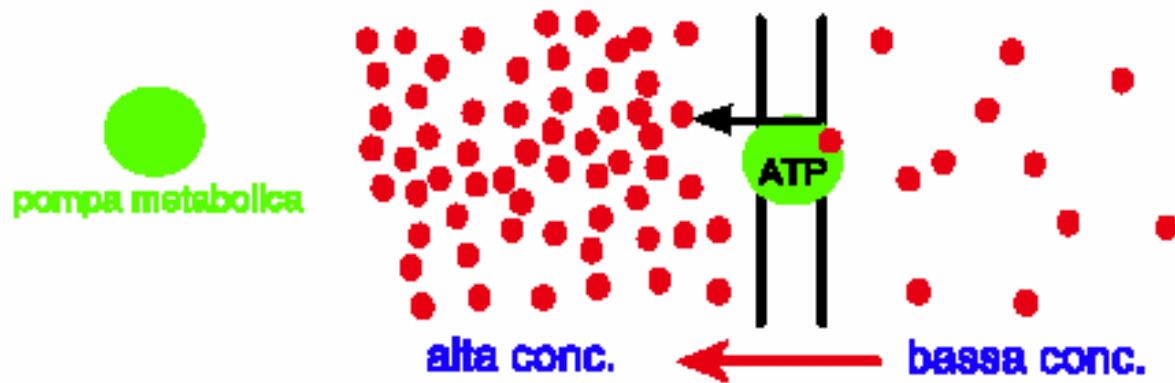
- secondo il gradiente di concentrazione della sostanza
- con l'intervento di una **proteina trasportatrice** ●



NON richiede il consumo di energia

3) Trasporto attivo :

- contro il gradiente di concentrazione
- richiede il consumo di energia



Come comunicano i neuroni?

I segnali impiegati dai neuroni per comunicare sono in gran parte determinati dalle proprietà elettriche della membrana cellulare

A riposo, i neuroni mantengono una differente distribuzione delle cariche elettriche tra l'esterno e l'interno della membrana

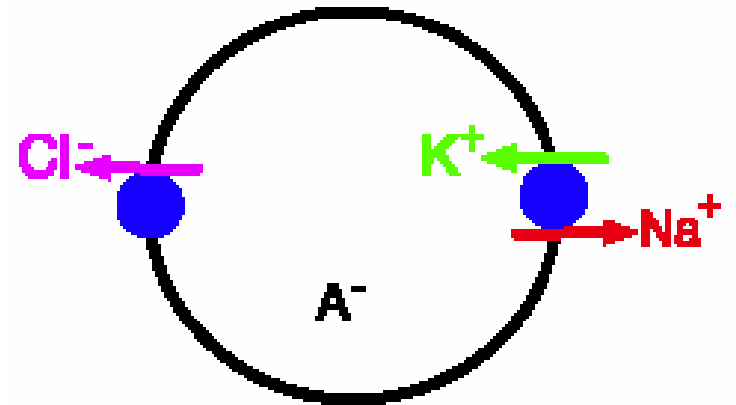
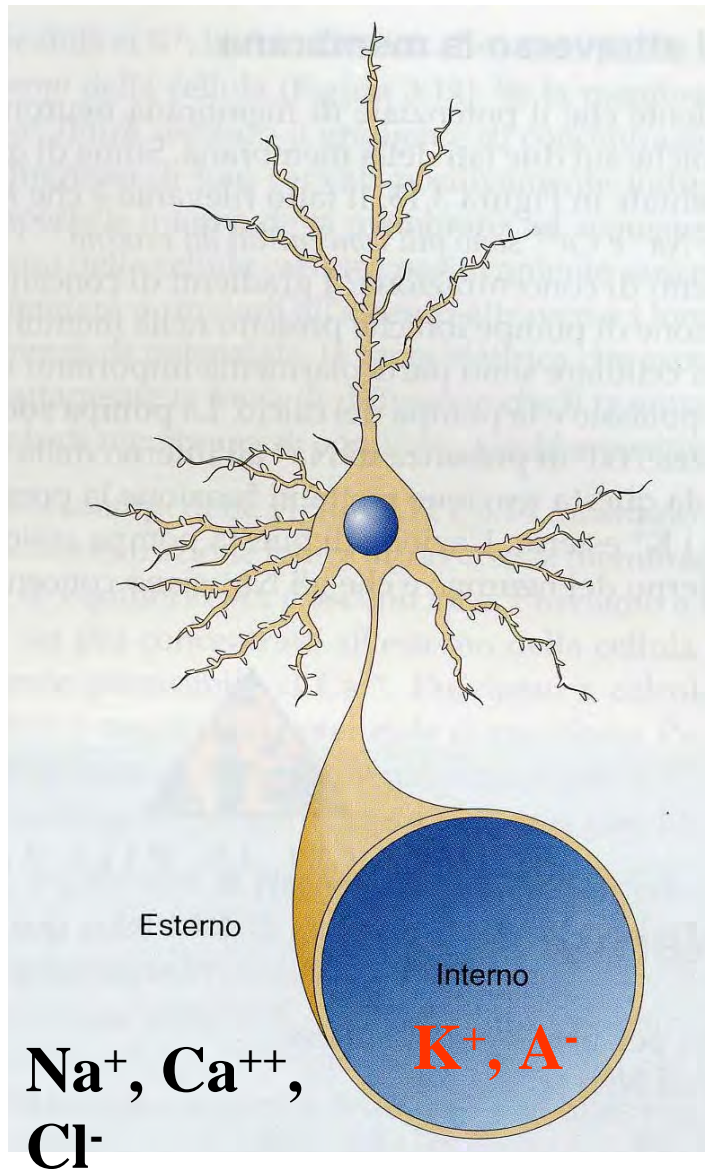
Questo potenziale elettrico è detto:

Potenziale di membrana di riposo V_m

- Le principali cariche elettriche sono rappresentate dagli **IONI** (molecole con cariche elettriche):

Sodio	Na⁺
Potassio	K⁺
Calcio	Ca⁺⁺
Cloro	Cl⁻

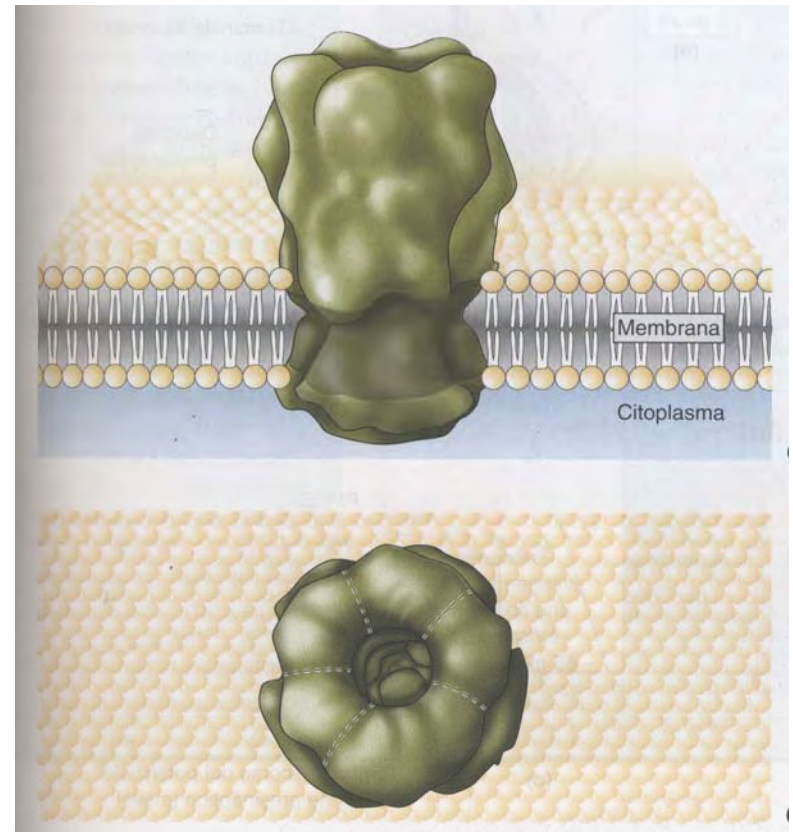
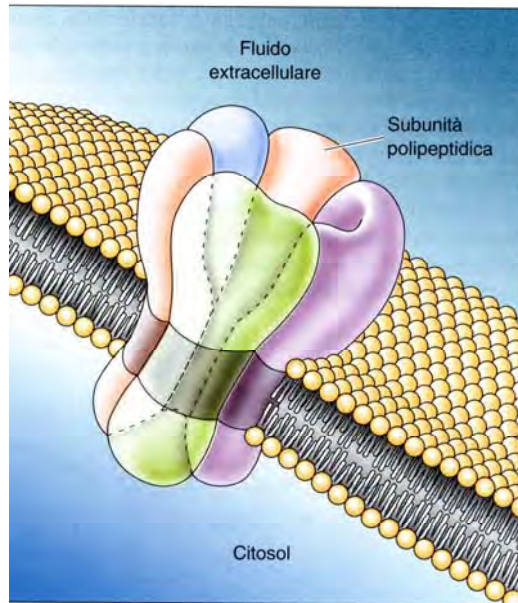
e **anioni proteici A⁻**



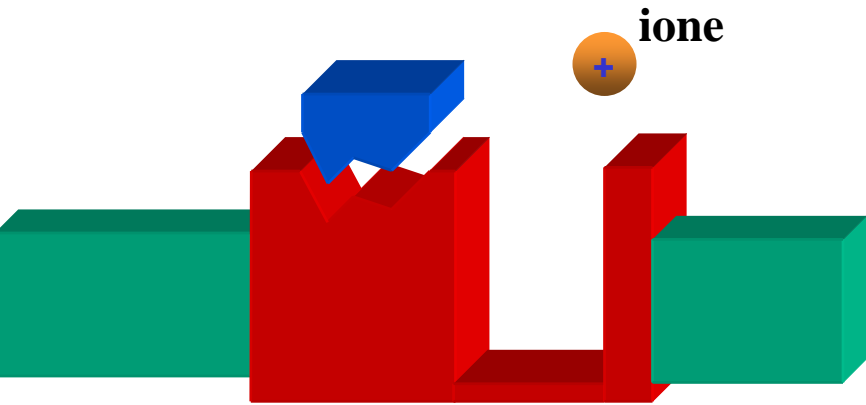
● Pompa metabolica

- Gli ioni **NON** possono attraversare liberamente la membrana cellulare, ma **SOLO** attraverso **CANALI**

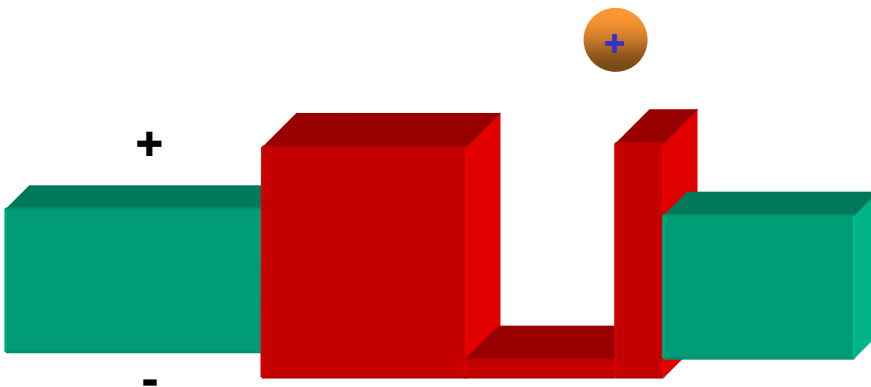
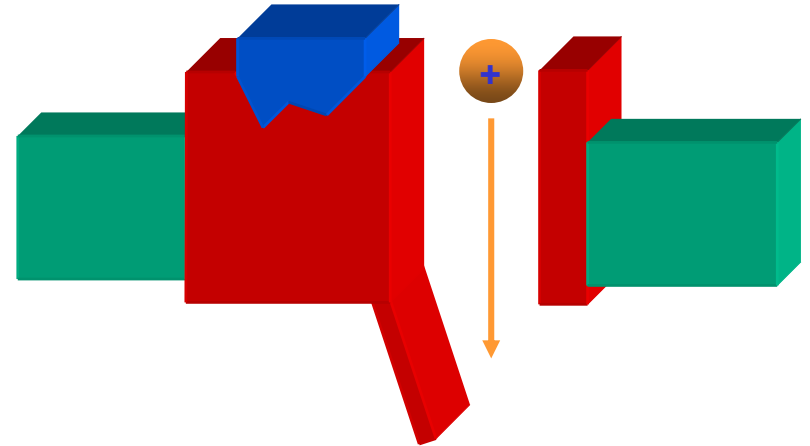
“CANALI IONICI”



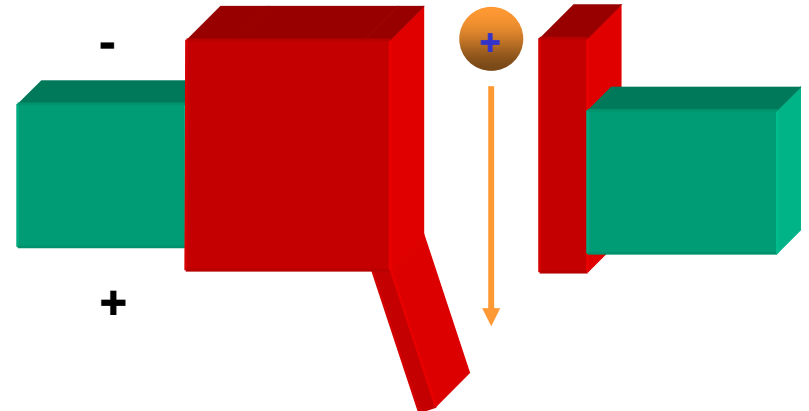
CANALI IONICI

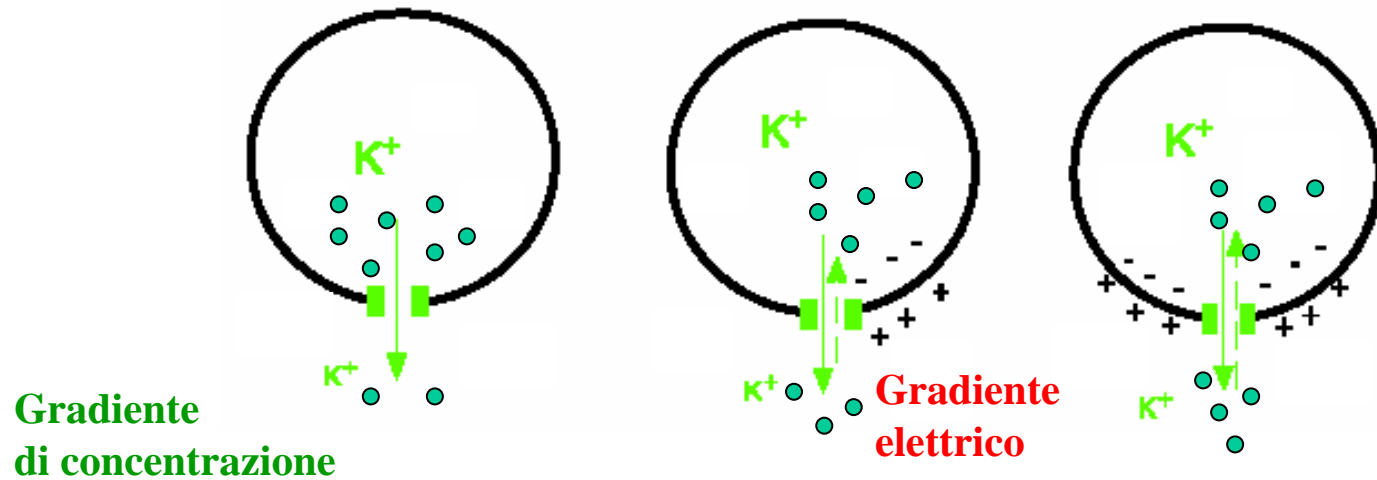


canali ionici a porta chimica
recettori ionotropi



canali ionici a porta elettrica



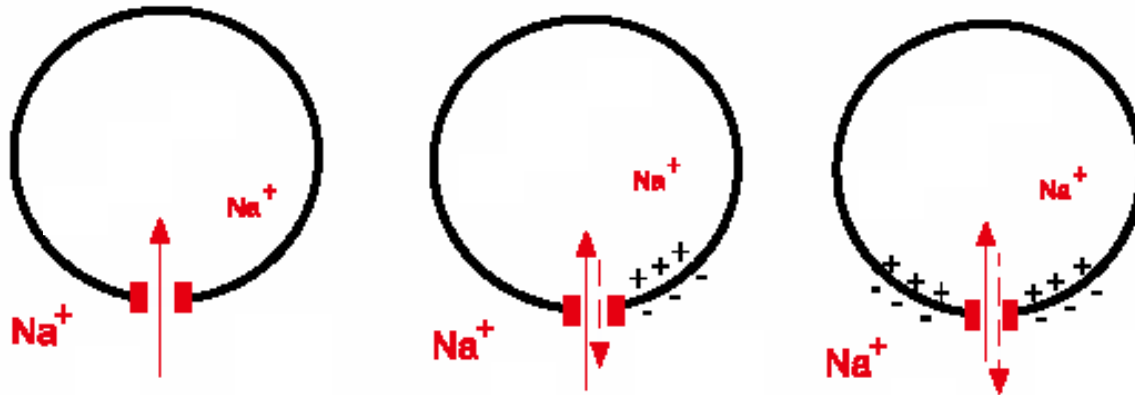


Equilibrio:

gradiente di concentrazione = e opposto a **gradiente elettrico**

Grazie a una particolare equazione (equazione di Nerst), è possibile calcolare il valore di potenziale a cui un determinato ione è in equilibrio

Potenziale d'Equilibrio per il potassio $E_{K^+} = -90 \text{ mV}$



$$E_{\text{Na}^+} = +55 \text{ mV}$$

A riposo la membrana presenta un numero maggiore di canali aperti per il potassio che per il sodio (30:1).

Di conseguenza, il potenziale di riposo è più vicino al potenziale di equilibrio del potassio (-90 mV) che a quello del sodio (+55 mV)

Potenziale di riposo $V_m = -70$ mV