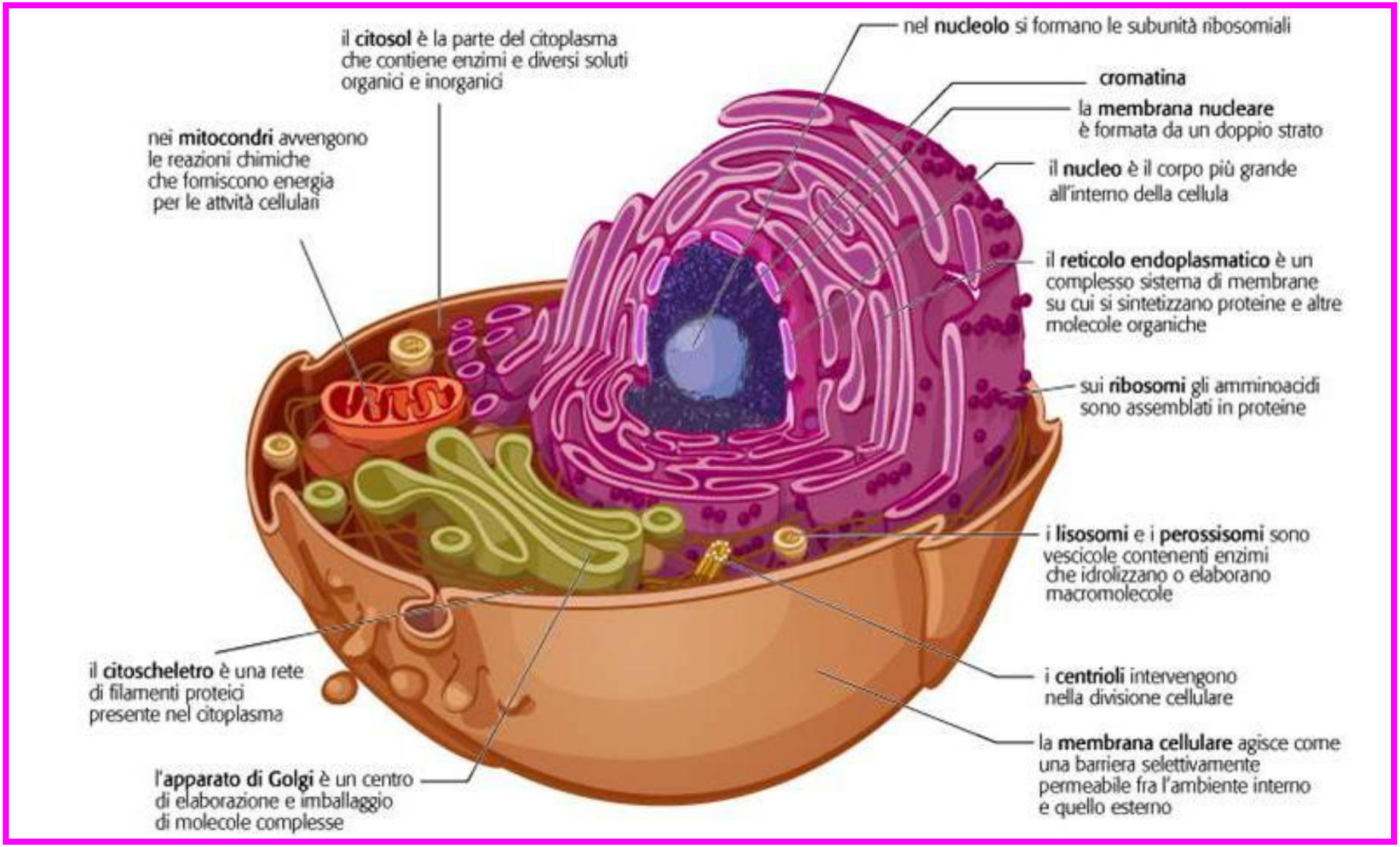
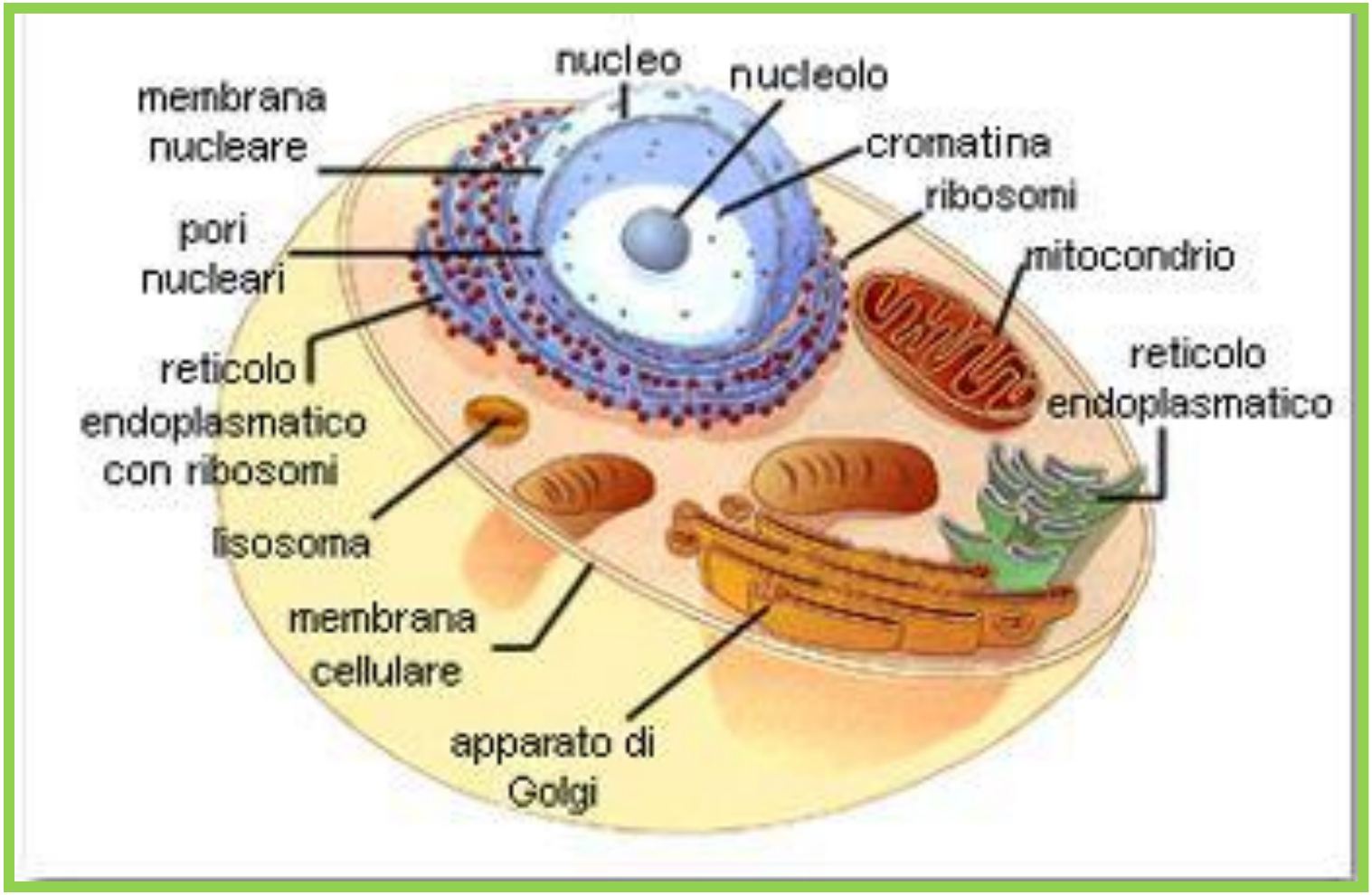
Il ruolo delle cellule nello sviluppo

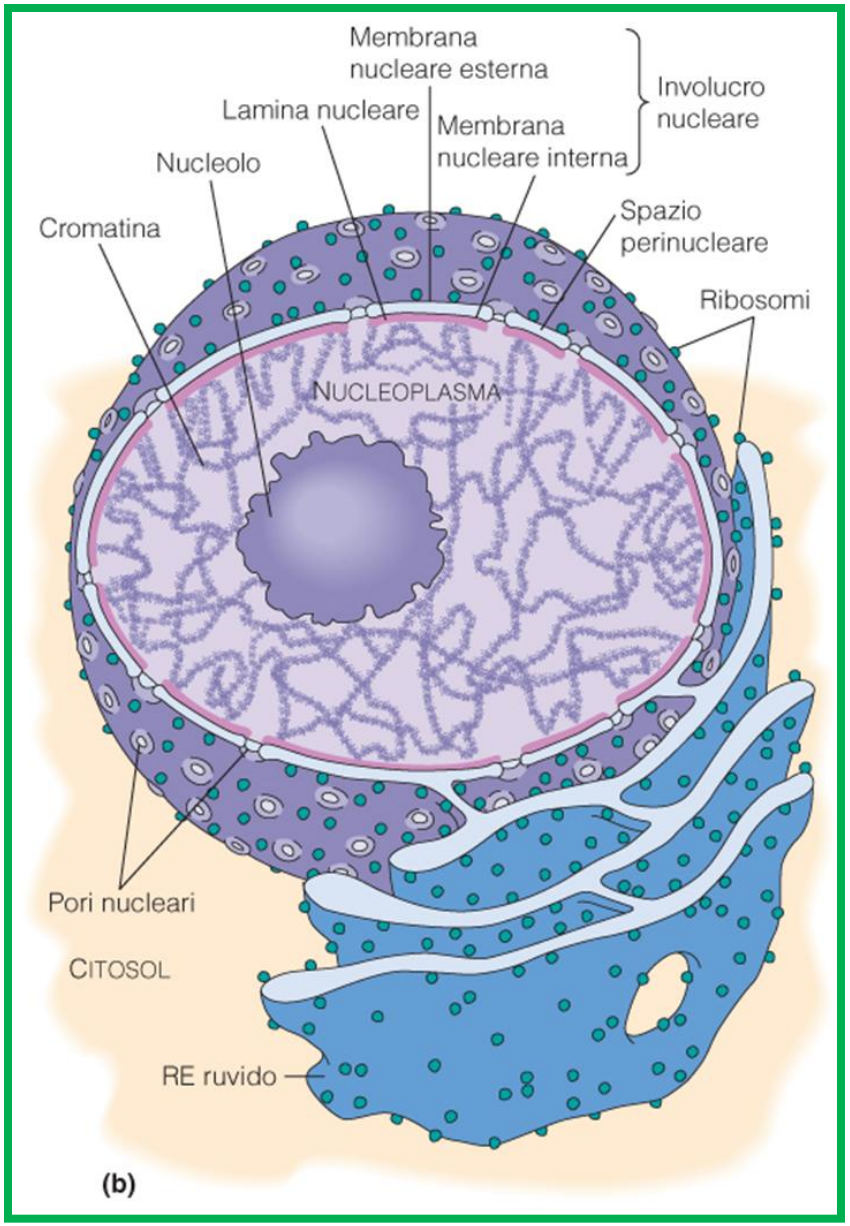
La cellula eucariotica



Le cellule sono le unità fondamentali della materia vivente

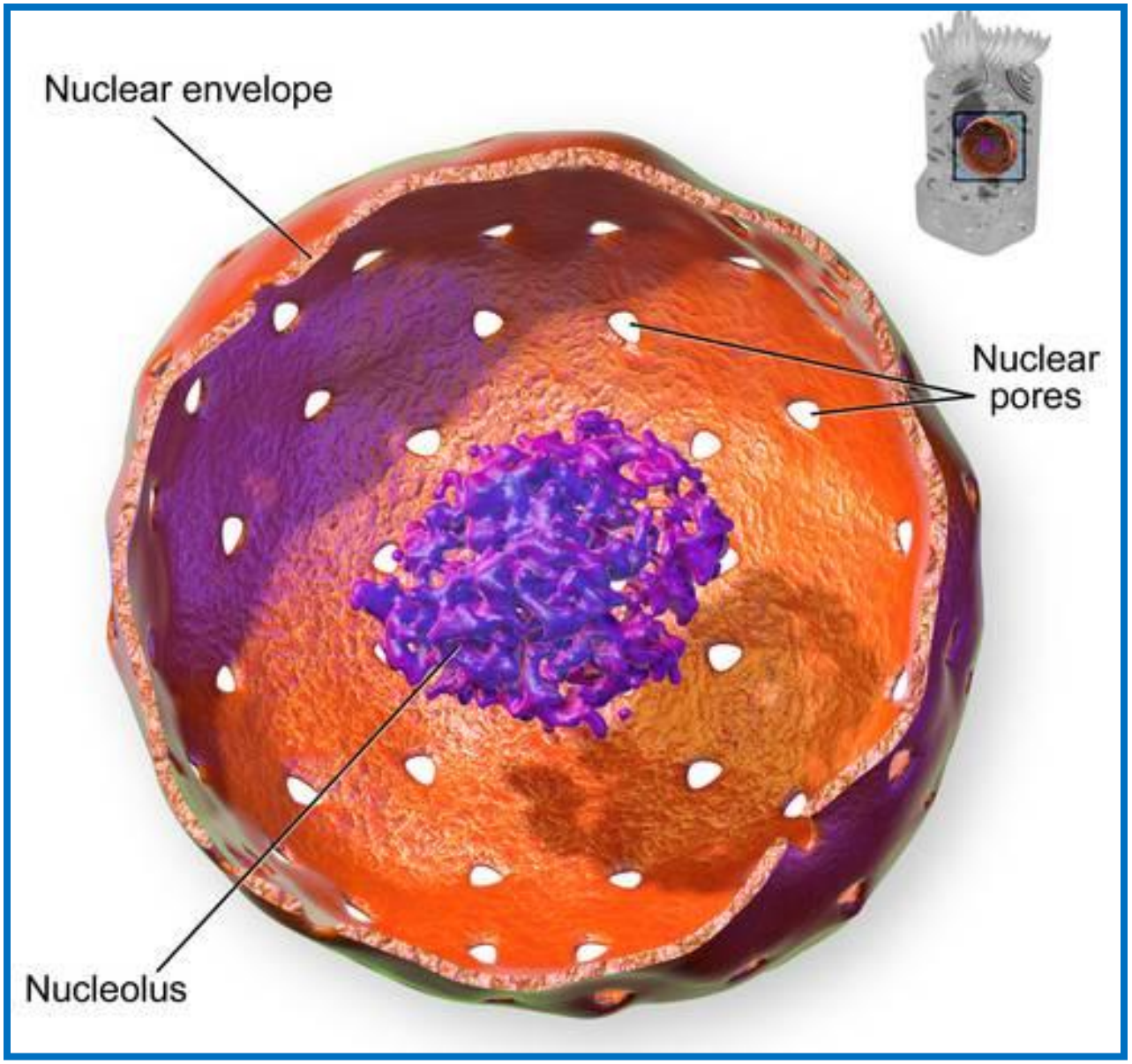

nucleo
nucleolo
membrana nucleare
cromatina
ribosomi
pori nucleari
mitocondrio
reticolo endoplasmatico
reticolo endoplasmatico con ribosomi
lisosoma
membrana cellulare
apparato di Golgi

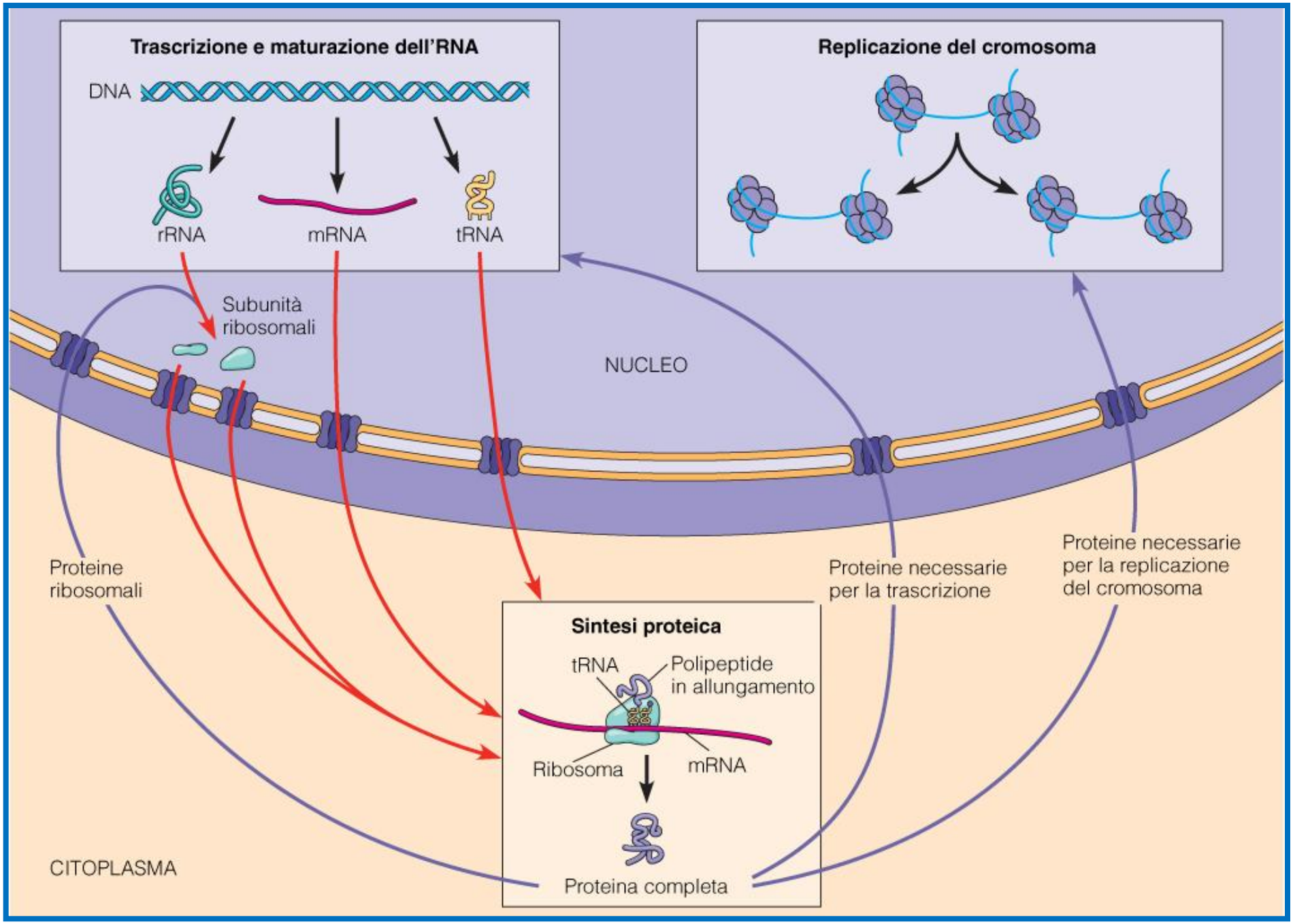
Il nucleo



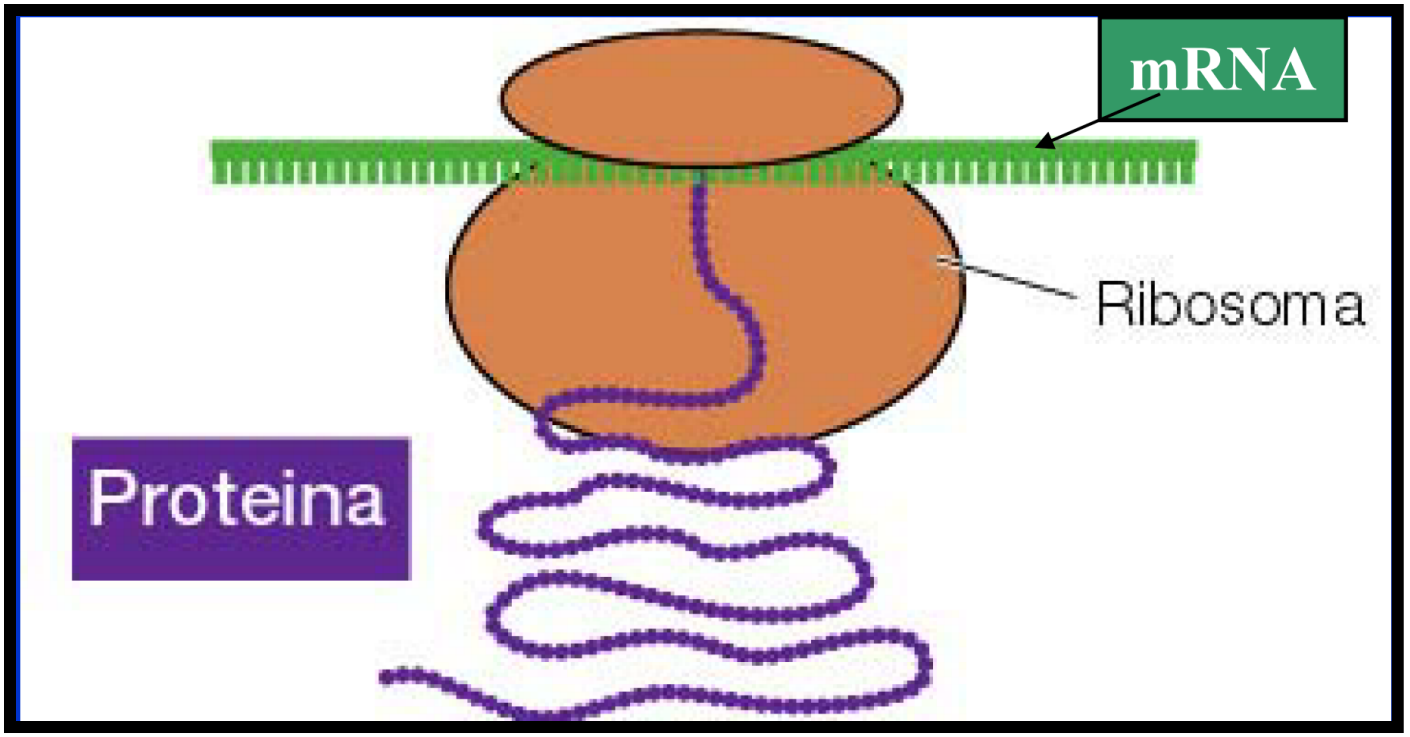
Il suo scopo è quello di:

- Contenere gli acidi nucleici;
- Duplicare il DNA;
- Trascrivere e maturare l'RNA;
- Dirigere le attività cellulari

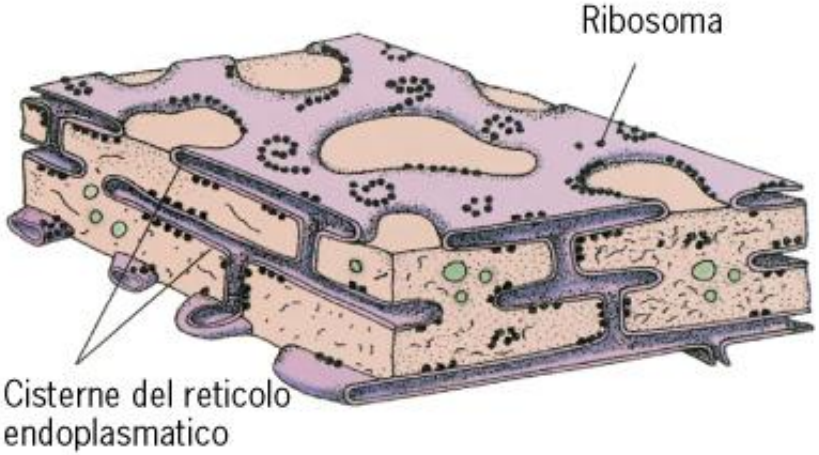

Nuclear envelope
Nuclear pores
Nucleolus

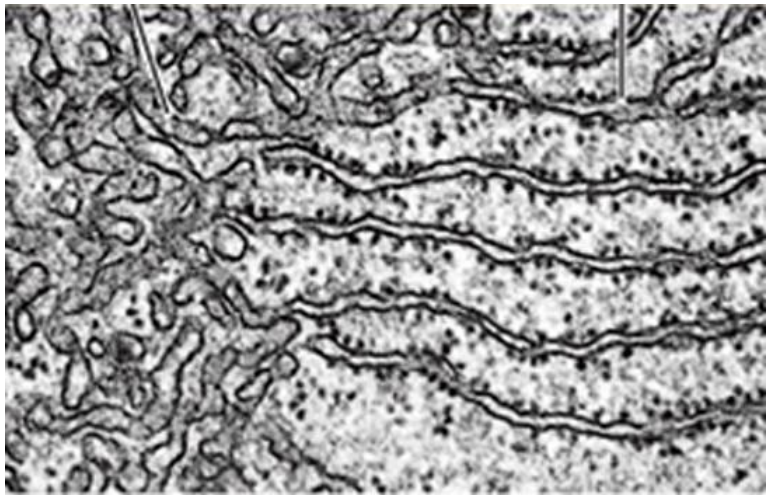

Trascrizione e maturazione dell'RNA
DNA
rRNA
mRNA
tRNA
Replicazione del cromosoma
Subunità ribosomali
NUCLEO
Proteine ribosomali
Proteine necessarie per la trascrizione
Proteine necessarie per la replicazione del cromosoma
Sintesi proteica
tRNA
Polipeptide in allungamento
Ribosoma
mRNA
Proteina completa
CITOPLASMA

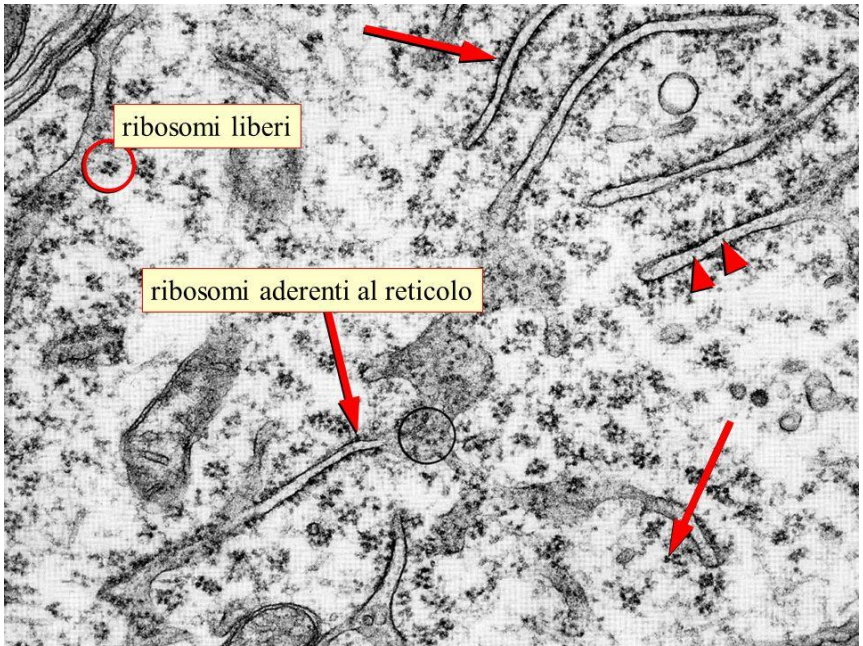
I ribosomi



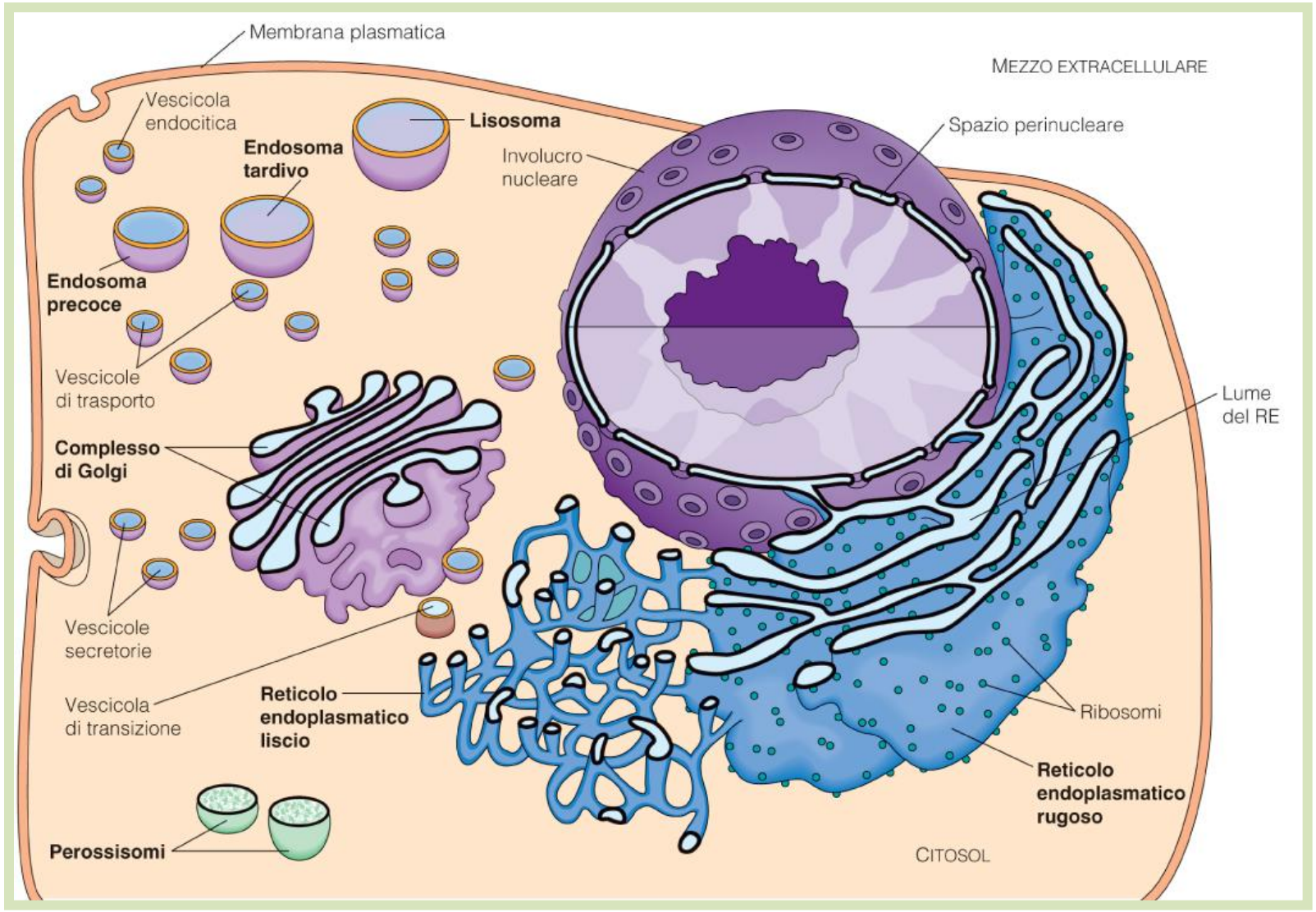
Il Reticolo Endoplasmatico Rugoso

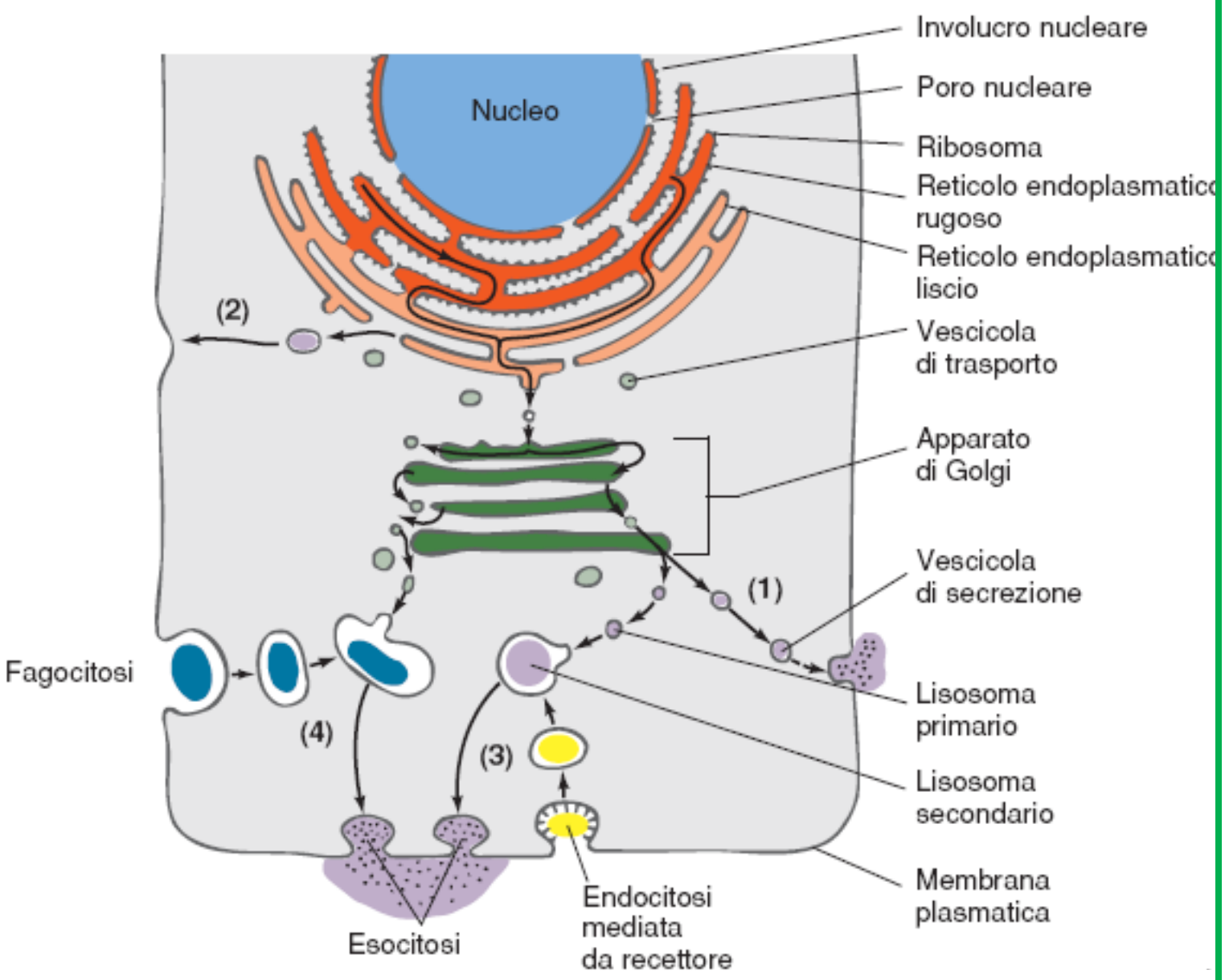


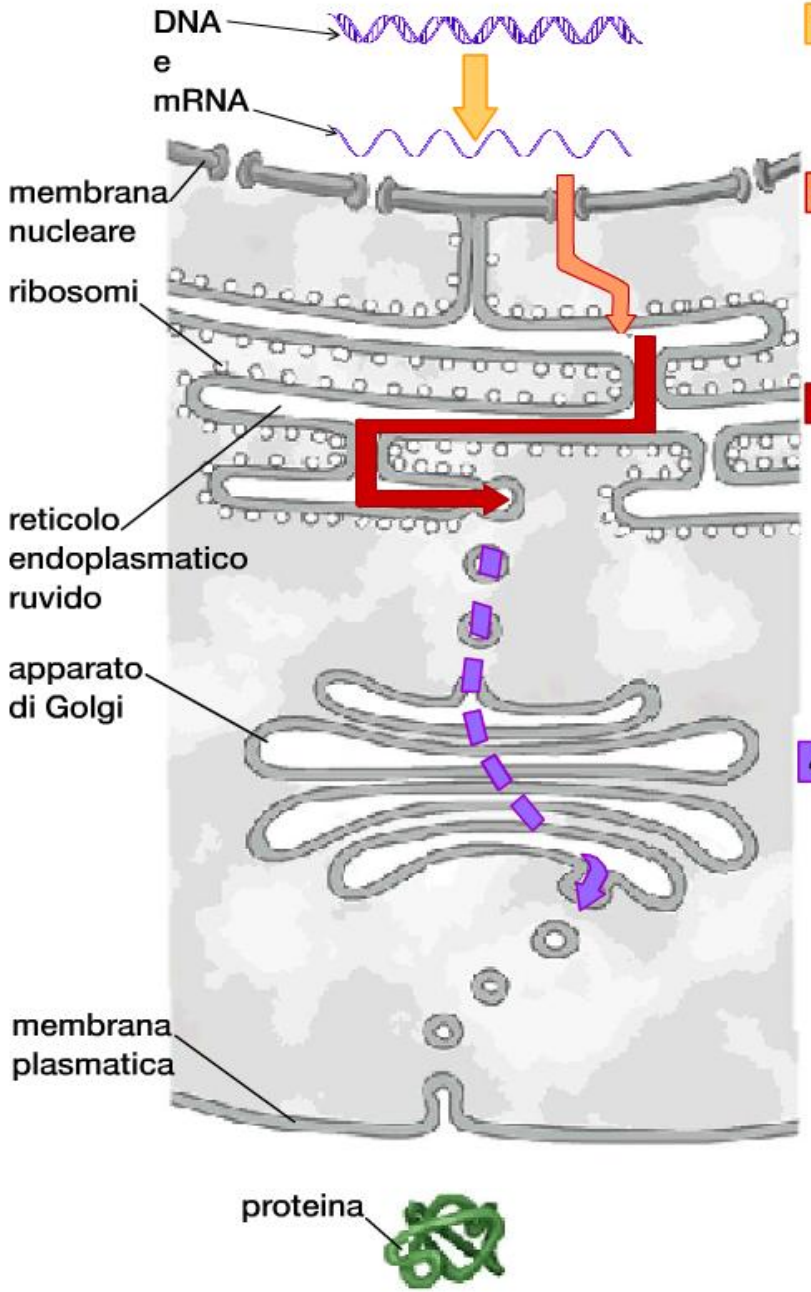




Il RER e il Golgi




Involucro nucleare
Poro nucleare
Nucleo
Ribosoma
Reticolo endoplasmatico rugoso
Reticolo endoplasmatico liscio
(2)
Vescicola di trasporto
Apparato di Golgi
Vescicola di secrezione
(1)
Fagocitosi
(4)
(3)
Lisosoma primario
Lisosoma secondario
Membrana plasmatica
Endocitosi mediata da recettore
Esocitosi



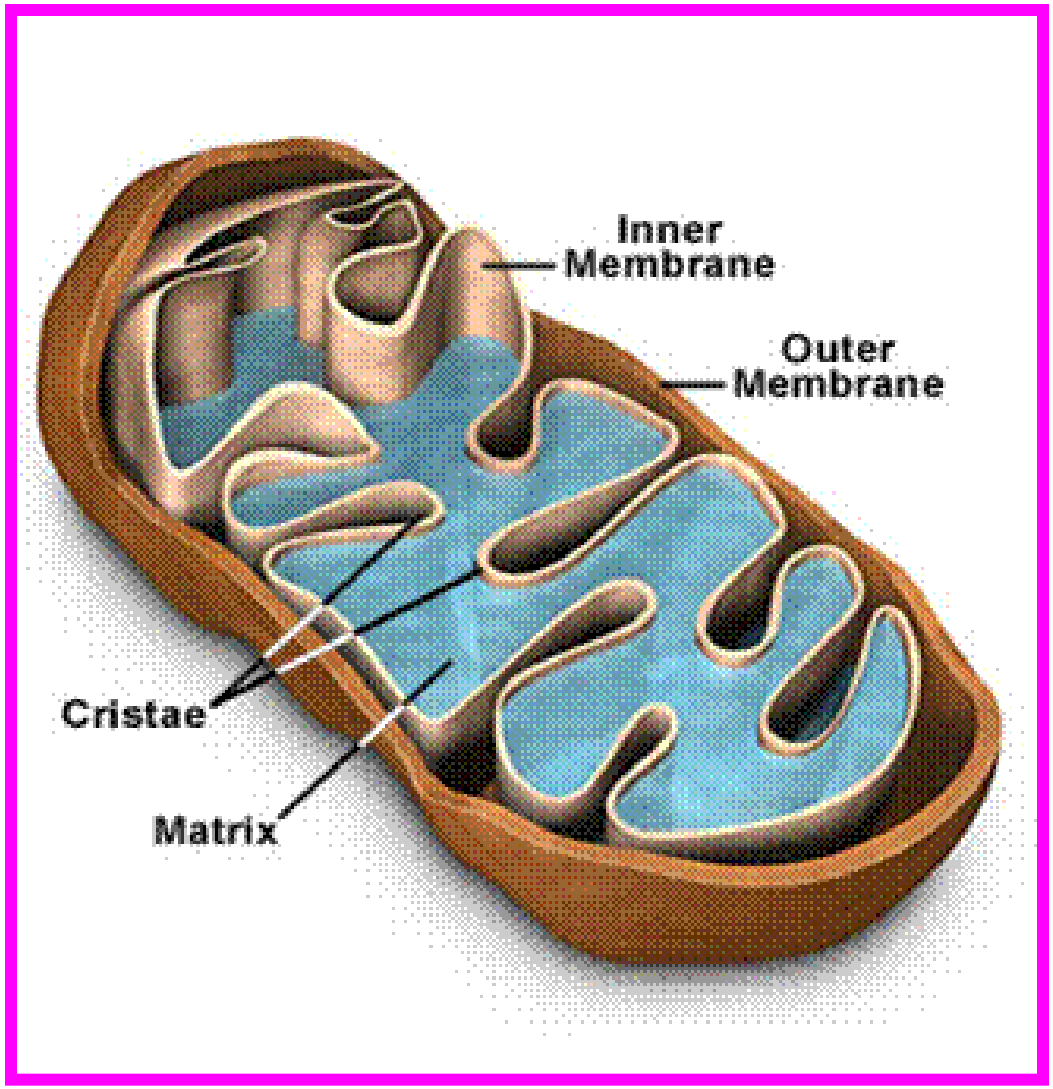
1 **TRASCRIZIONE**
Le istruzioni del DNA vengono copiate in mRNA

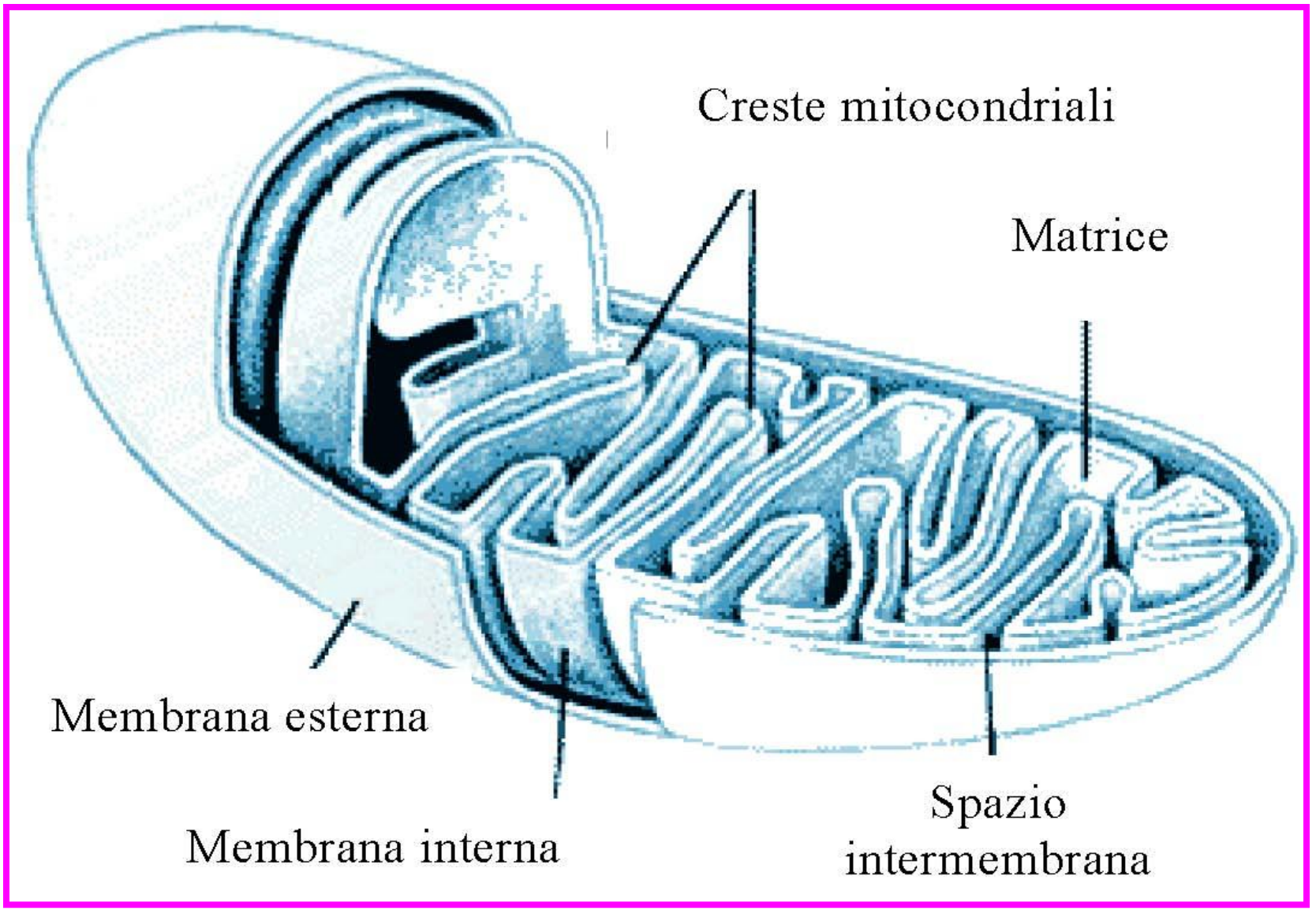
2 **TRADUZIONE**
L'mRNA esce dai pori nucleari, raggiunge i ribosomi dove le istruzioni vengono "lette" e tradotte in proteine

3 La proteina entra nel reticolo endoplasmatico ruvido dove si ripiega su se stessa

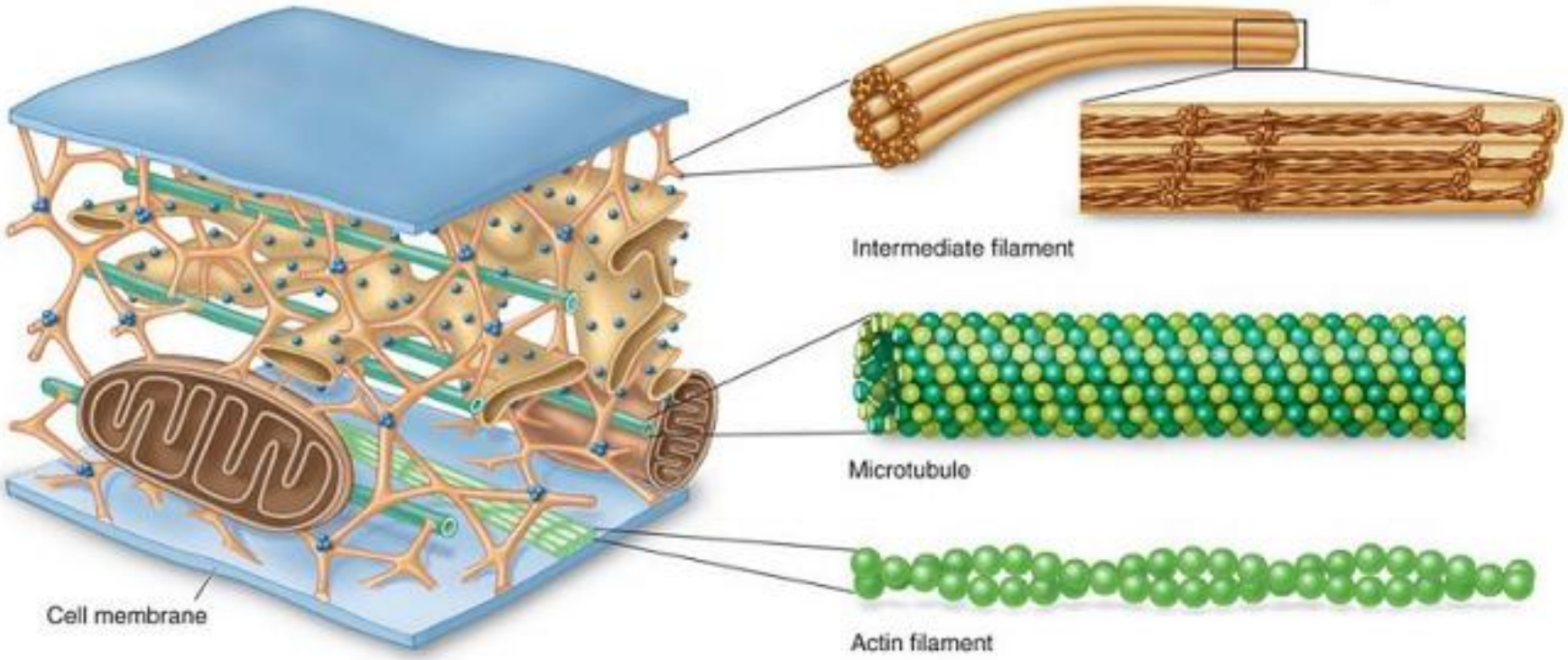
4 La proteina, attraverso vesciole di trasporto, passa nell'apparato di Golgi per ulteriori elaborazioni e per essere smistata a destinazione

I mitocondri

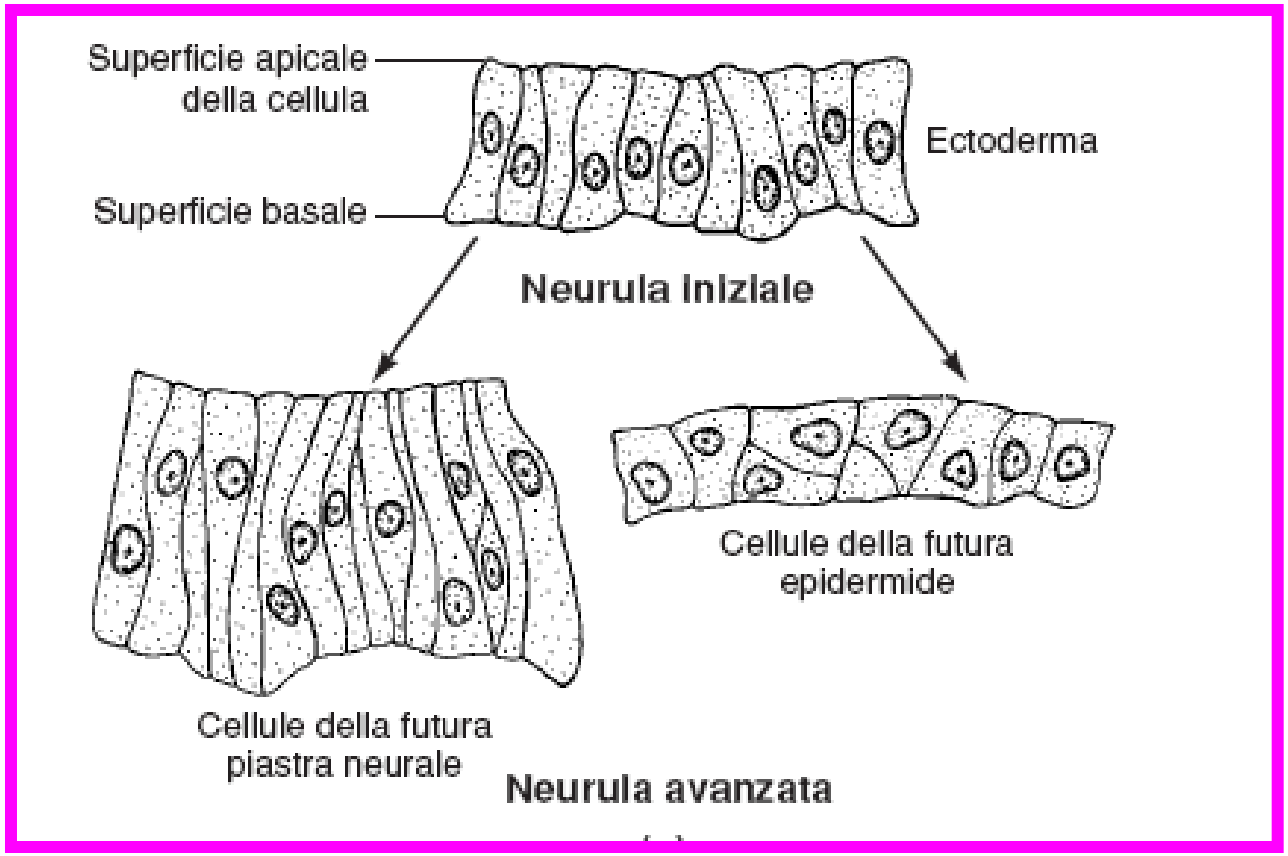



Creste mitocondriali
Matrice
Membrana esterna
Membrana interna
Spazio
intermembrana

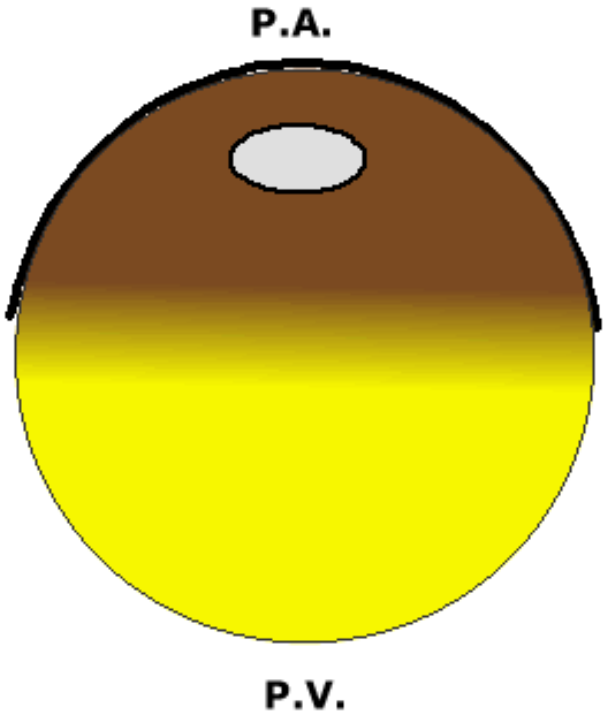
Il citoscheletro



Il citoscheletro: cambiamento della forma delle cellule



Il citoscheletro: distribuzione di molecole e organuli nella cellula



Il citoscheletro e il movimento delle cellule

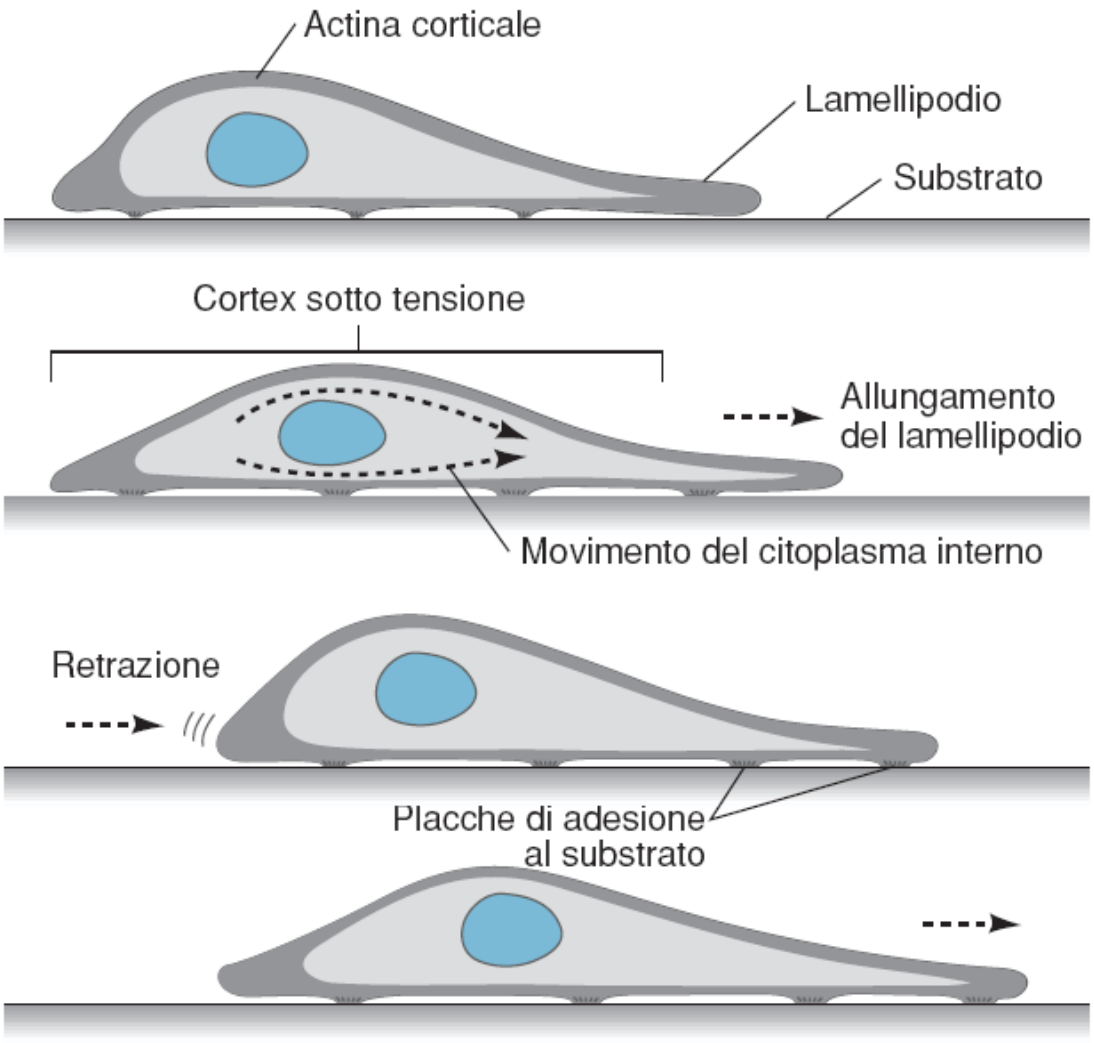
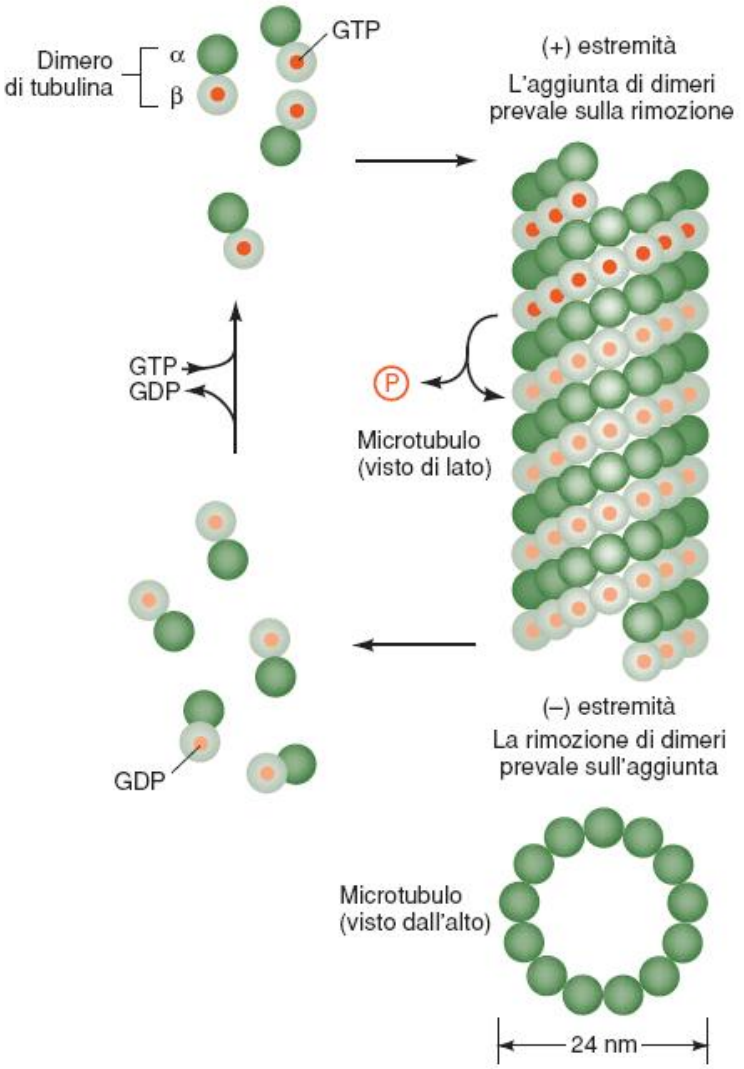
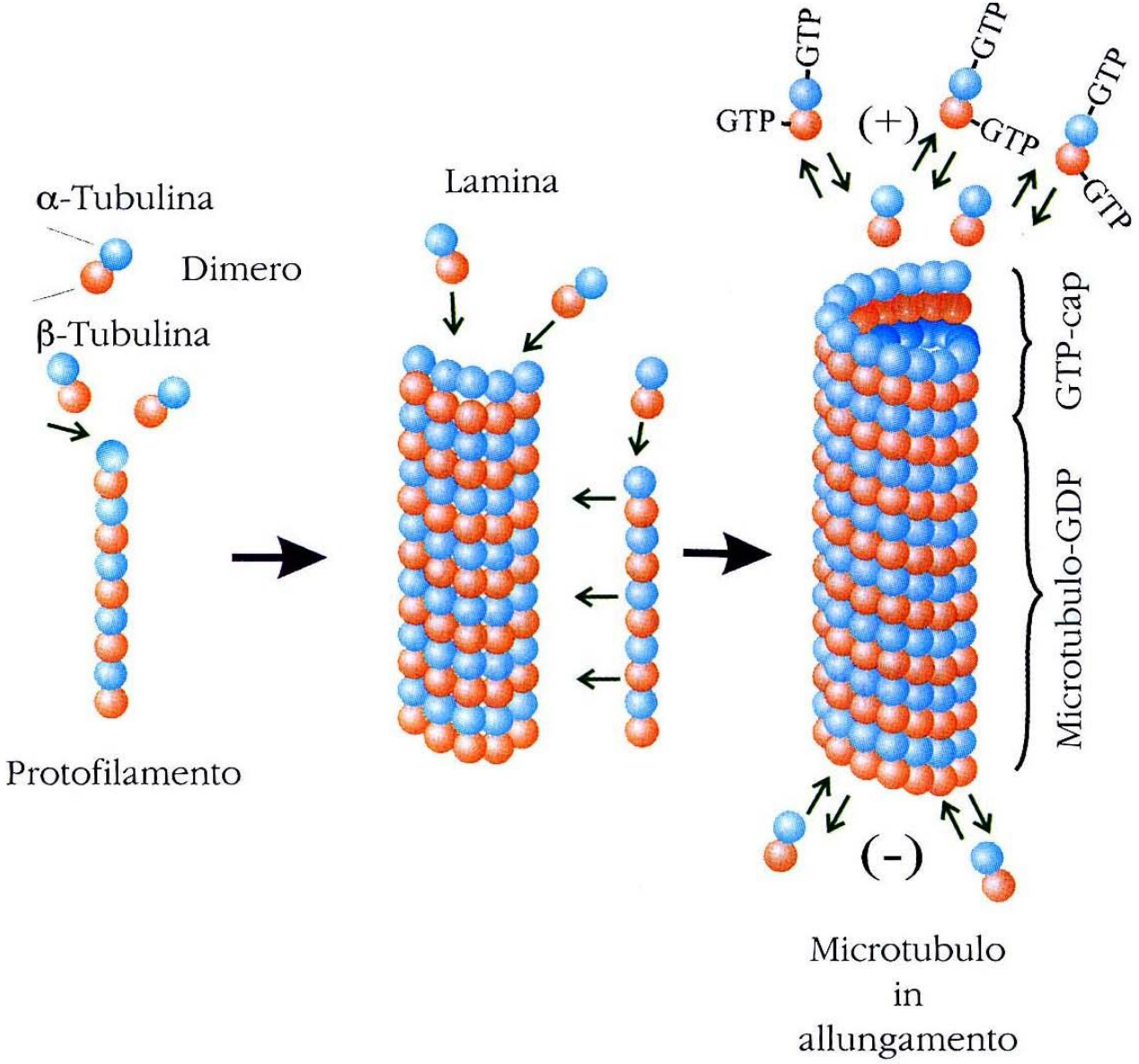


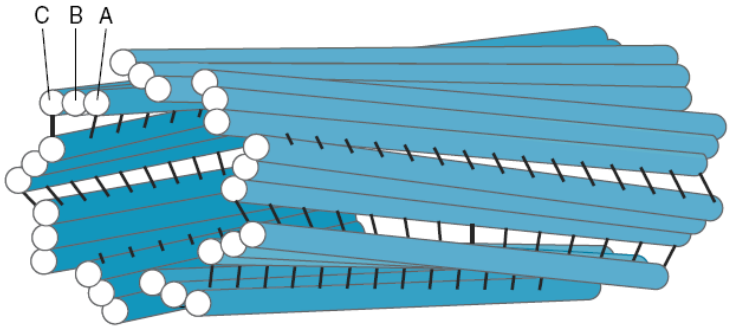
Figura 2.19 Schema del movimento di un fibroblasto in coltura.

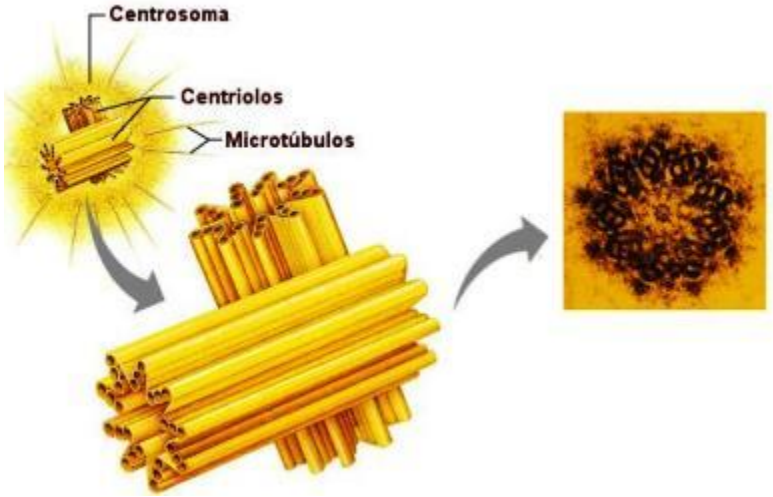
I microtubuli

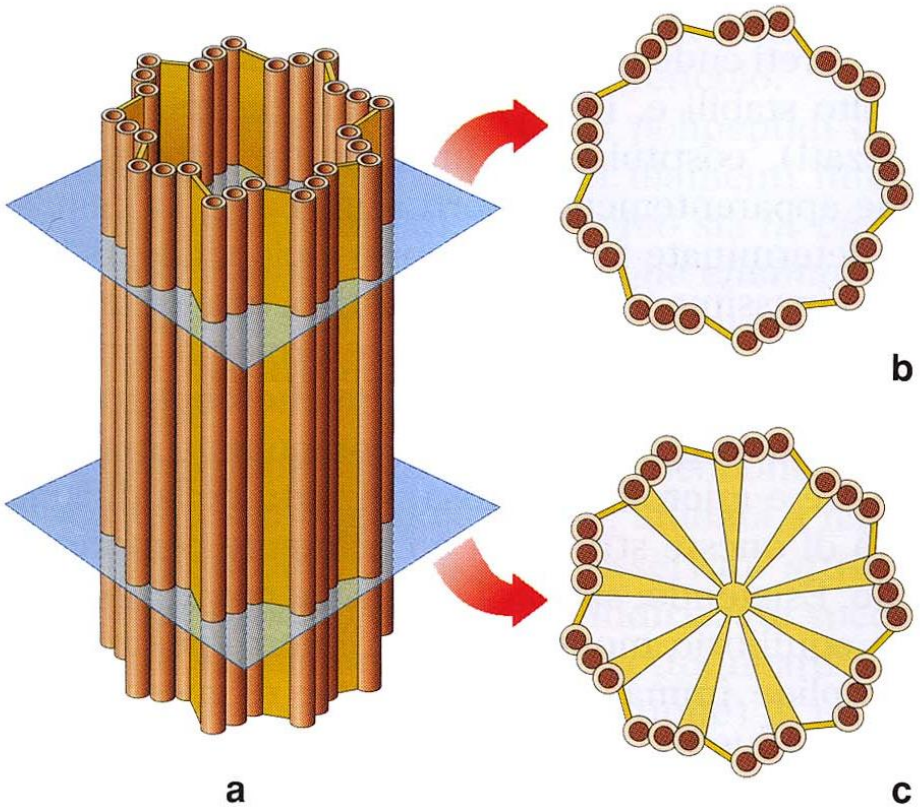


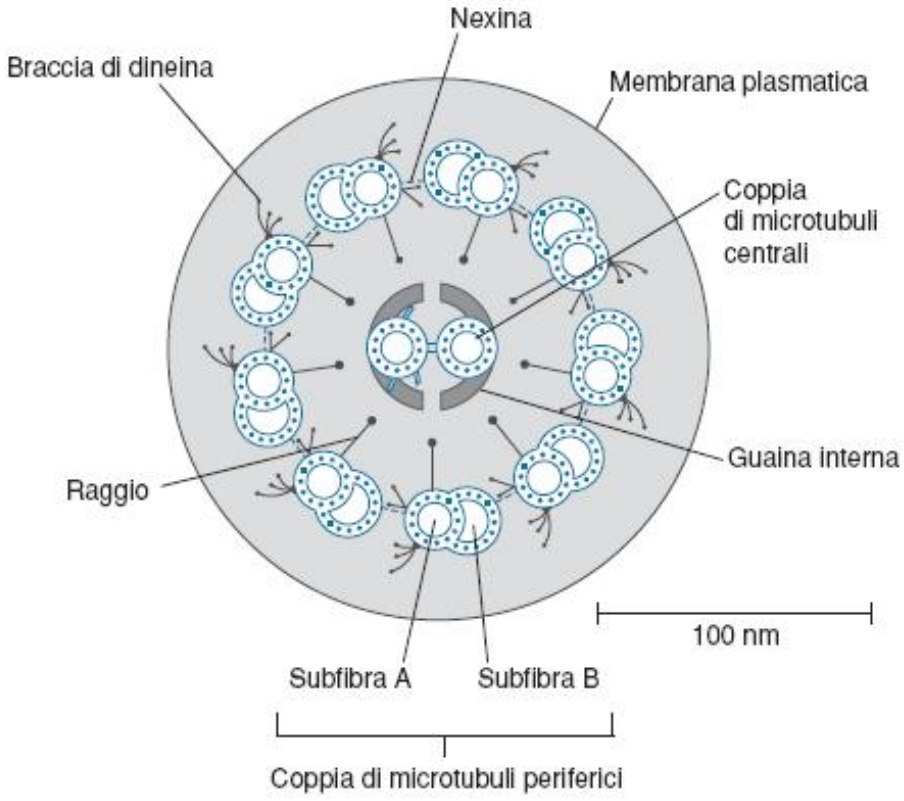

α-Tubulina
Dimero
β-Tubulina
Protofilamento
Lamina
GTP
(+)
(-)
GTP-cap
Microtubulo-GDP
Microtubulo
in
allungamento

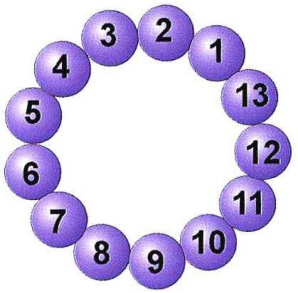
I microtubuli



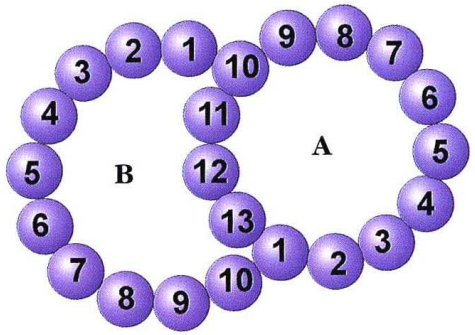



a
b
c





Micronodulo



Coppia

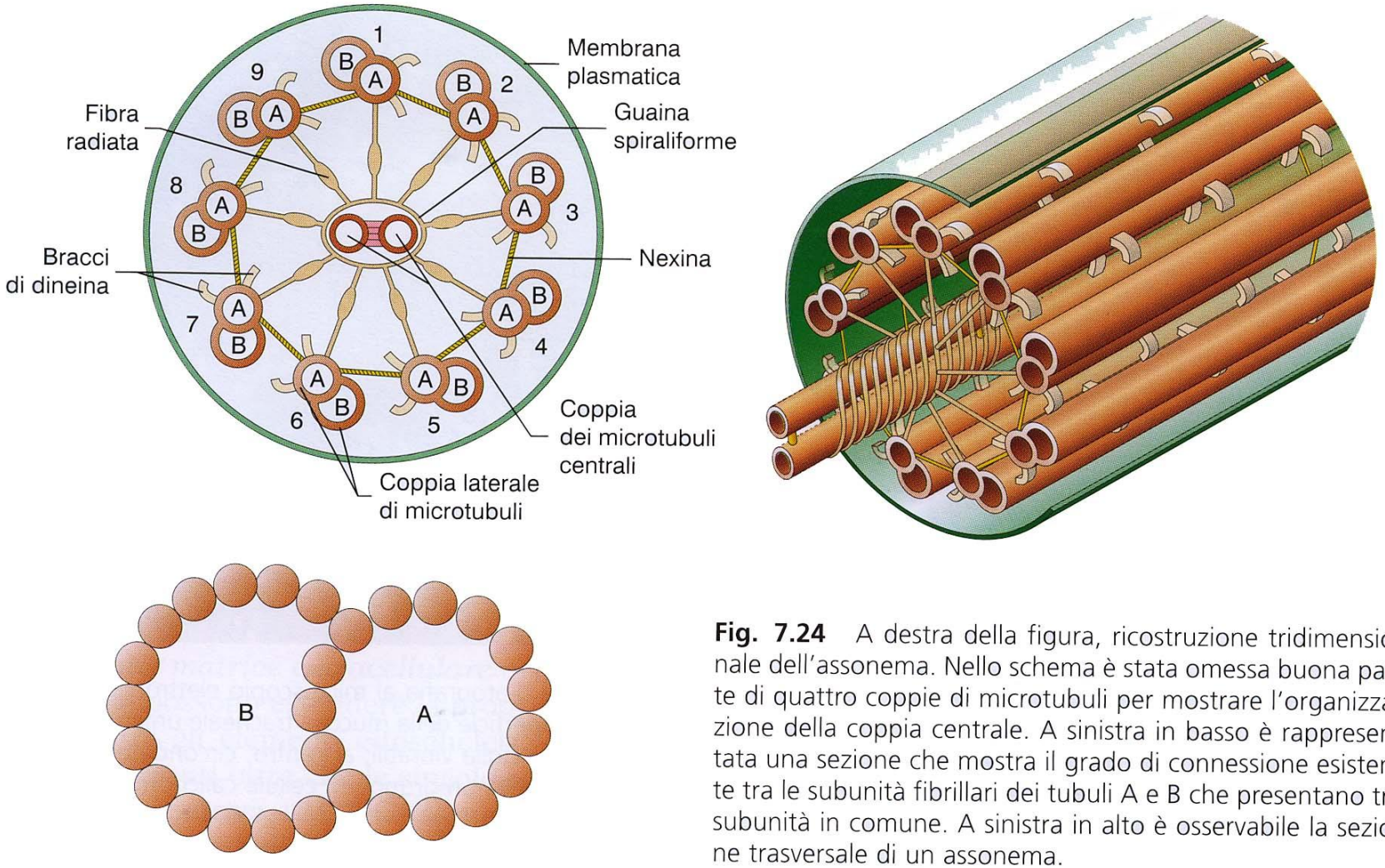
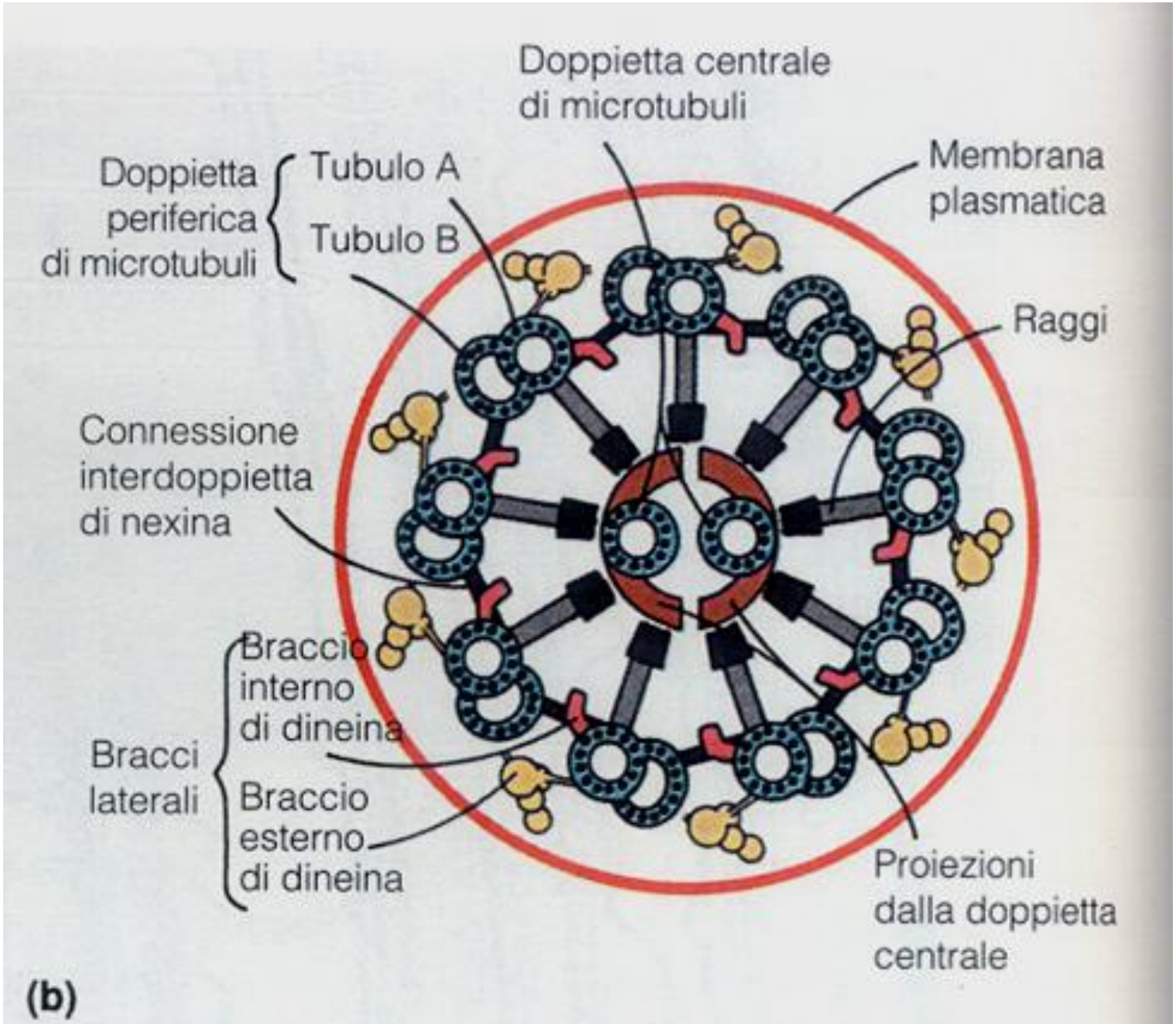
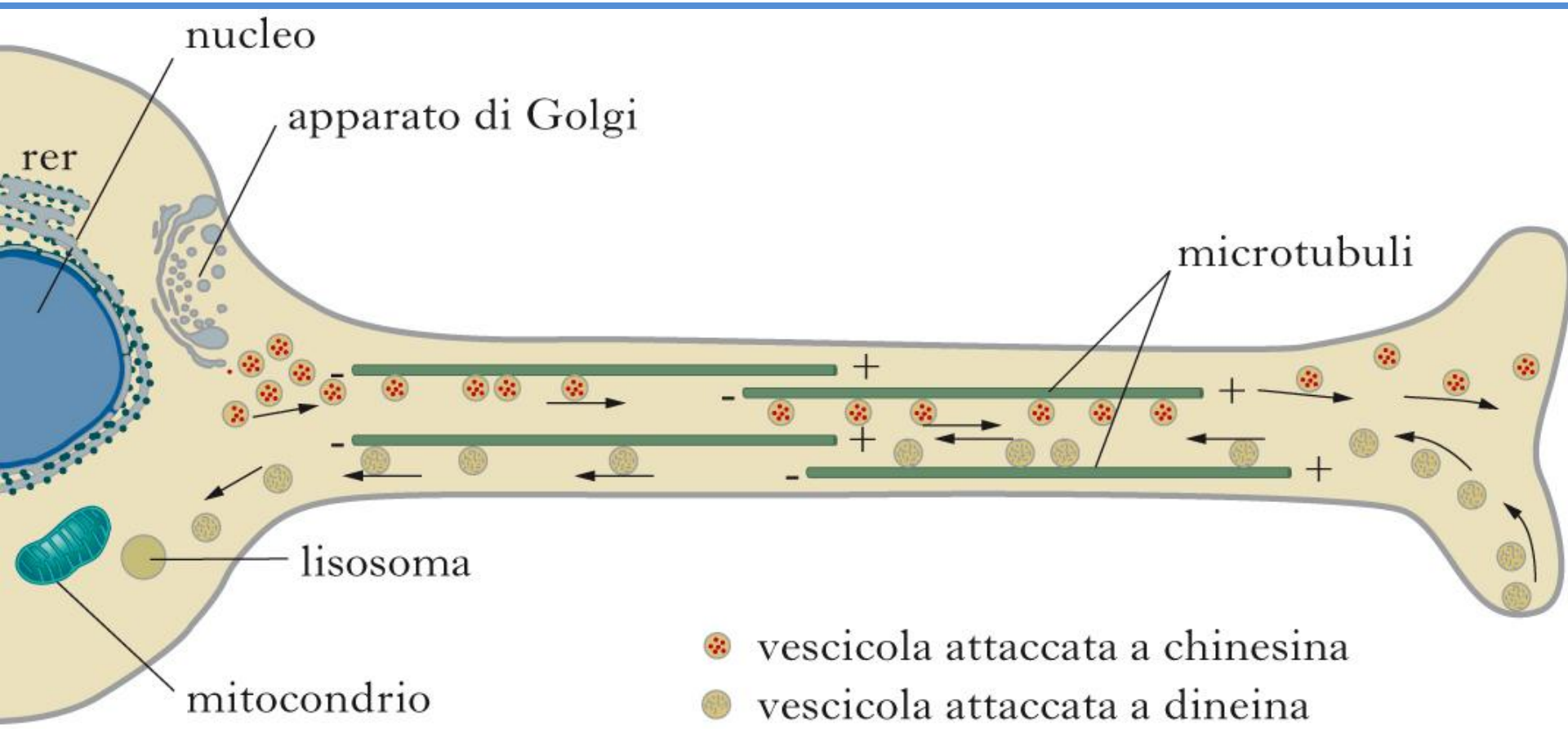


Fig. 7.24 A destra della figura, ricostruzione tridimensionale dell'assonema. Nello schema è stata omessa buona parte di quattro coppie di microtubuli per mostrare l'organizzazione della coppia centrale. A sinistra in basso è rappresentata una sezione che mostra il grado di connessione esistente tra le subunità fibrillari dei tubuli A e B che presentano tre subunità in comune. A sinistra in alto è osservabile la sezione trasversale di un assonema.

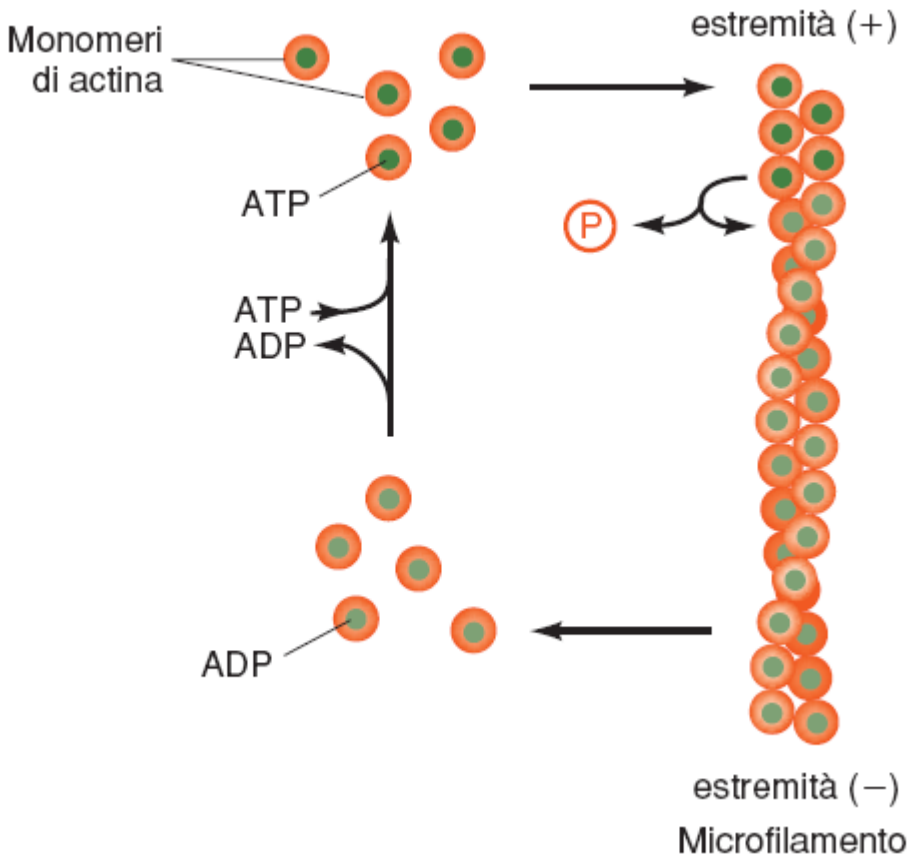

Doppietta centrale
di microtubuli
Doppietta
periferica
di microtubuli
Tubulo A
Tubulo B
Membrana
plasmatica
Raggi
Connessione
interdoppietta
di nexina
Bracci
laterali
Braccio
interno
di dineina
Braccio
esterno
di dineina
Proiezioni
dalla doppietta
centrale

(b)

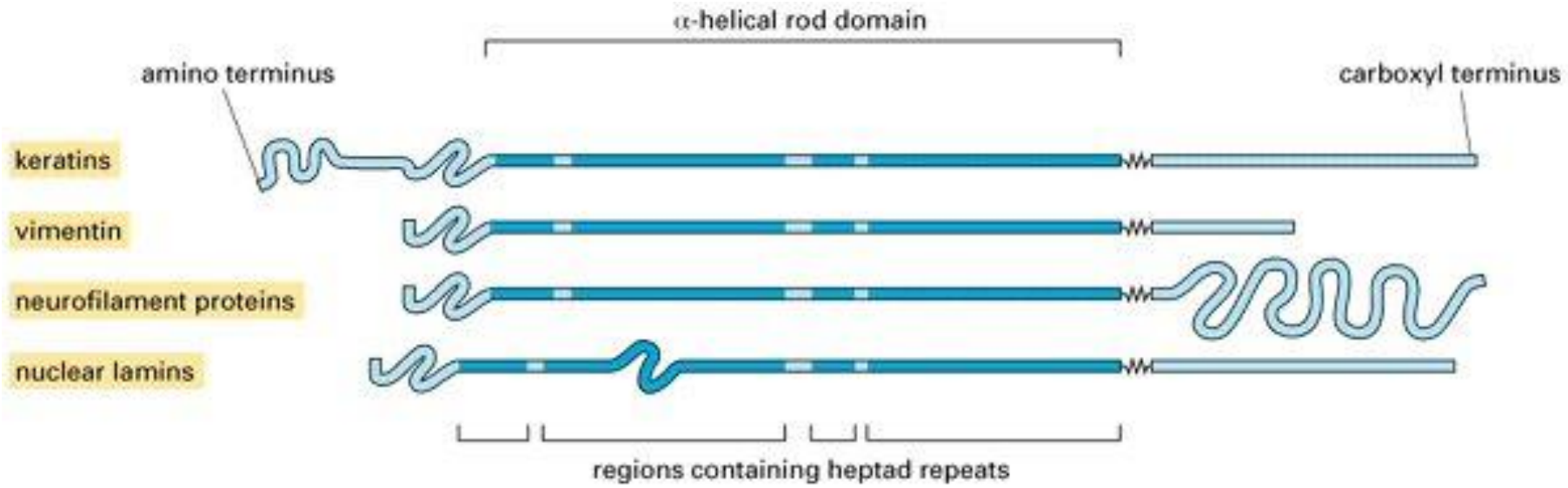
I microtubuli: trasporto intracellulare

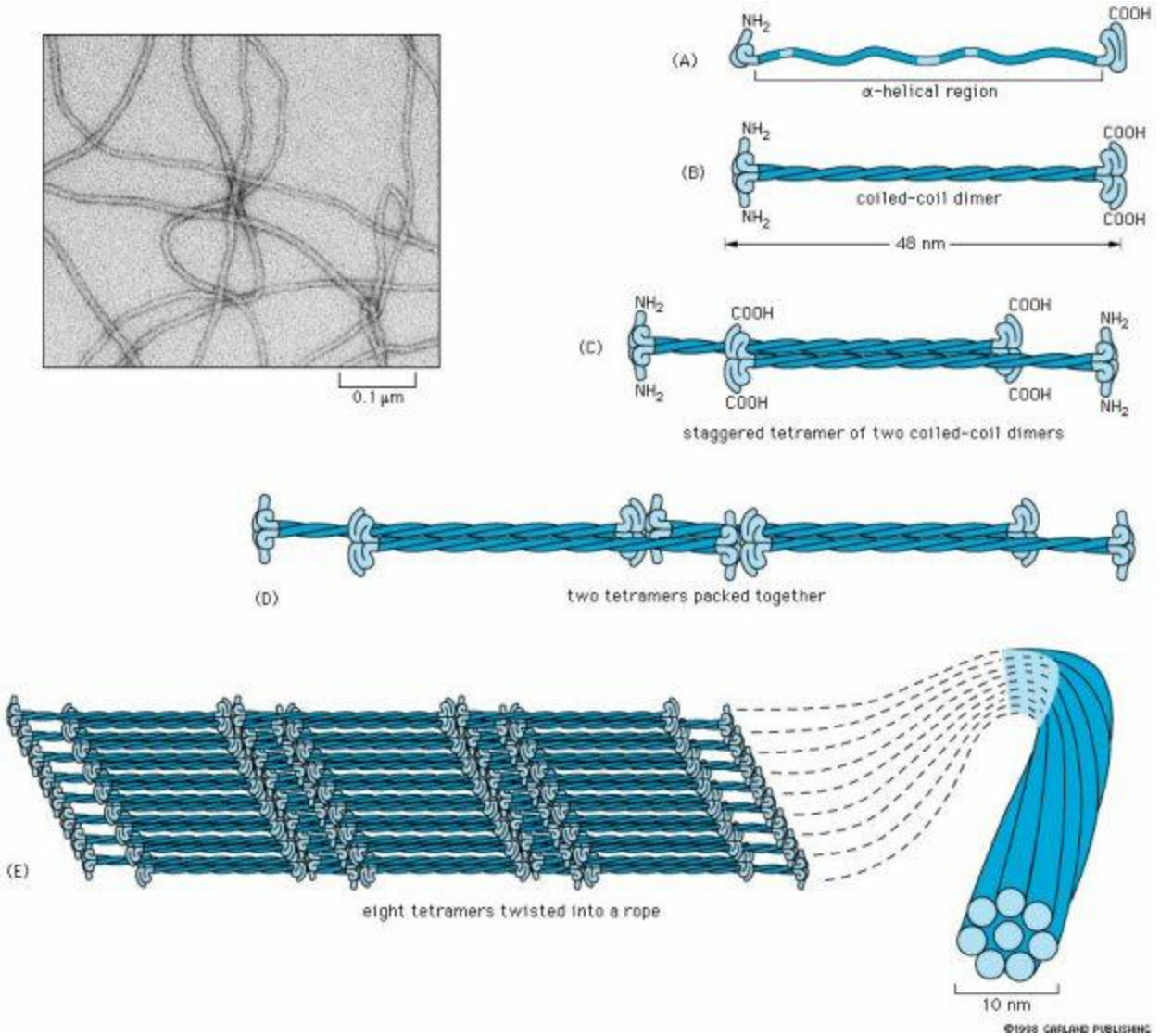


I microfilamenti

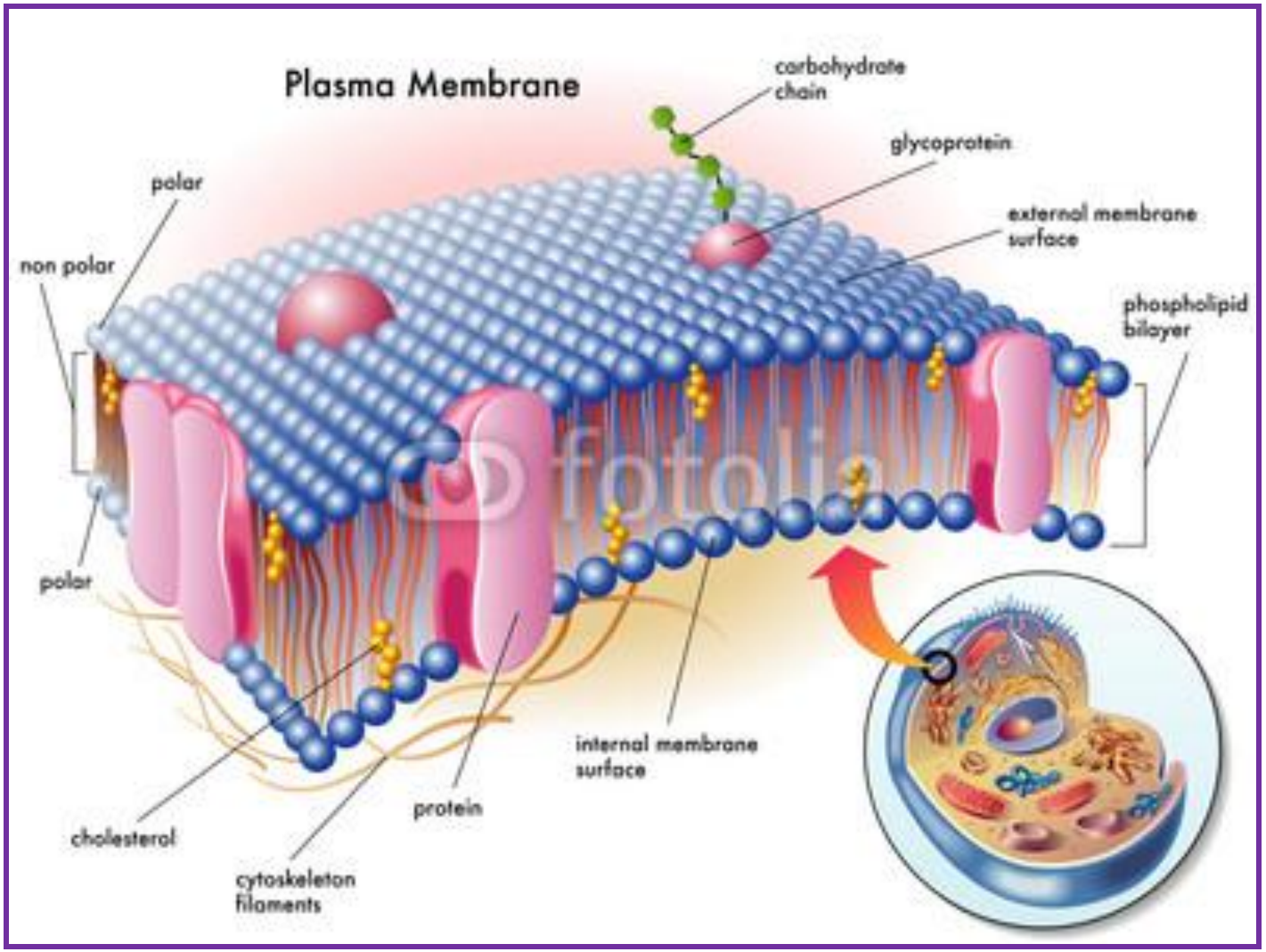


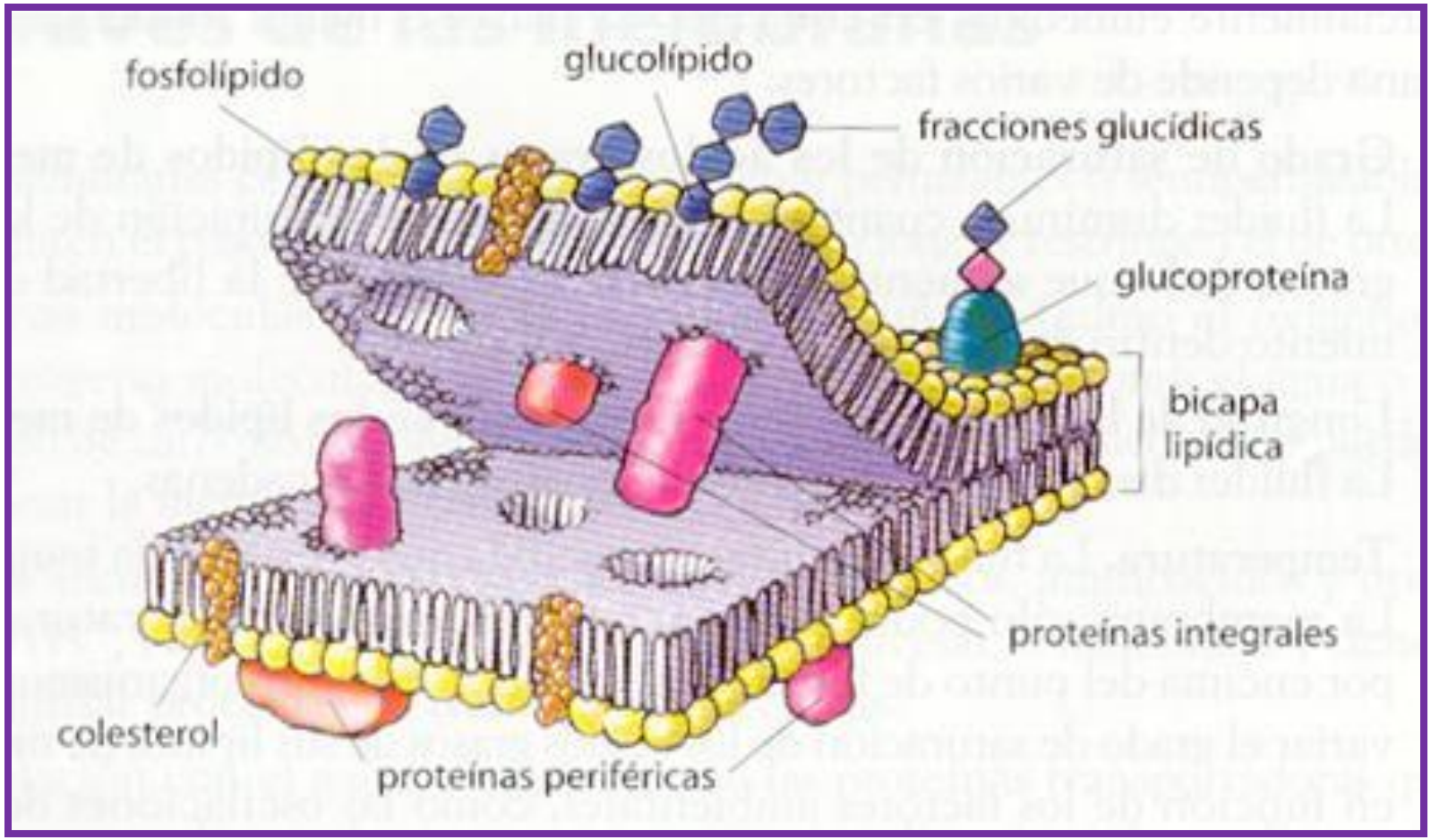
I filamenti intermedi




0.1 μm
(A)
NH2
COOH
α-helical region
(B)
NH2
COOH
coiled-coil dimer
NH2
COOH
48 nm
(C)
NH2
COOH
COOH
NH2
NH2
COOH
COOH
NH2
staggered tetramer of two coiled-coil dimers
(D)
two tetramers packed together
(E)
eight tetramers twisted into a rope
10 nm
©1998 GARLAND PUBLISHING

La membrana plasmatica




fosfolípido
glucolípido
fracciones glucídicas
glucoproteína
bicapa lipídica
proteínas integrales
colesterol
proteínas periféricas

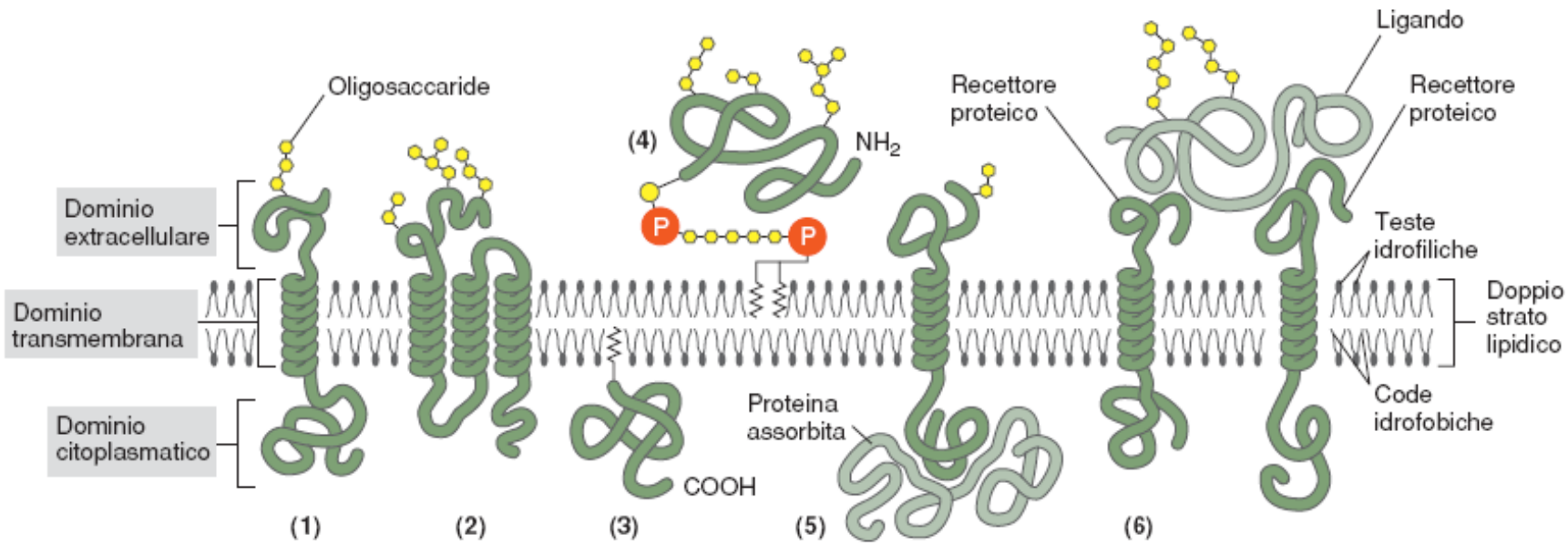
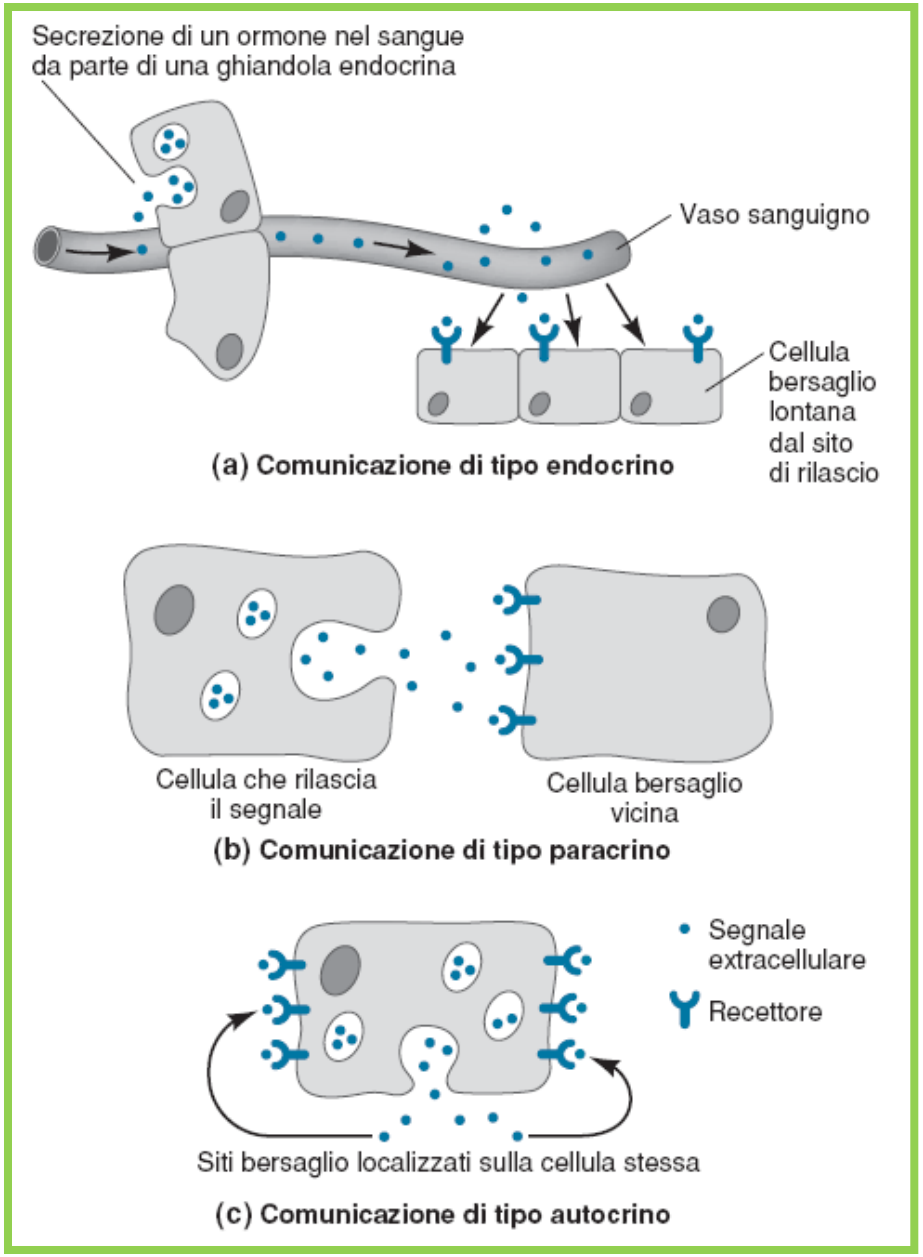


Figura 2.16 **Modello a mosaico fluido di una membrana plasmatica.** I lipidi formano un duplice strato con la loro componente idrofobica (apolare) contrapposta e la componente idrofilica (polare) rivolta verso l'esterno della cellula e verso l'interno, ovvero verso il citoplasma. La maggior parte delle proteine transmembrana presentano un dominio extracellulare, uno o più domini transmembrana e un dominio citoplasmatico (1, 2). Altre proteine sono ancorate al doppio strato lipidico mediante un lipide legato covalentemente alla proteina o direttamente (3) o mediante uno zucchero (4). Altre molecole proteiche sono legate alla membrana mediante adsorbimento a proteine transmembrana (5, 6). Molte delle proteine di membrana sono glicoproteine dal momento che il loro dominio extracellulare è caratterizzato dalla presenza di carboidrati (1, 2, 4, 5).

La comunicazione cellulare



La comunicazione cellulare

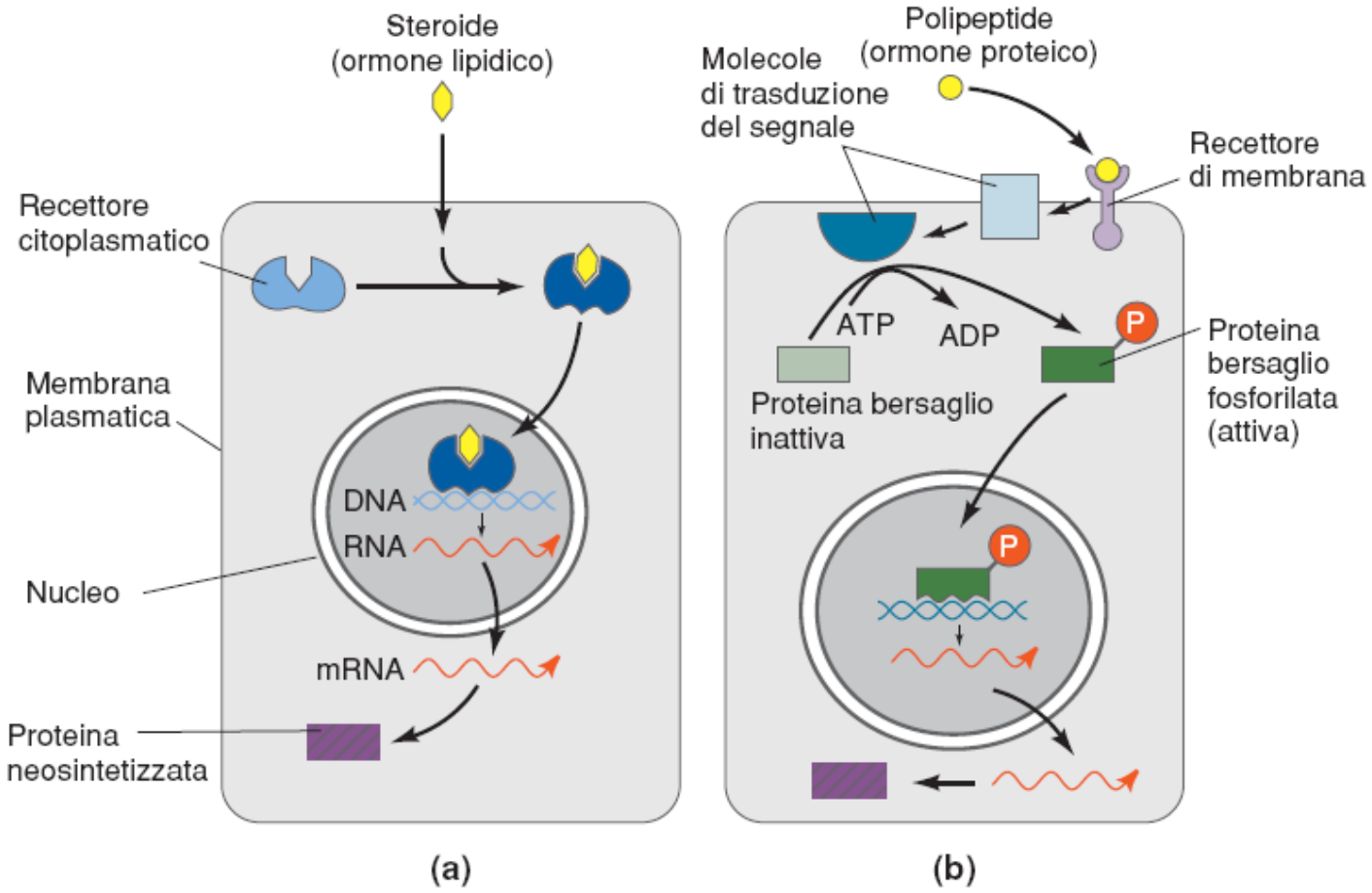
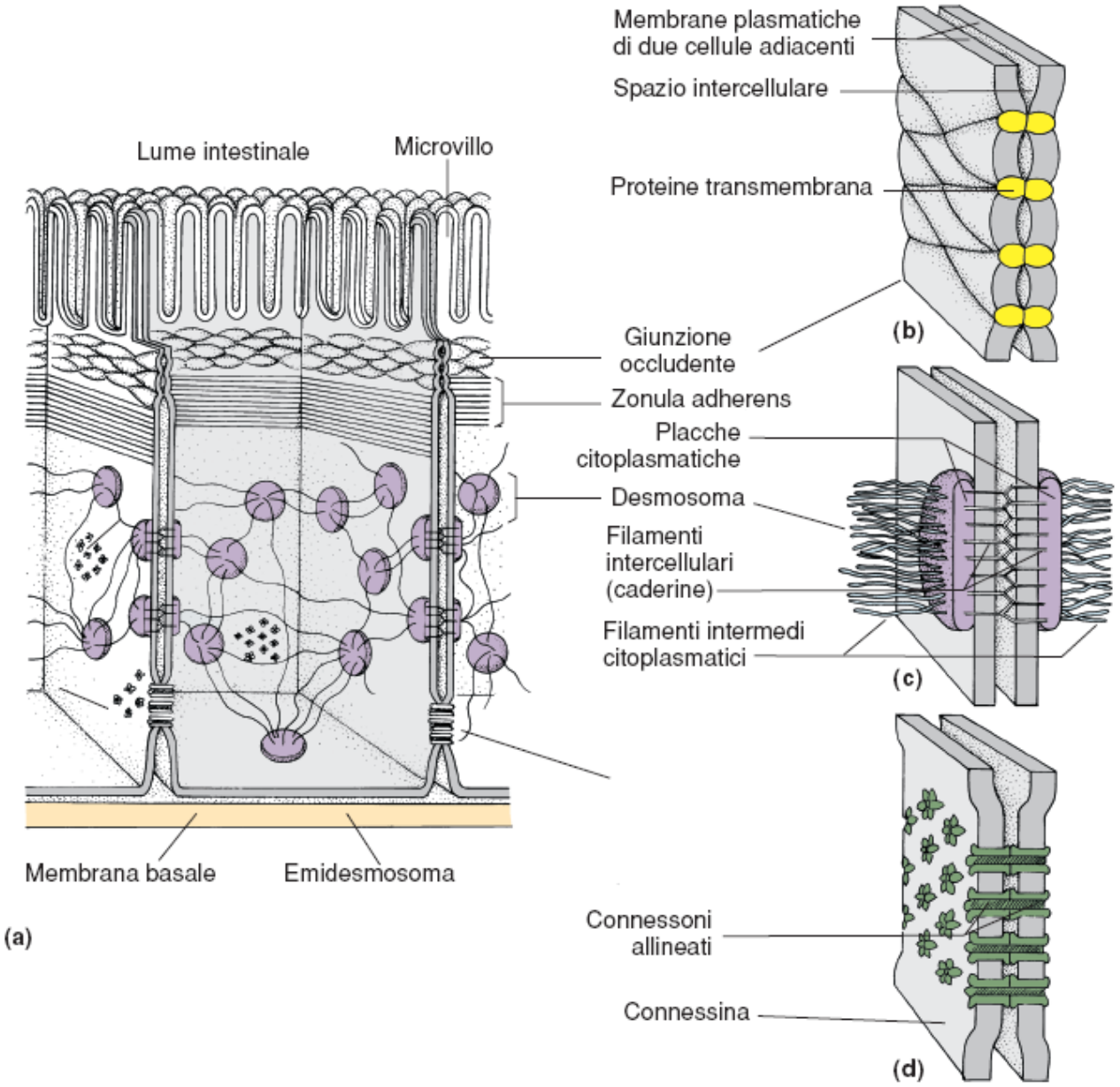
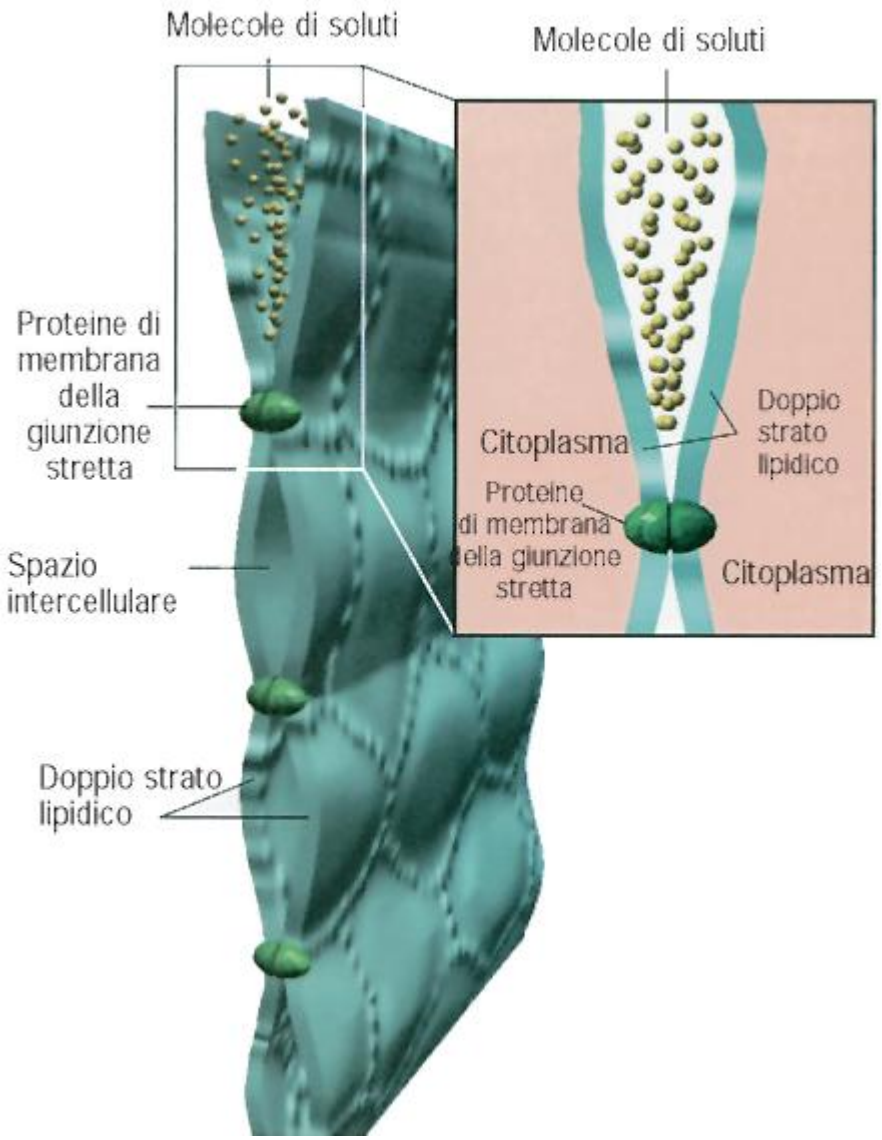


Figura 2.23 Risposta delle cellule a segnali di natura steroidea (a) e proteica (b).

Le giunzioni



Le giunzioni occludenti



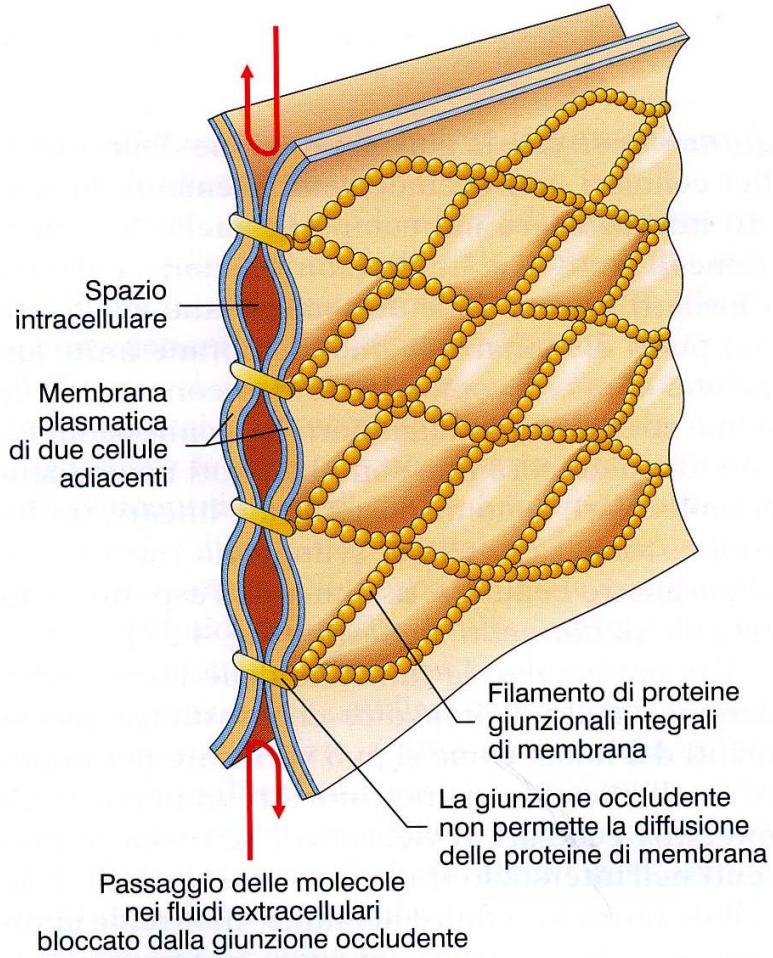
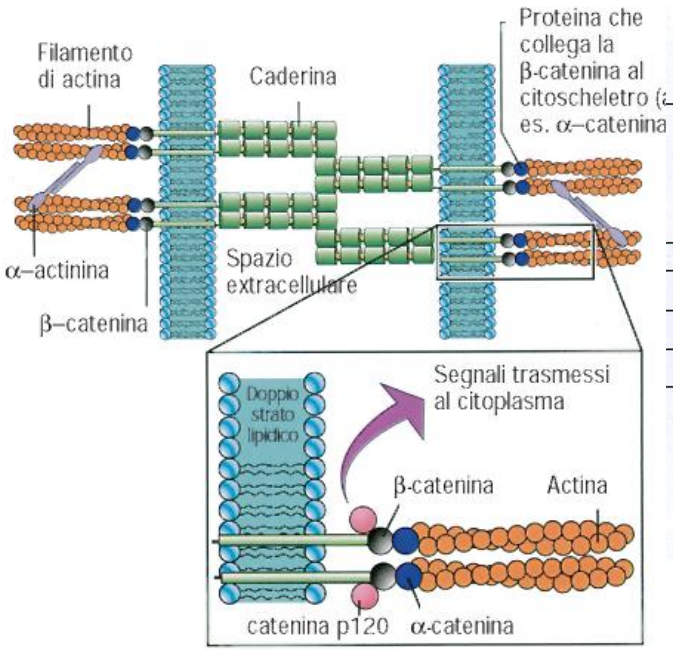
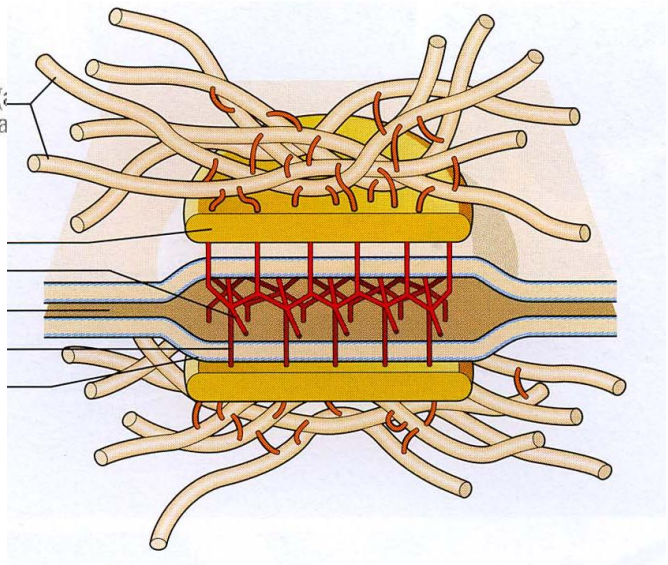


Fig. 4.26 Schema che illustra la *zonula occludens* (fascia occludente) tra due cellule di un epitelio cilindrico semplice (spiegazione nel testo).

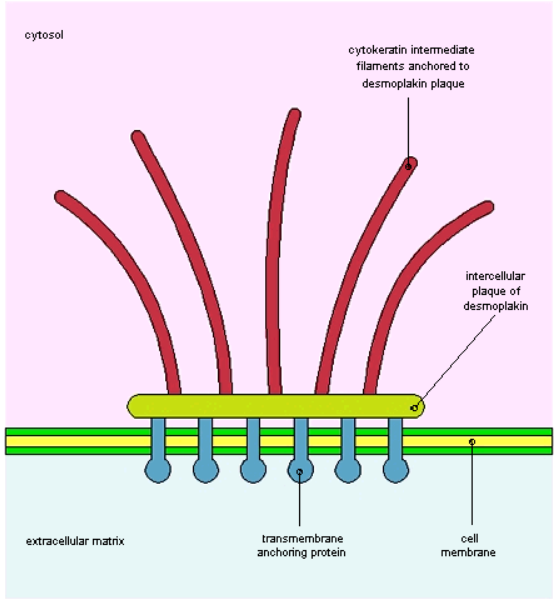
GIUNZIONI ADERENTI



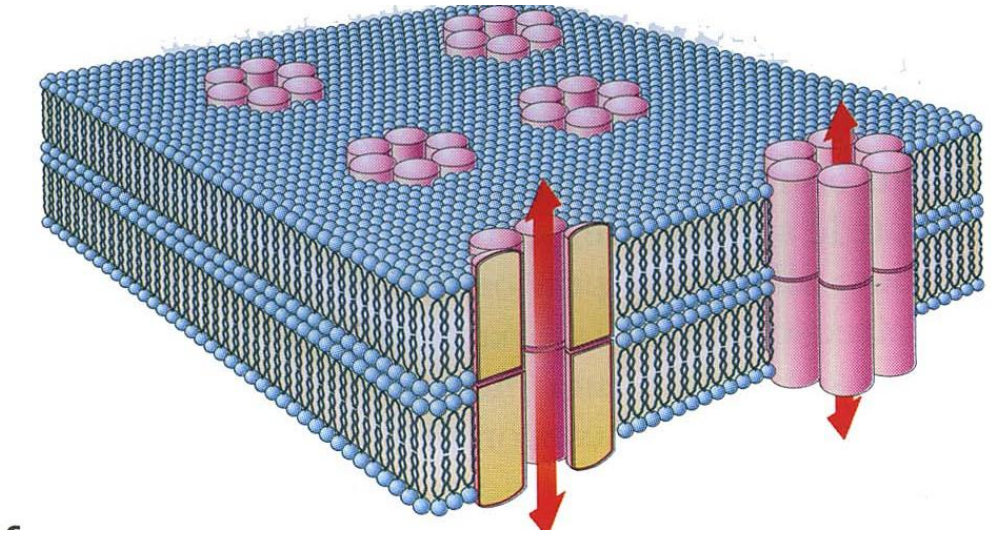
DESMOSOMI



EMIDESMOSOMI



Le giunzioni comunicanti



Il ciclo cellulare

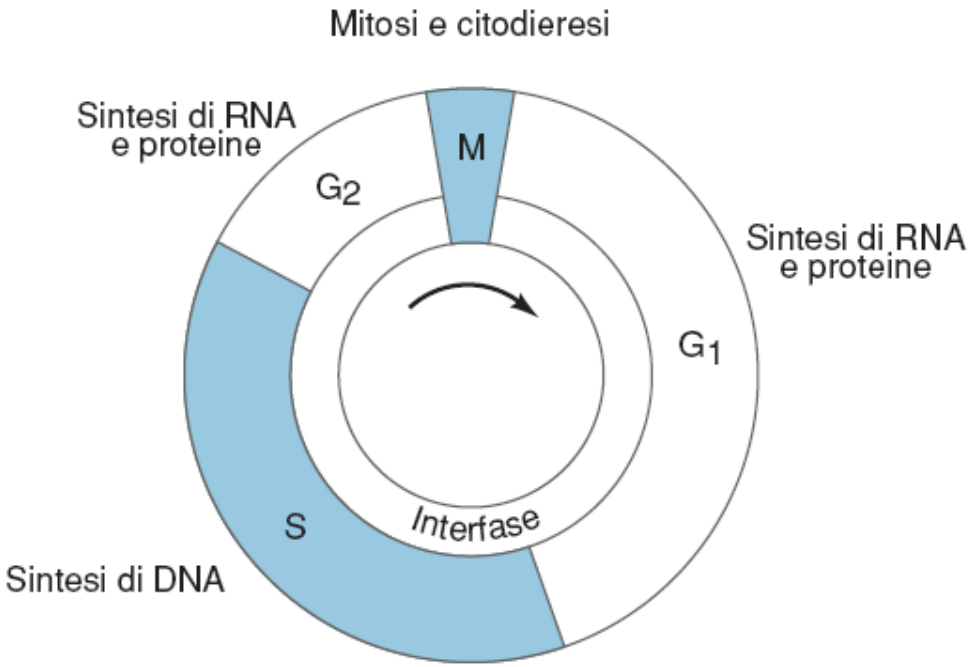
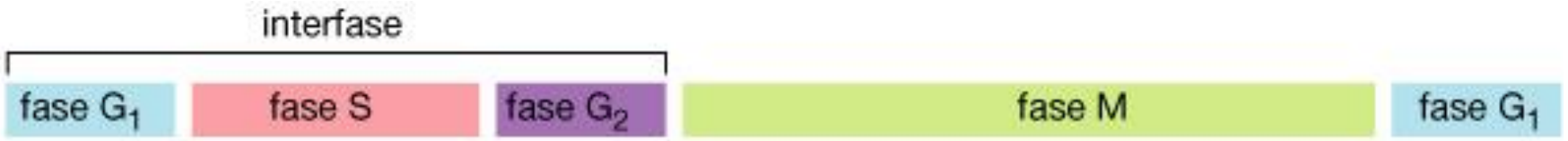
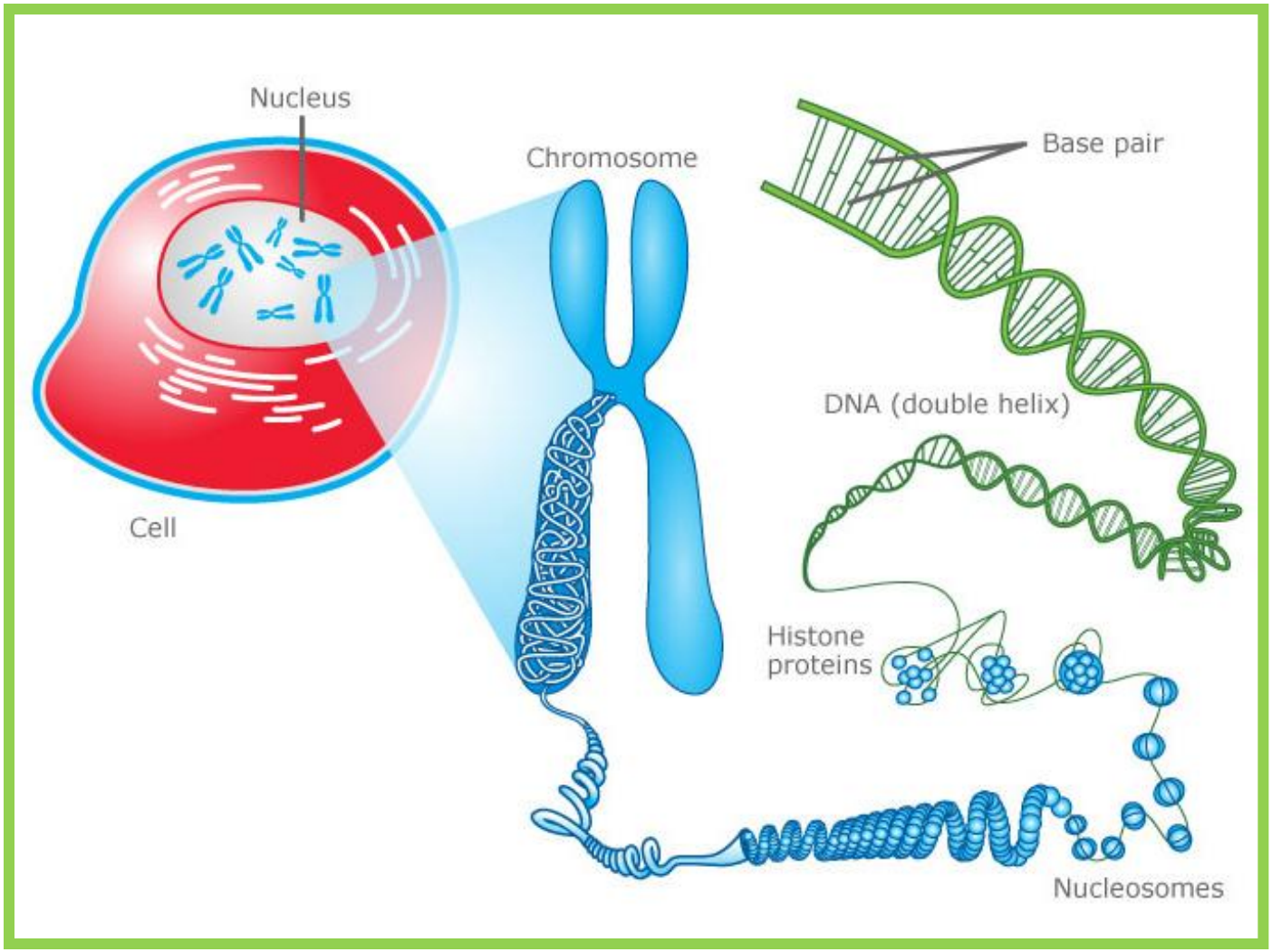


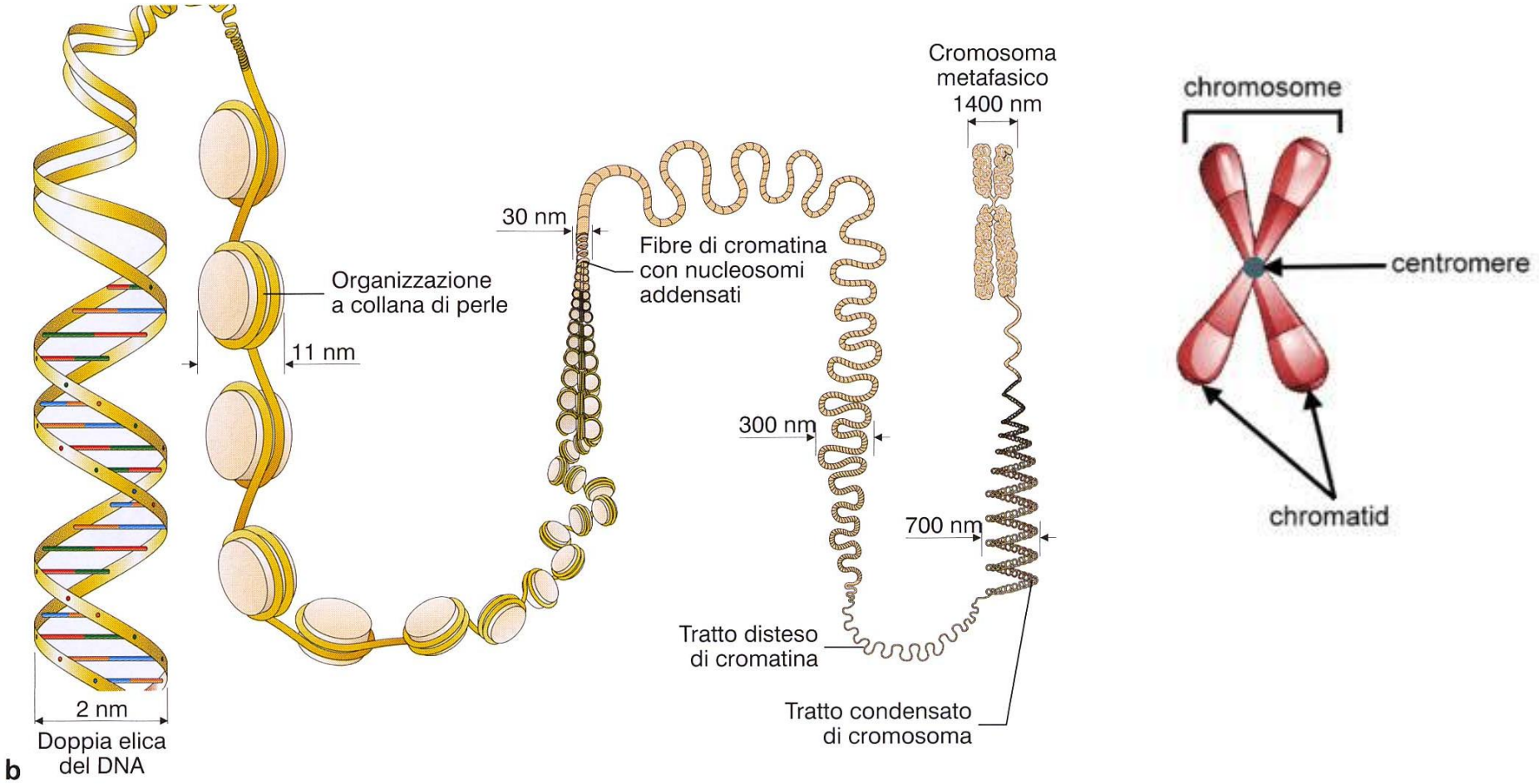
Figura 2.12 **Rappresentazione schematica del ciclo cellulare.** Le quattro fasi, G_1, S, G_2, M hanno una durata diversa a seconda del tipo di cellula considerato, con la fase G1 che, in genere, presenta le maggiori variazioni.


interfase
fase G_1
fase S
fase G_2
fase M
fase G_1

La duplicazione del DNA



La duplicazione del DNA



La mitosi

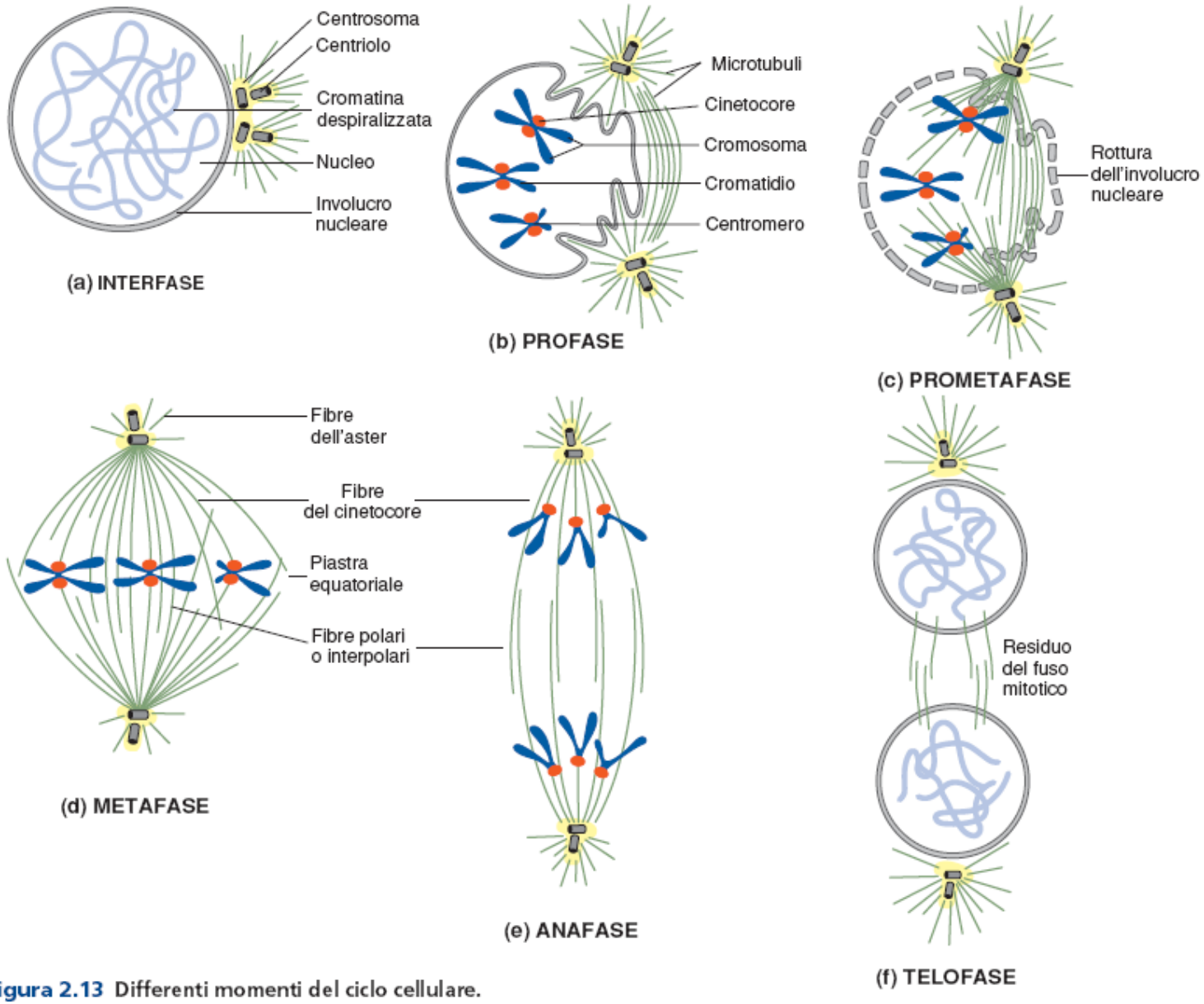
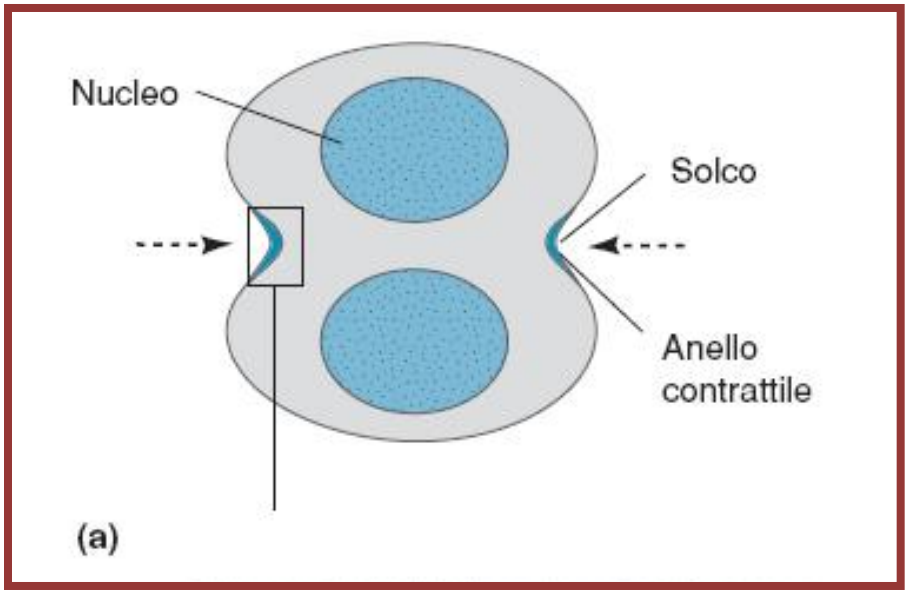
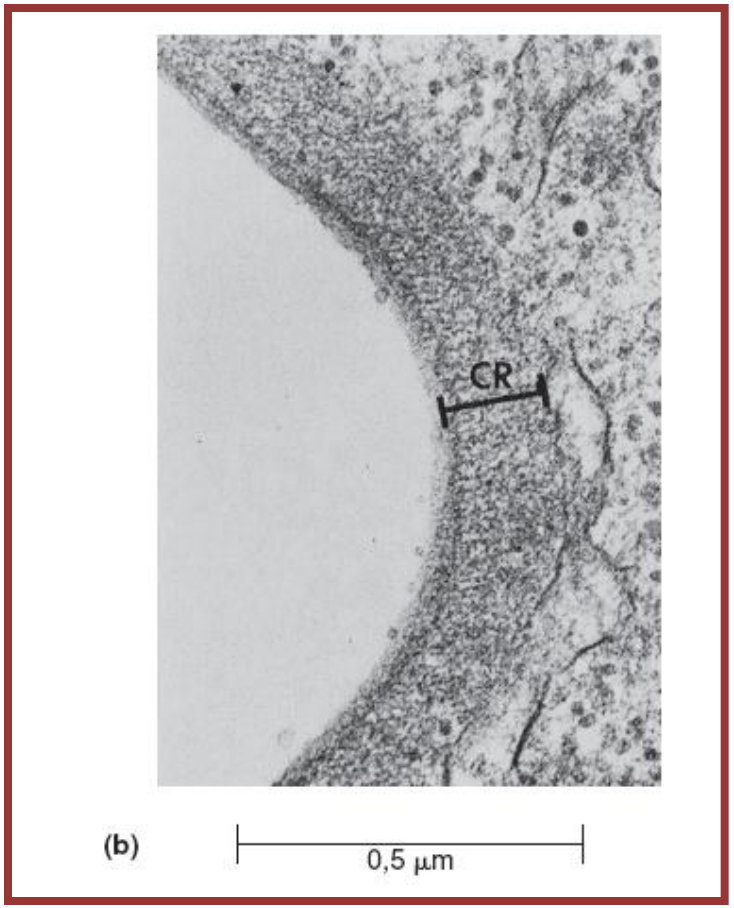


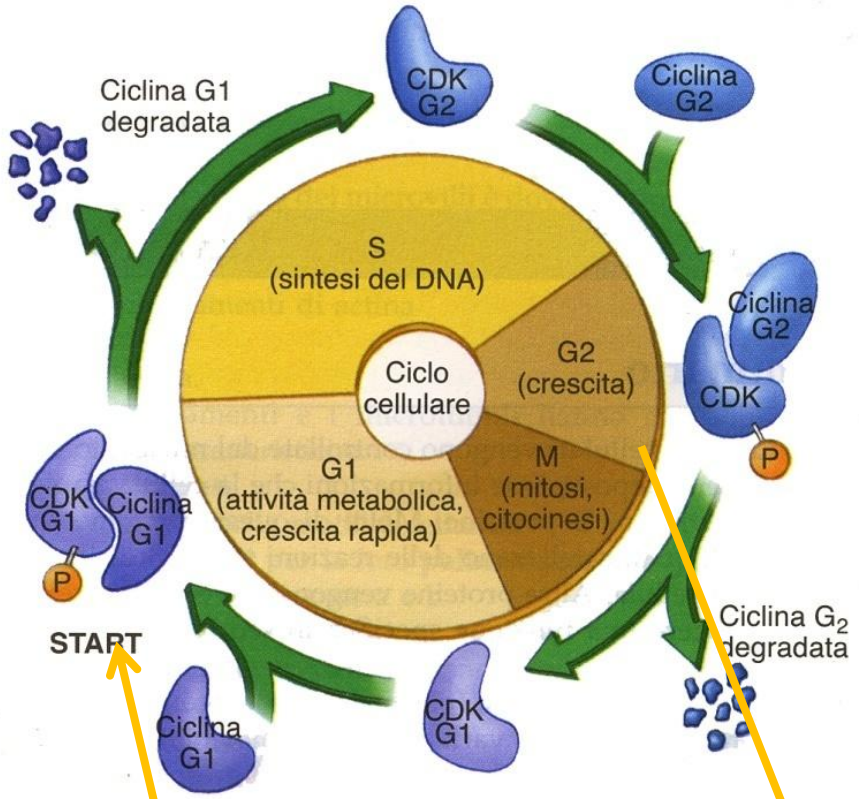
Figura 2.13 Differenti momenti del ciclo cellulare.

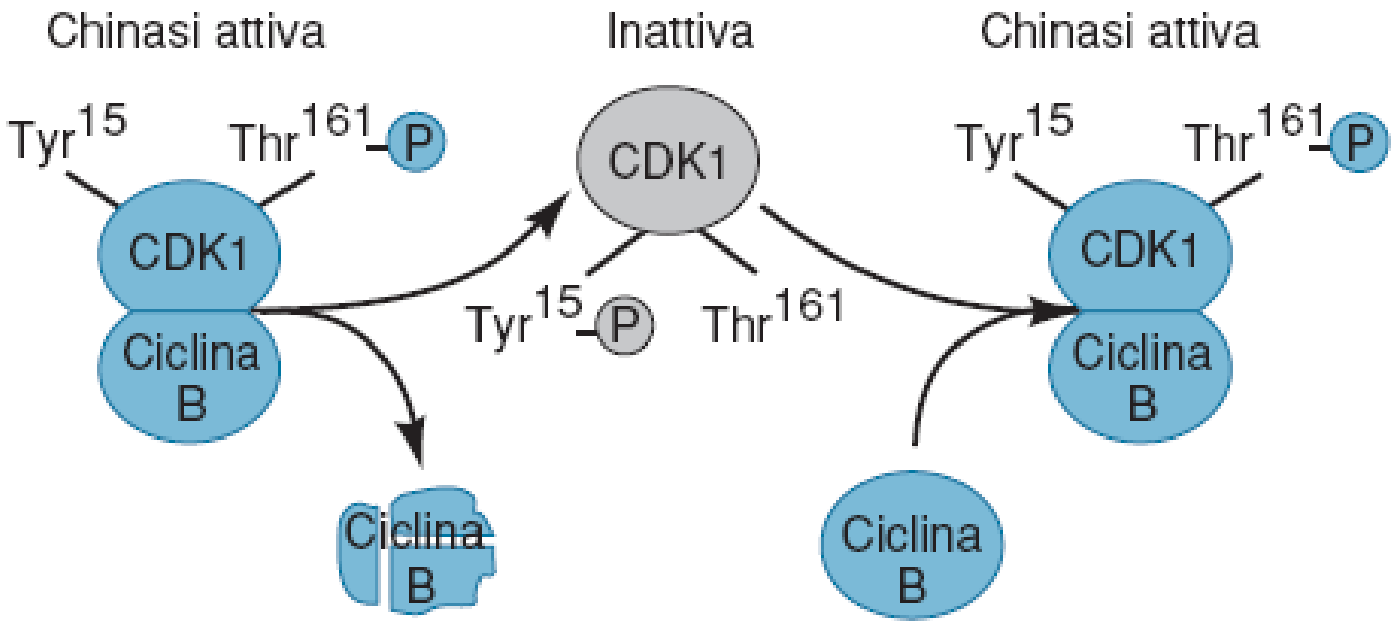
La citodieresi





Il controllo del ciclo cellulare




Chinasi attiva
Inattiva
Chinasi attiva
Tyr15
Thr161
P
CDK1
Ciclina B
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