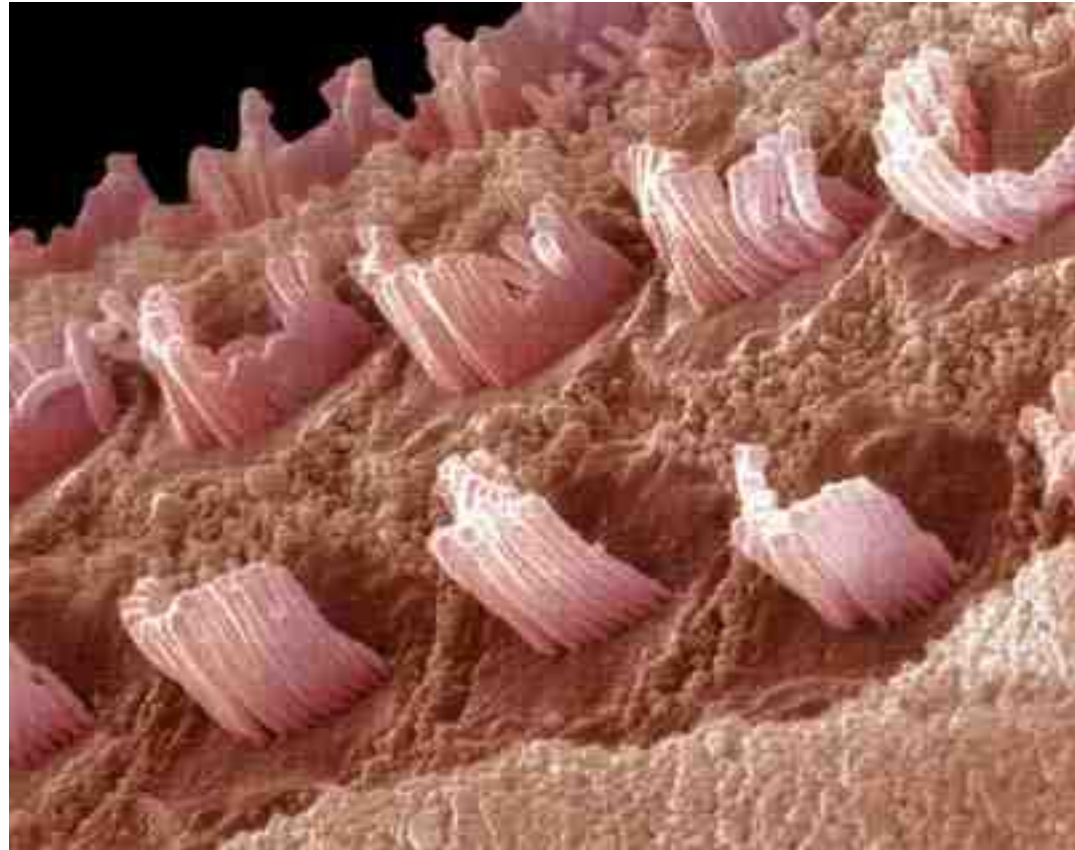


# Stereocilia

Long microvilli.

Where found ???  
limited to the male  
reproductive tract  
(epididymis and  
ductus deferens) and  
the receptor hair  
cells in the ear.



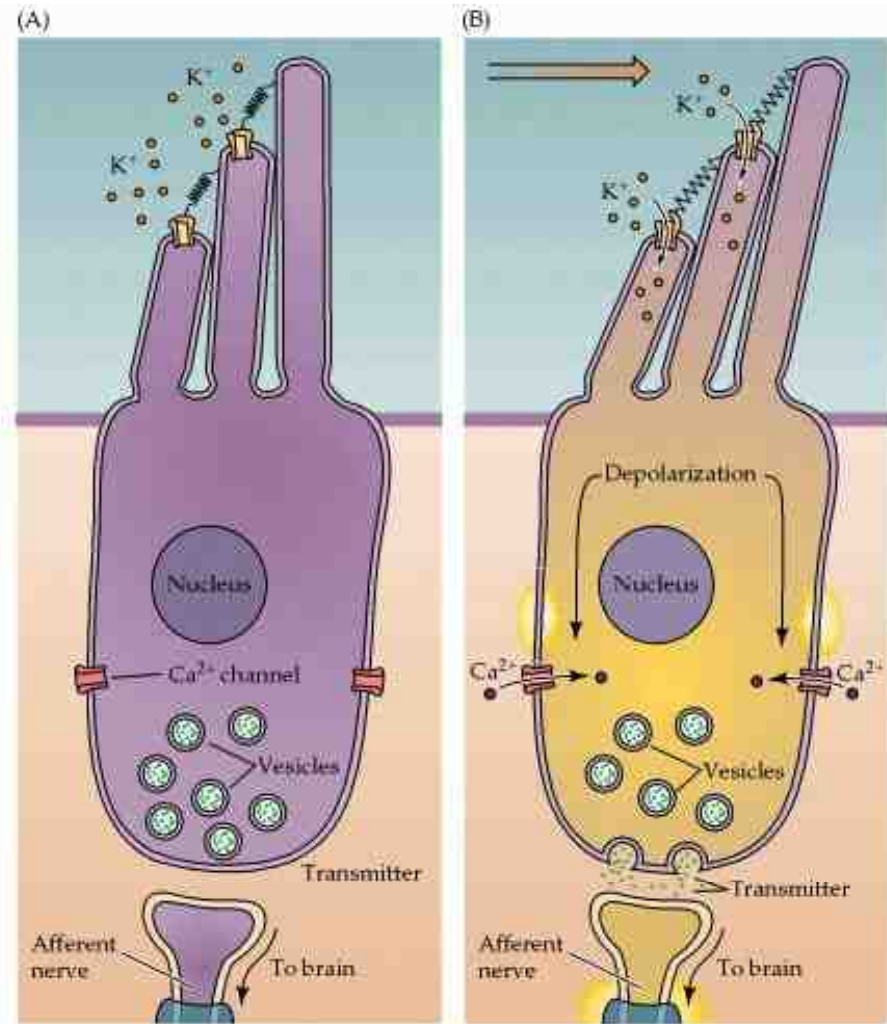
Hair cells within the inner ear contain bundles of hair-like extensions that convert sound.

## Mechanoelectrical transduction mediated by hair cells.

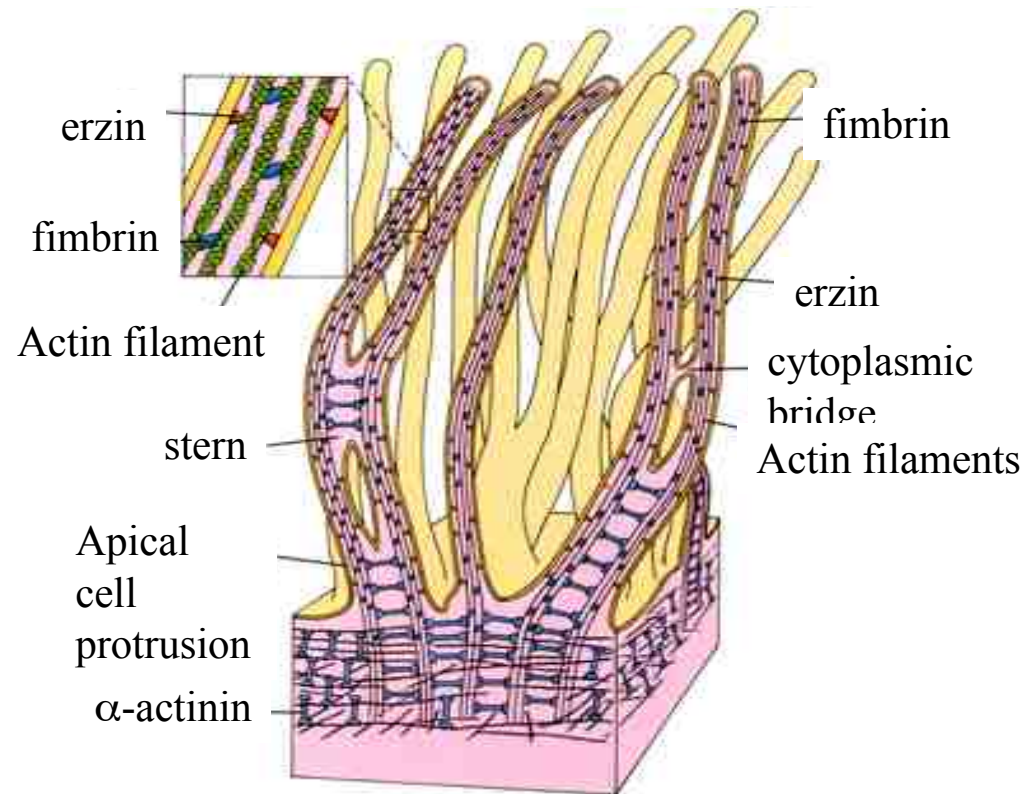
The stereocilia of the hair cells protrude into the endolymph, which is high in  $K^+$  and has an electrical potential of +80 mV relative to the perilymph.

When the hair bundle is deflected toward the tallest stereocilium (B), cation-selective channels open near the tips of the stereocilia, allowing  $K^+$  ions to flow into the hair cell down their electrochemical gradient.

The resulting depolarization of the hair cell opens voltage-gated  $Ca^{2+}$  channels in the cell soma, allowing calcium entry and release of neurotransmitter onto the nerve endings of the auditory nerve.



- Apical cytoplasmic protrusions, with intermingling thin and thick regions. Cytoplasmic bridges interconnect thick regions.
- Actin filament bundles that are cross-linked by **fimbrin** support them.
- Actin bundles in stem portion are anchored to network of  $\mu$ -actinin present in cross-bridges and apical cytoplasm of cell.



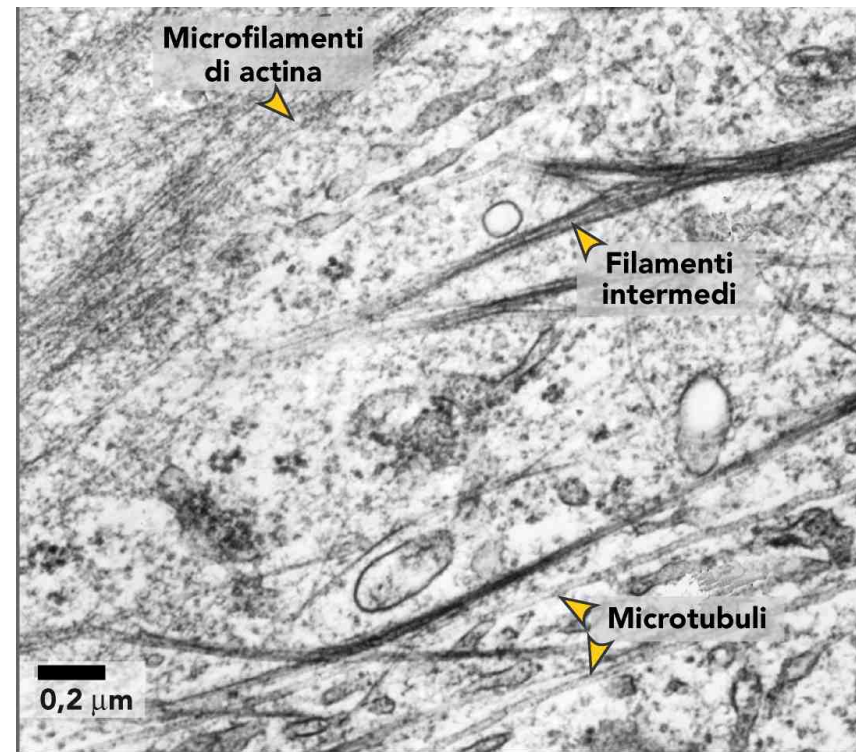
# filamenti intermedi

## Proteine dei filamenti intermedi

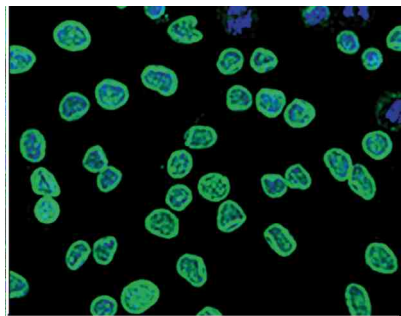
- 6 diversi tipi di proteine fibrose, con distribuzione tessuto specifica:

- CHERATINA
- VIMENTINA
- DESMINA
- PROTEINA ACIDA FIBRILLARE DELLA GLIA GFAP
- PROTEINE DEI NEUROFILAMENTI NF
- NESTINA
- LAMINA NUCLEARE (nucleare, in tutte le cellule)

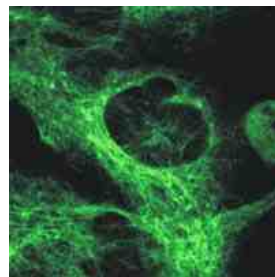
Tessuto  
specifica  
citoplasmatiche



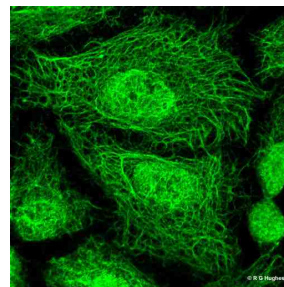
Lamina B



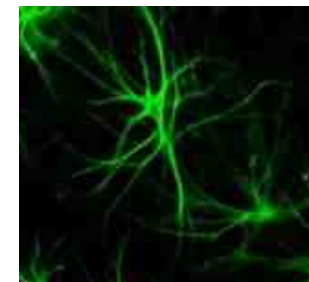
vimentina



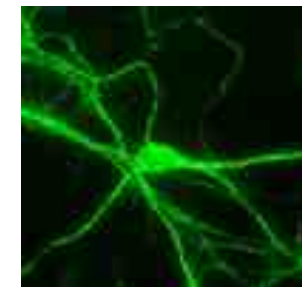
citocheratina



GFAP



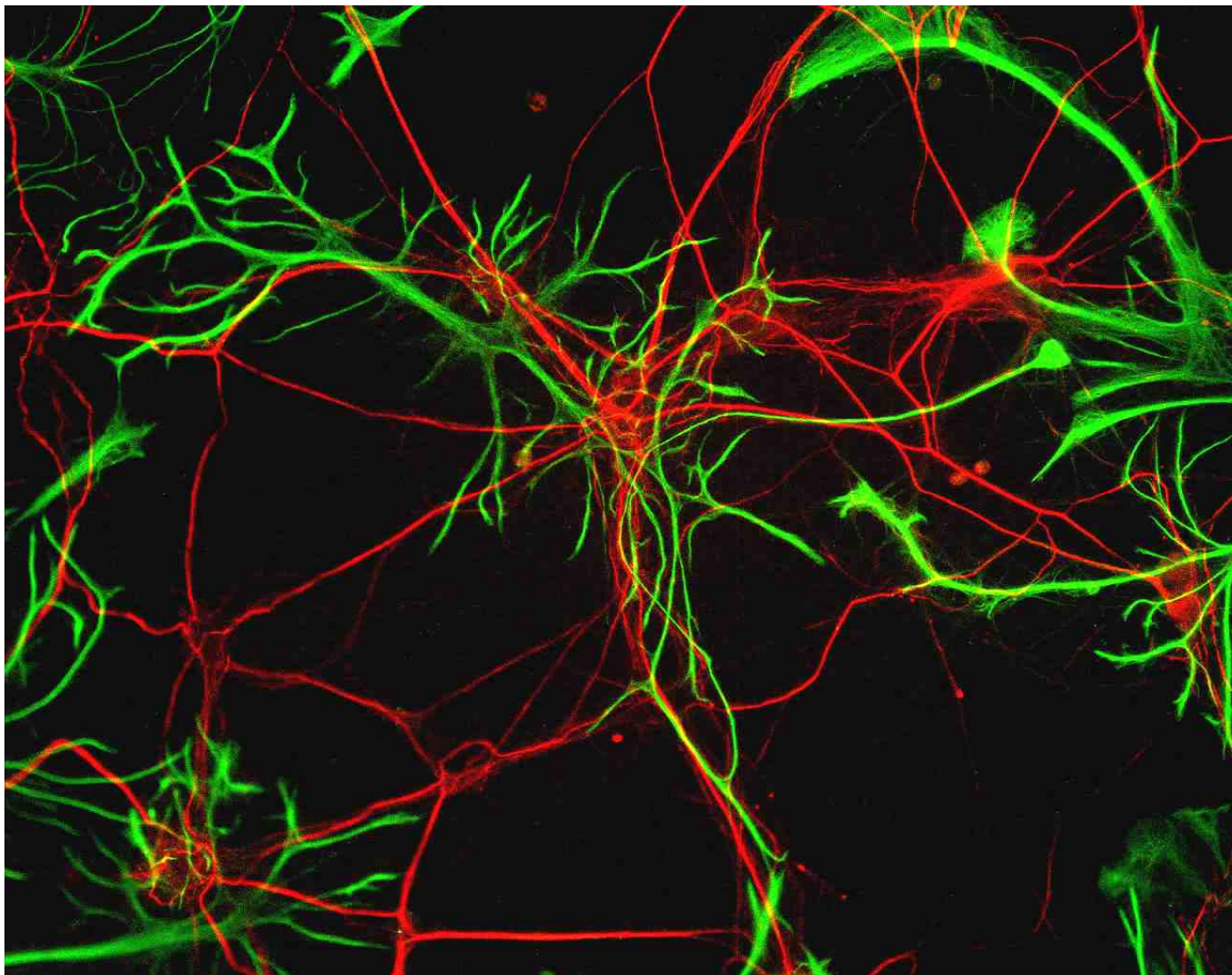
neurofilamenti

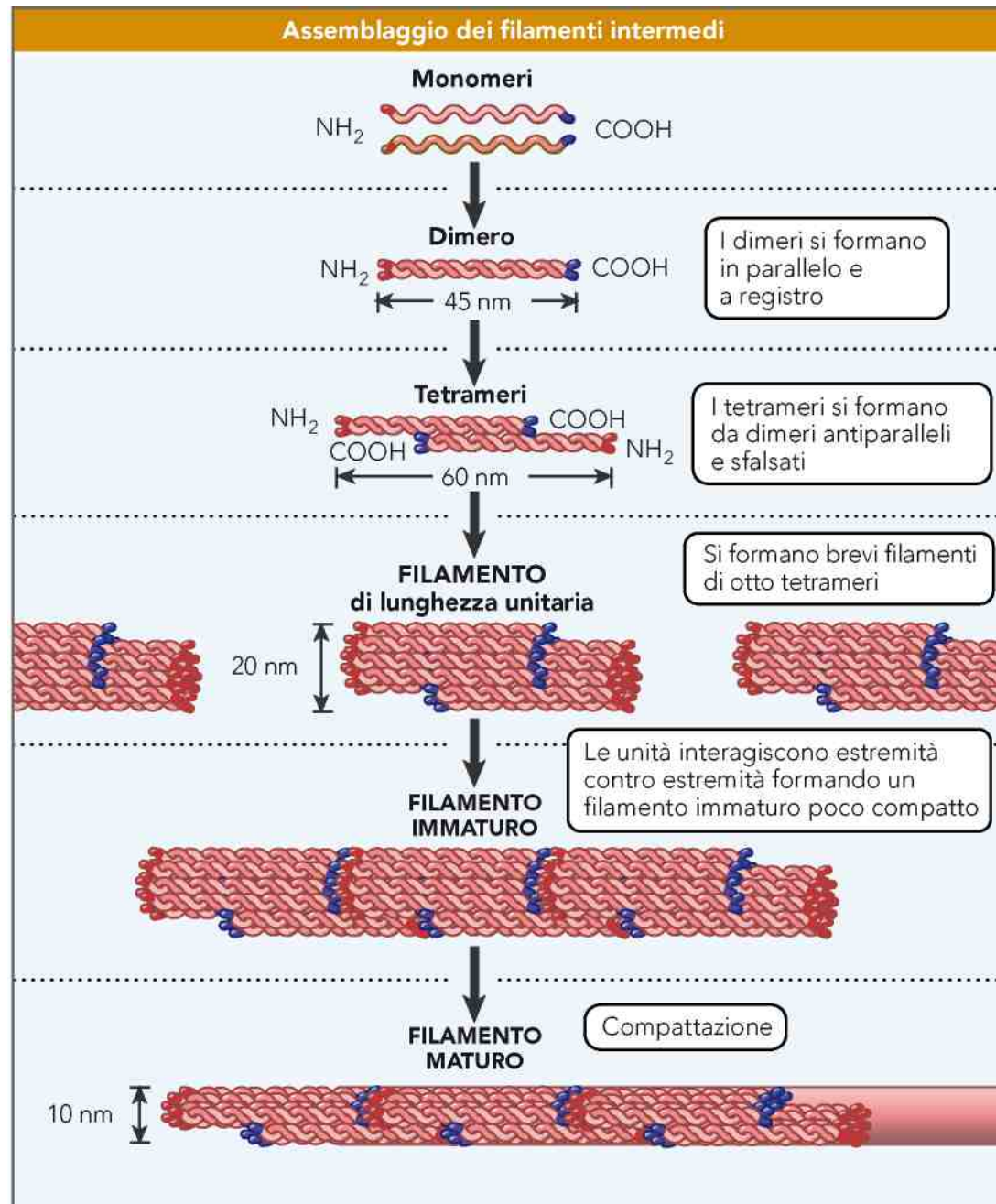


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- Anti-neurofilamenti (cellule neuronali)
- Anti-GFAP (cellule gliali)





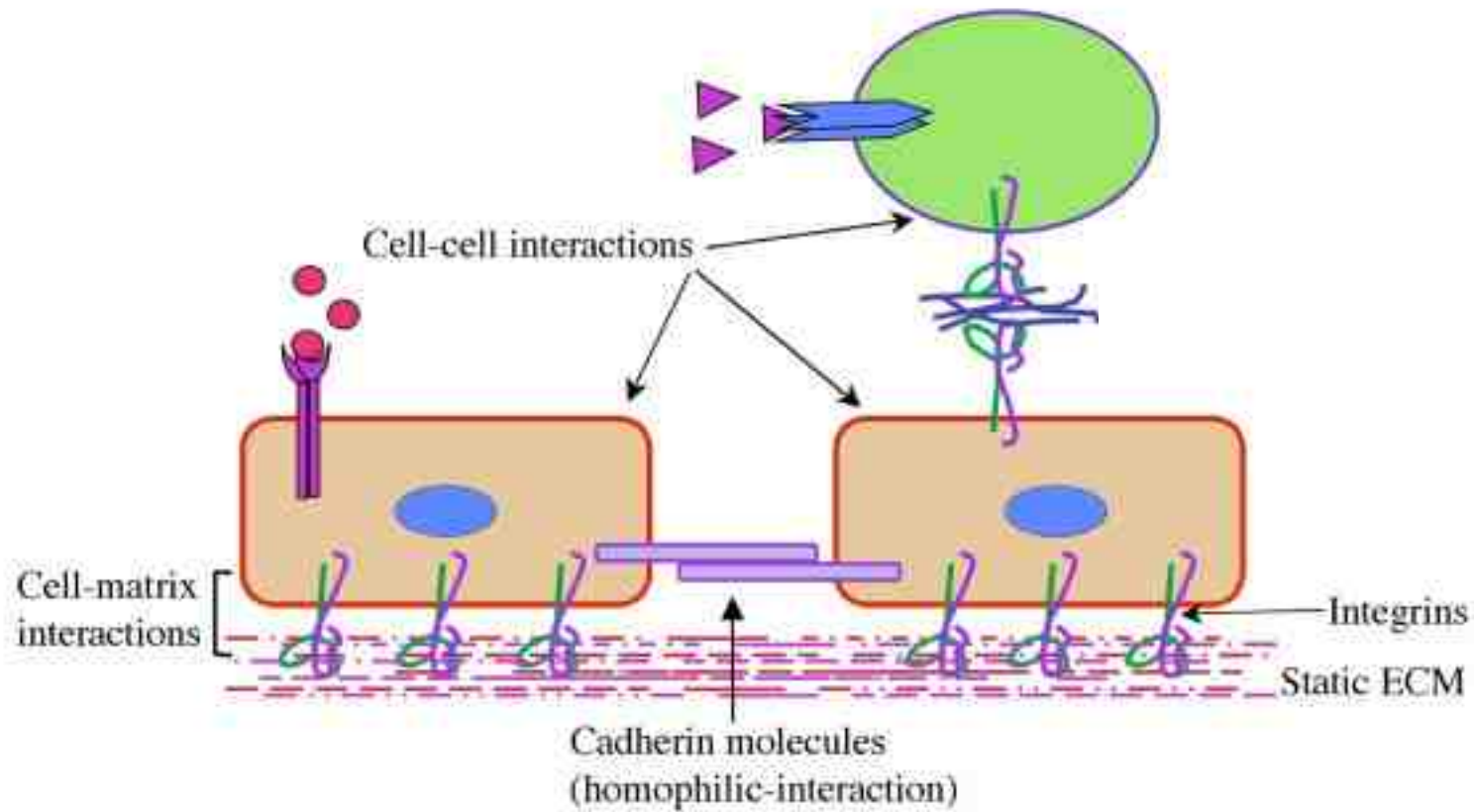
# Adesioni cellulari



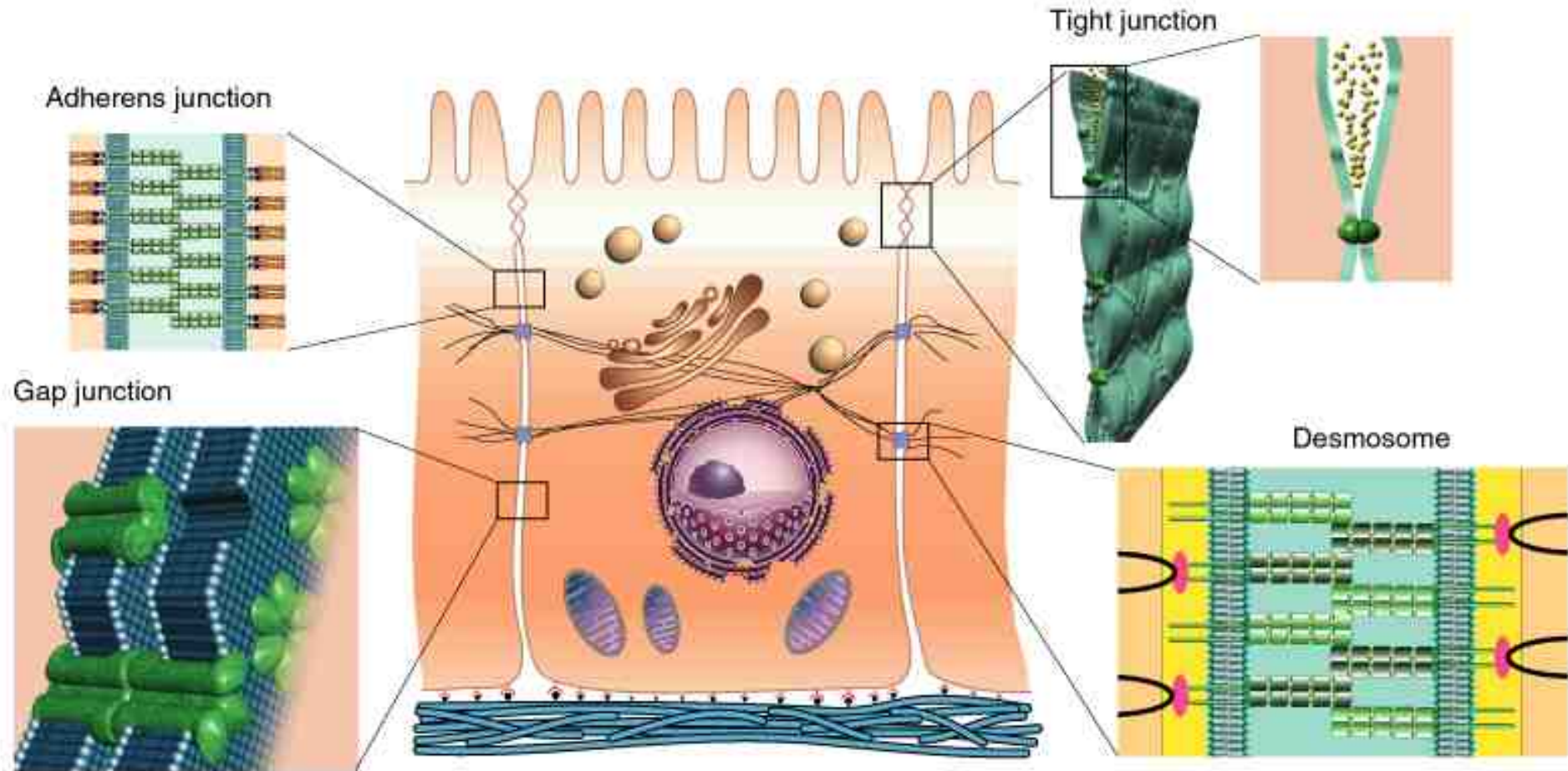
Adesioni omofiliche “cellula-cellula”

Adesioni eterofiliche “cellula-cellula”

Adesione eterofiliche “cellula-matrice extra cellulare (ECM)”

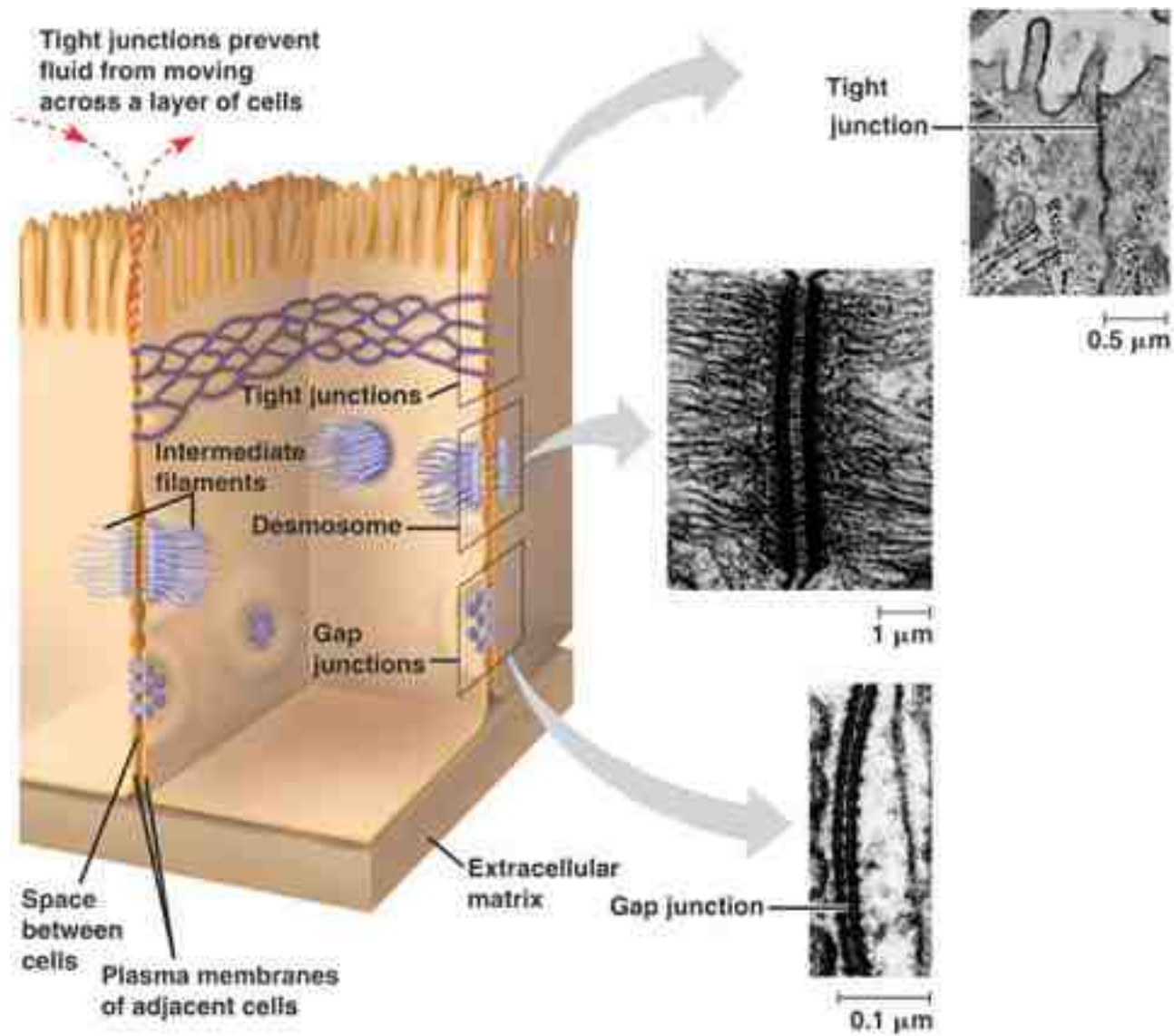


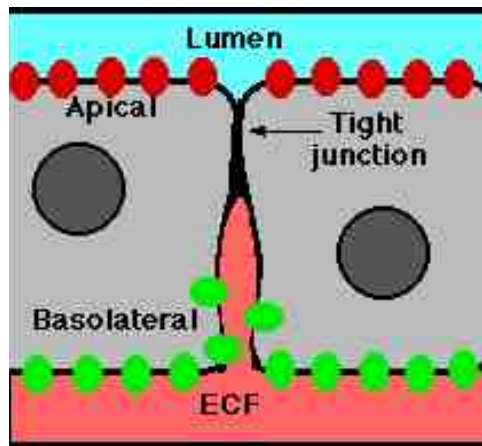
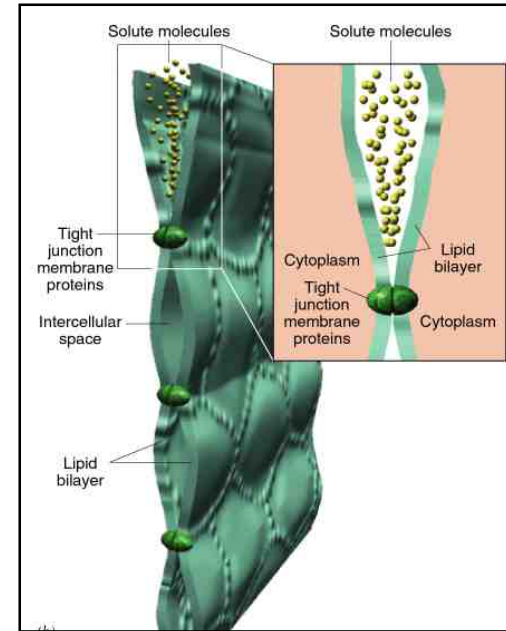
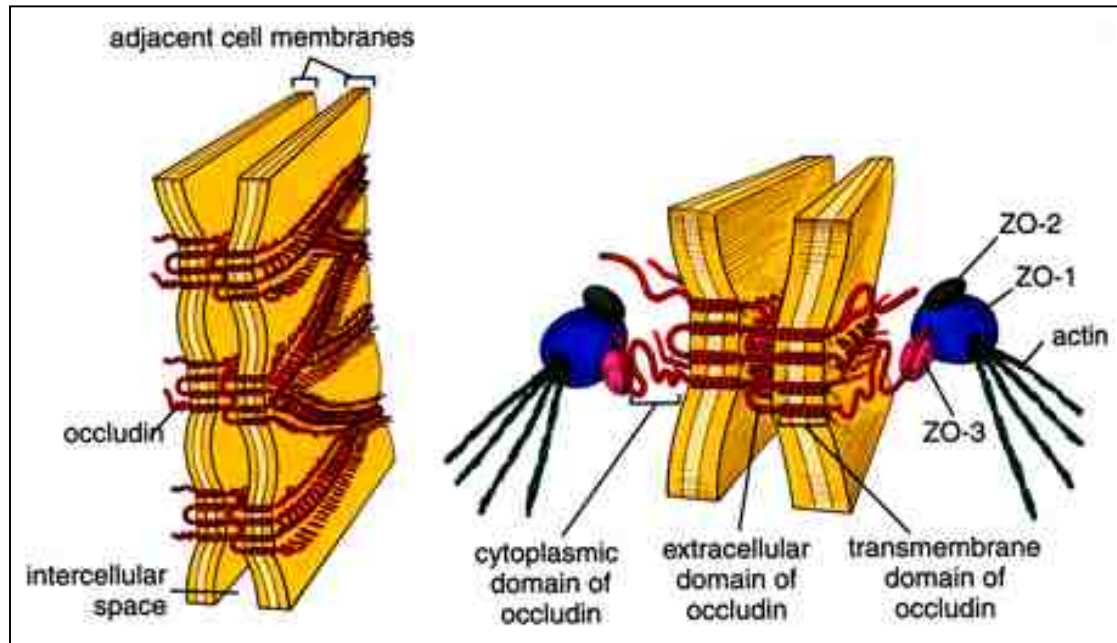
## Adesioni omofile "cellula-cellula"



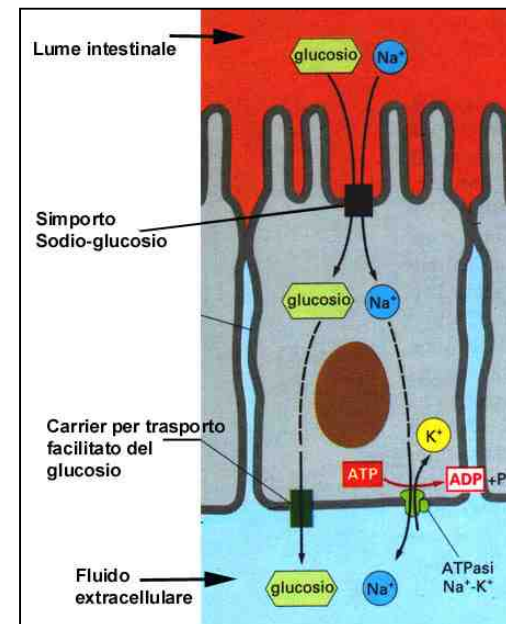
(a)

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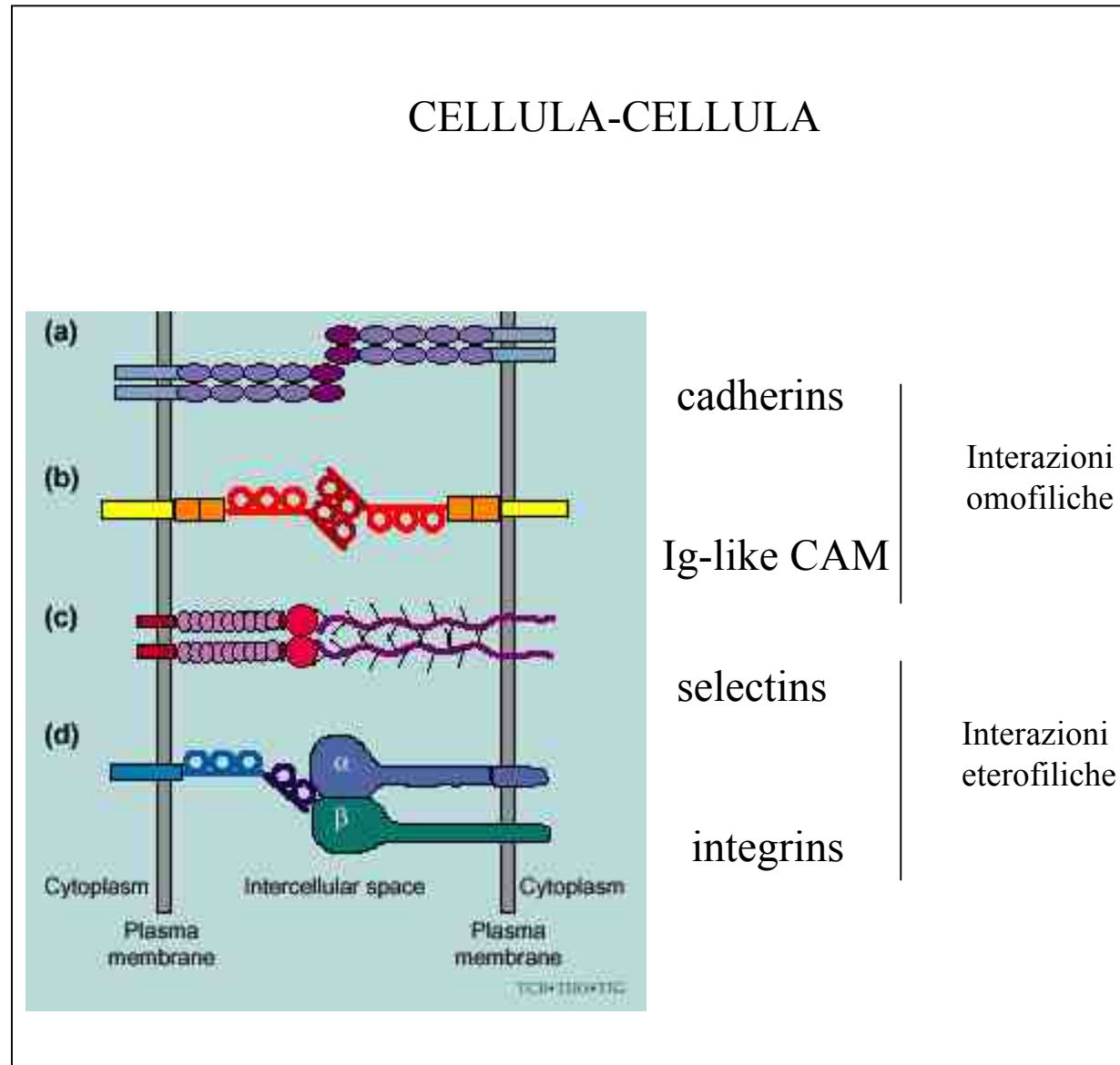




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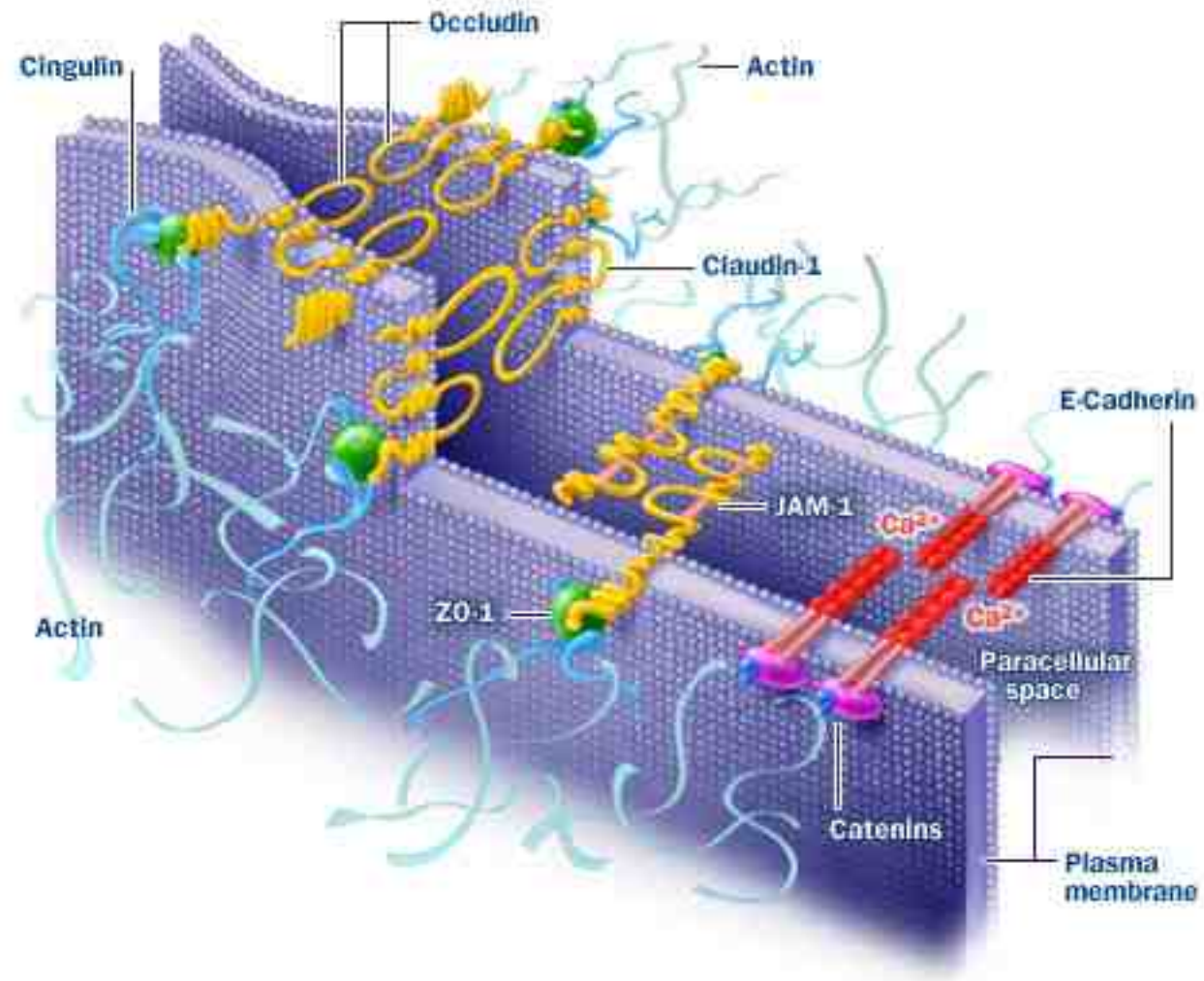


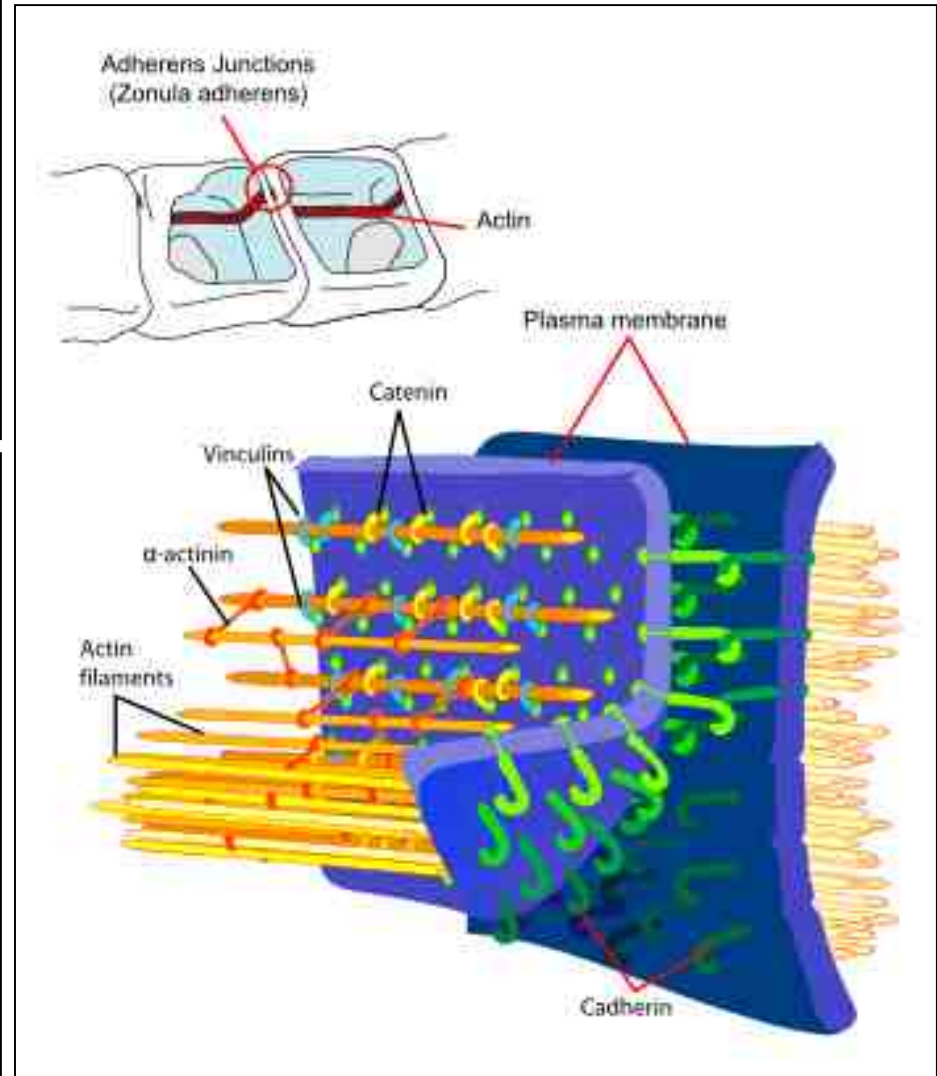
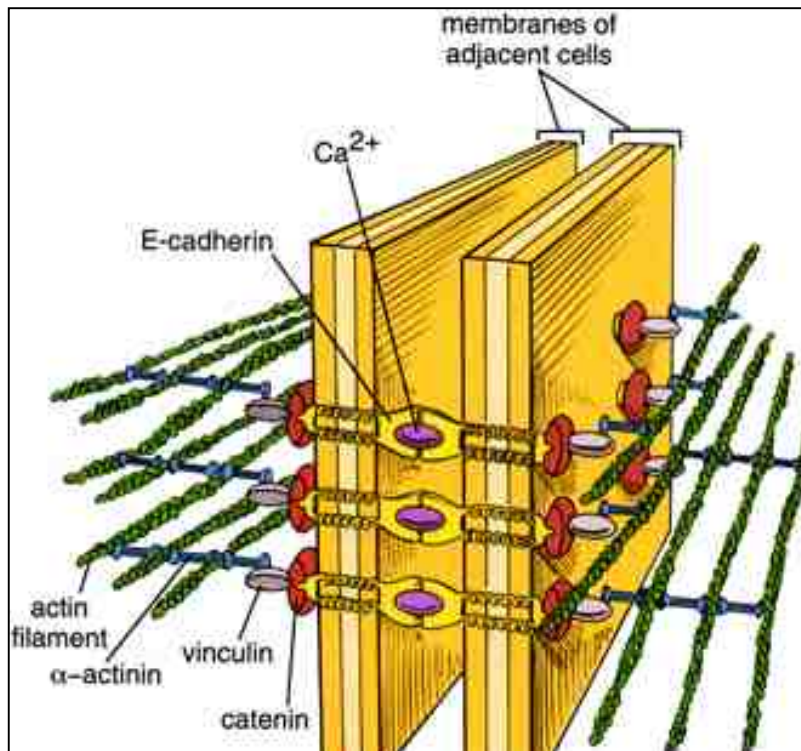
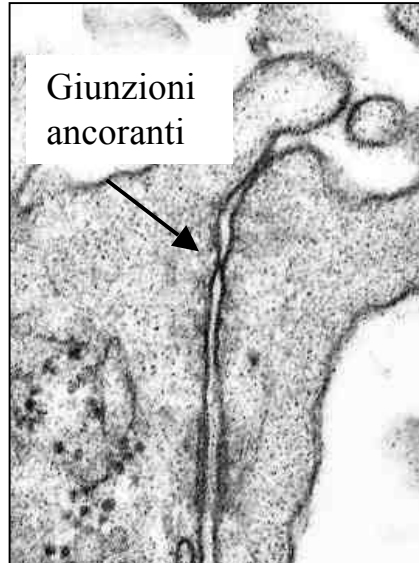
## Molecole di adesione



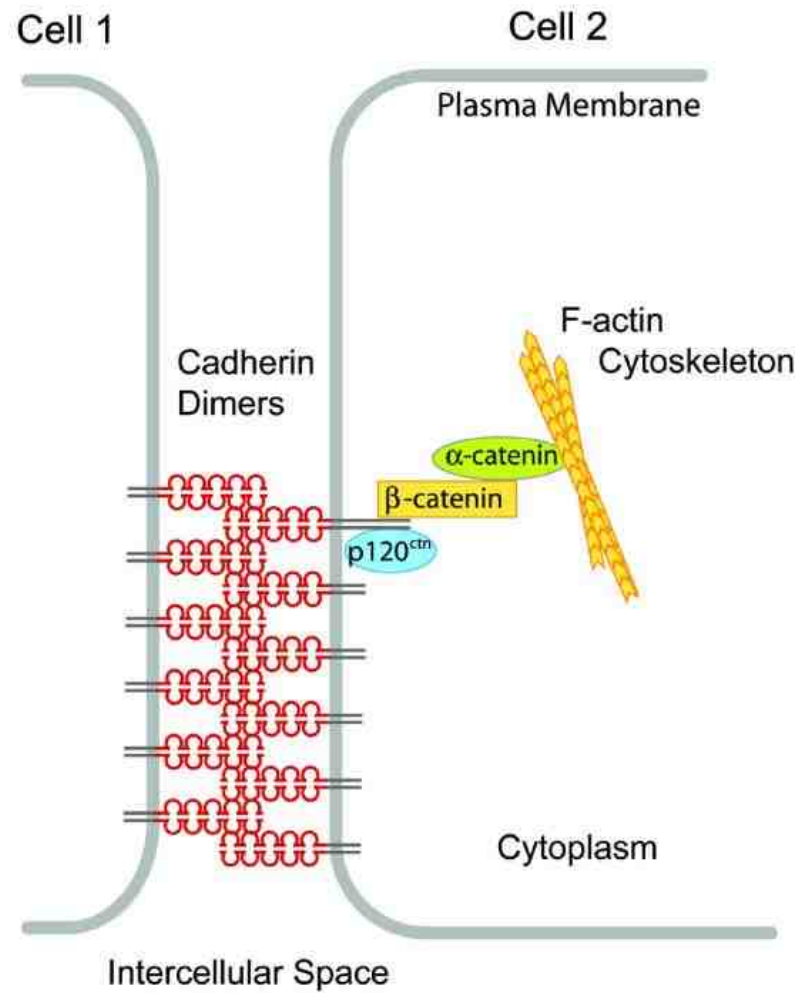
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## Adherens Junction



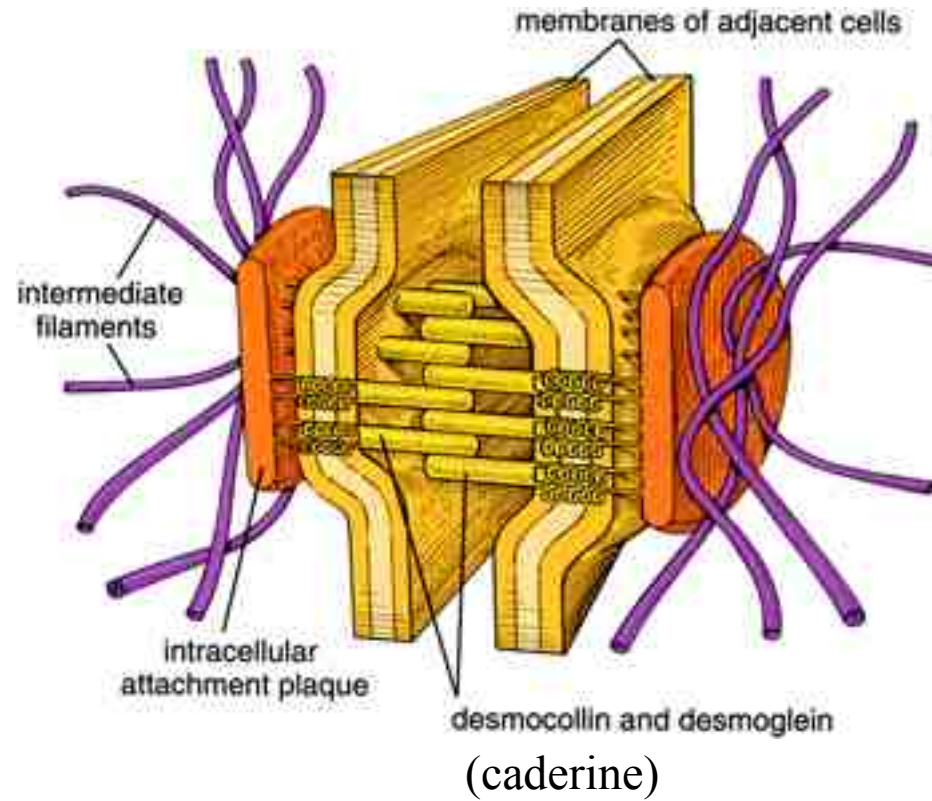
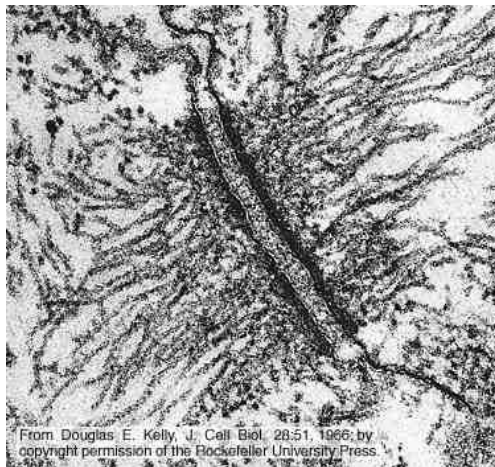
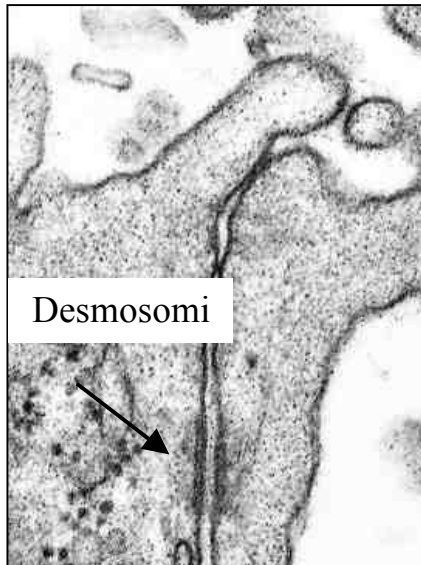
*Arthritis Research & Therapy*

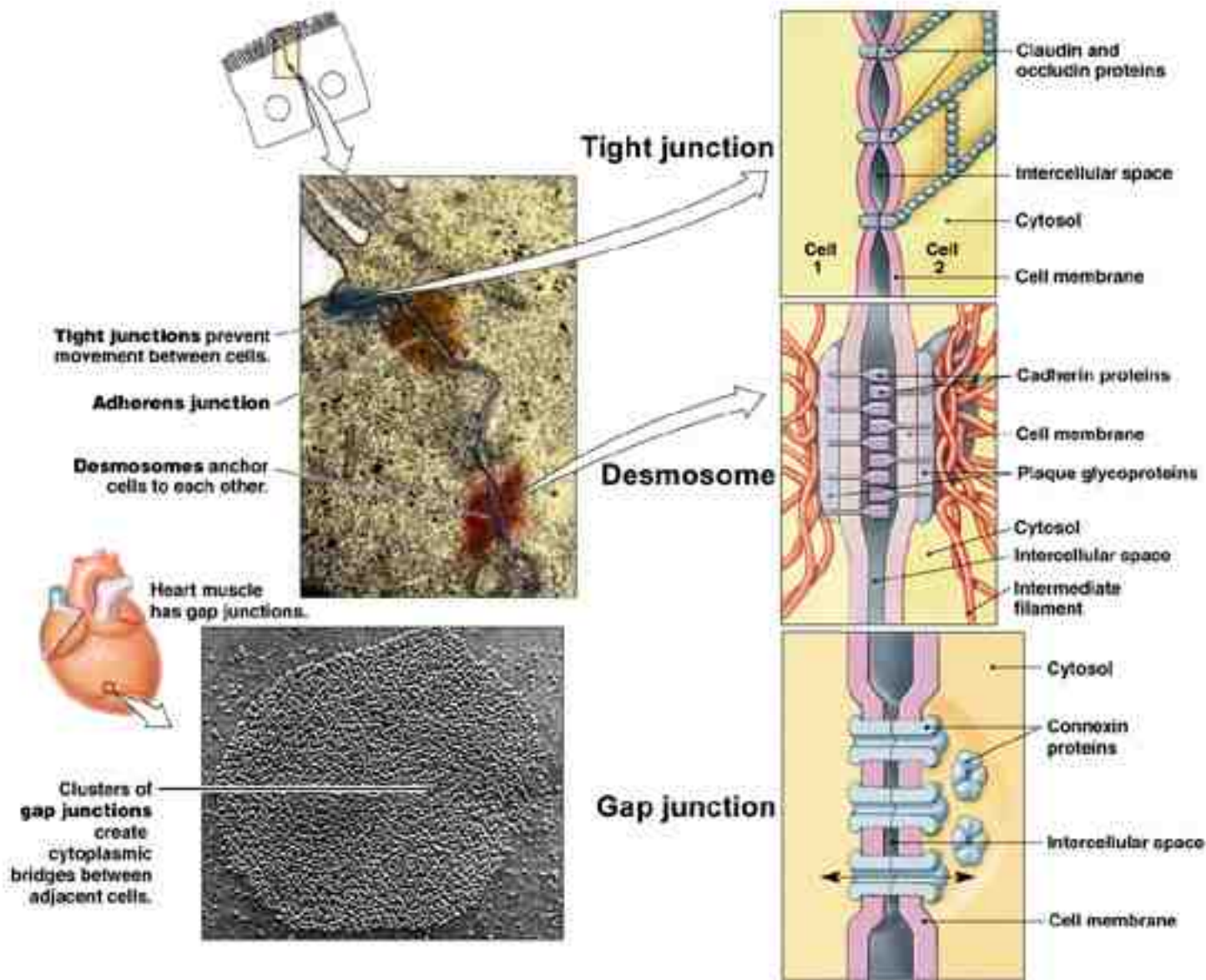
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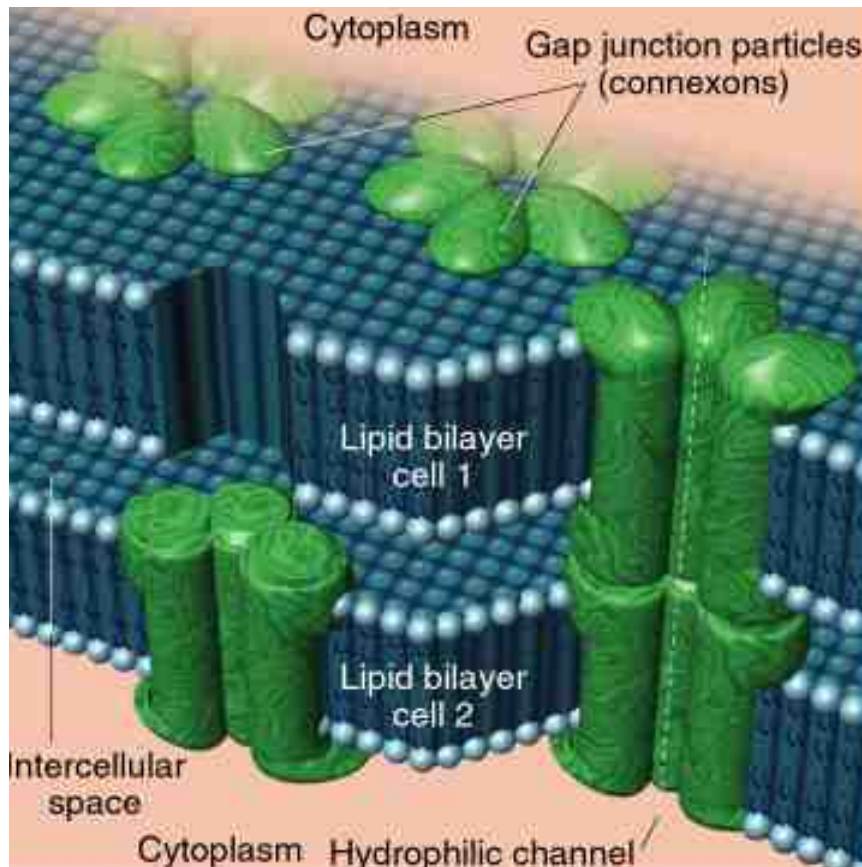
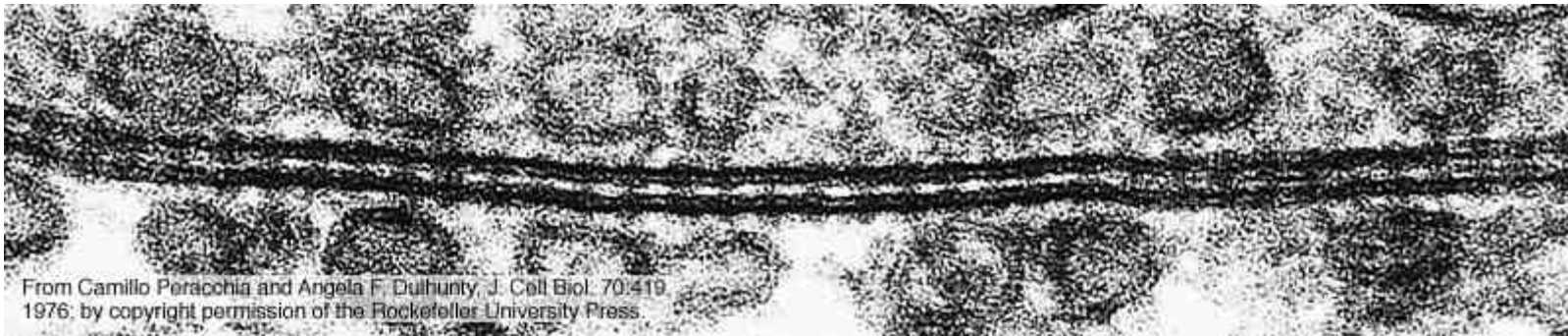
16



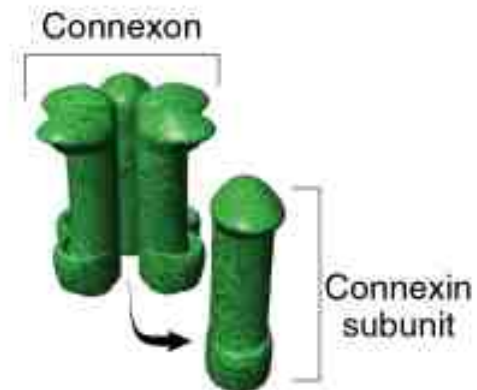
# desmosomi





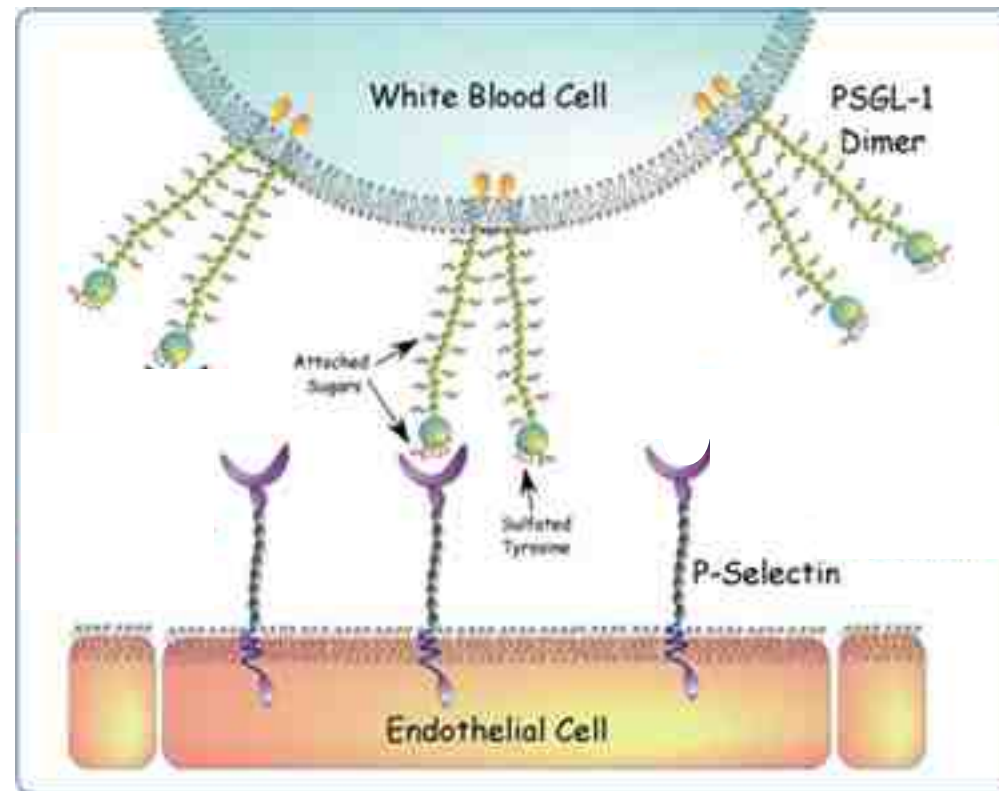


## GAP junction



# Interazioni eterofoliche cellule-cellule e cellule-ECM

Interazioni eterofiliche cellule-cellule mediate da selectine che legano particolari glicoproteine di superficie. Questo tipo di interazione è particolarmente importante nella reazione tra leucociti e cellule endoteliali attivate.



Adesione ---> extravasazione ---> migrazione

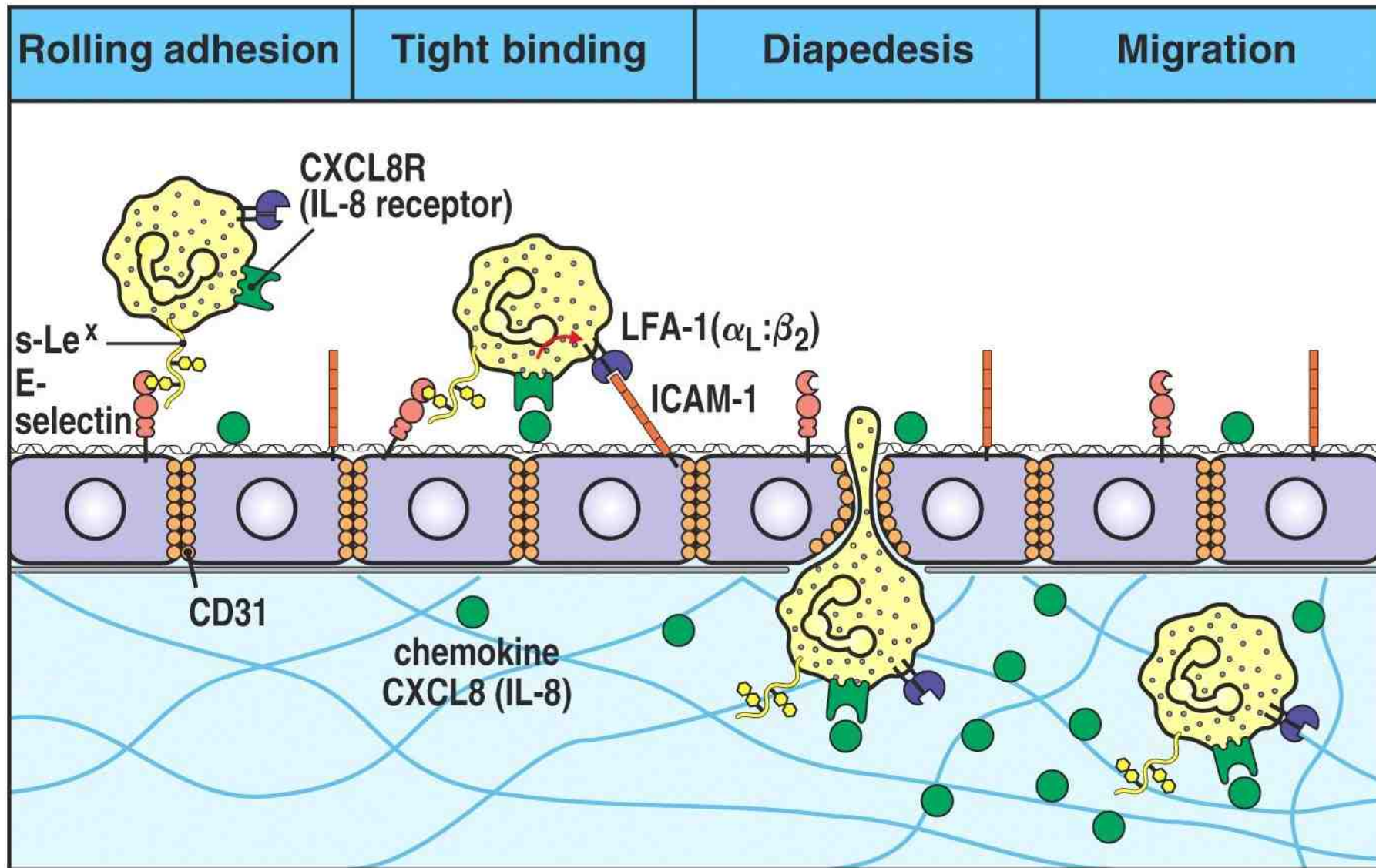
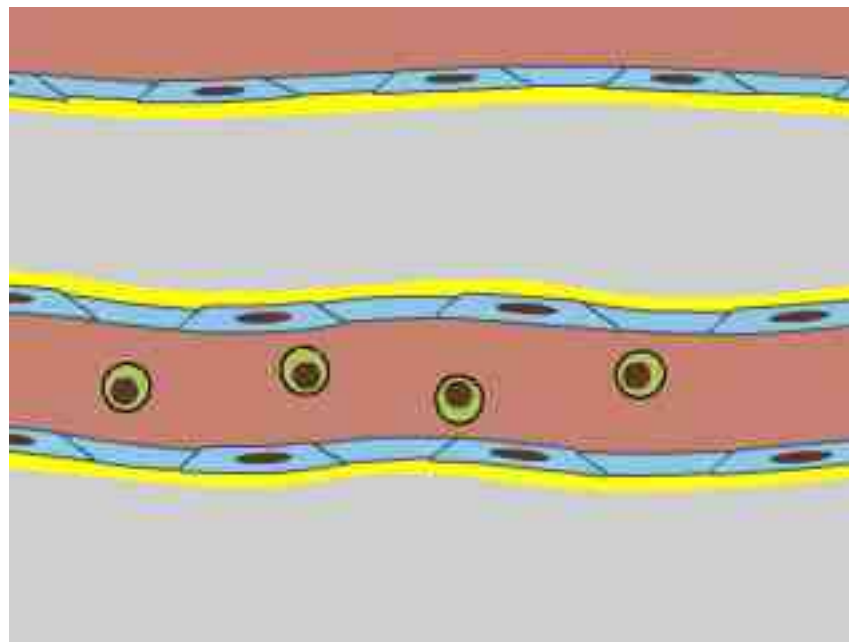
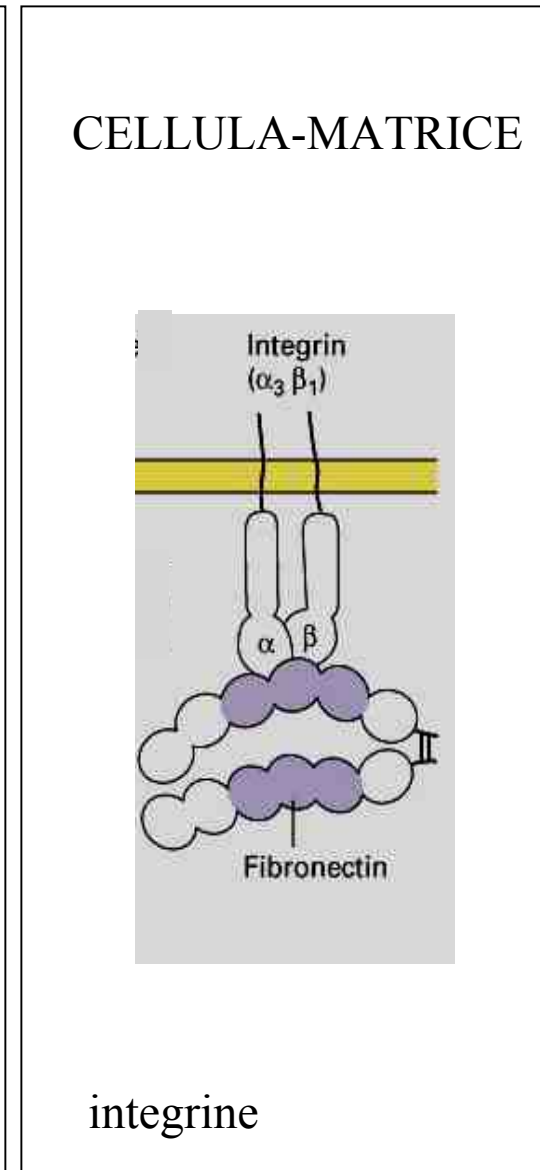
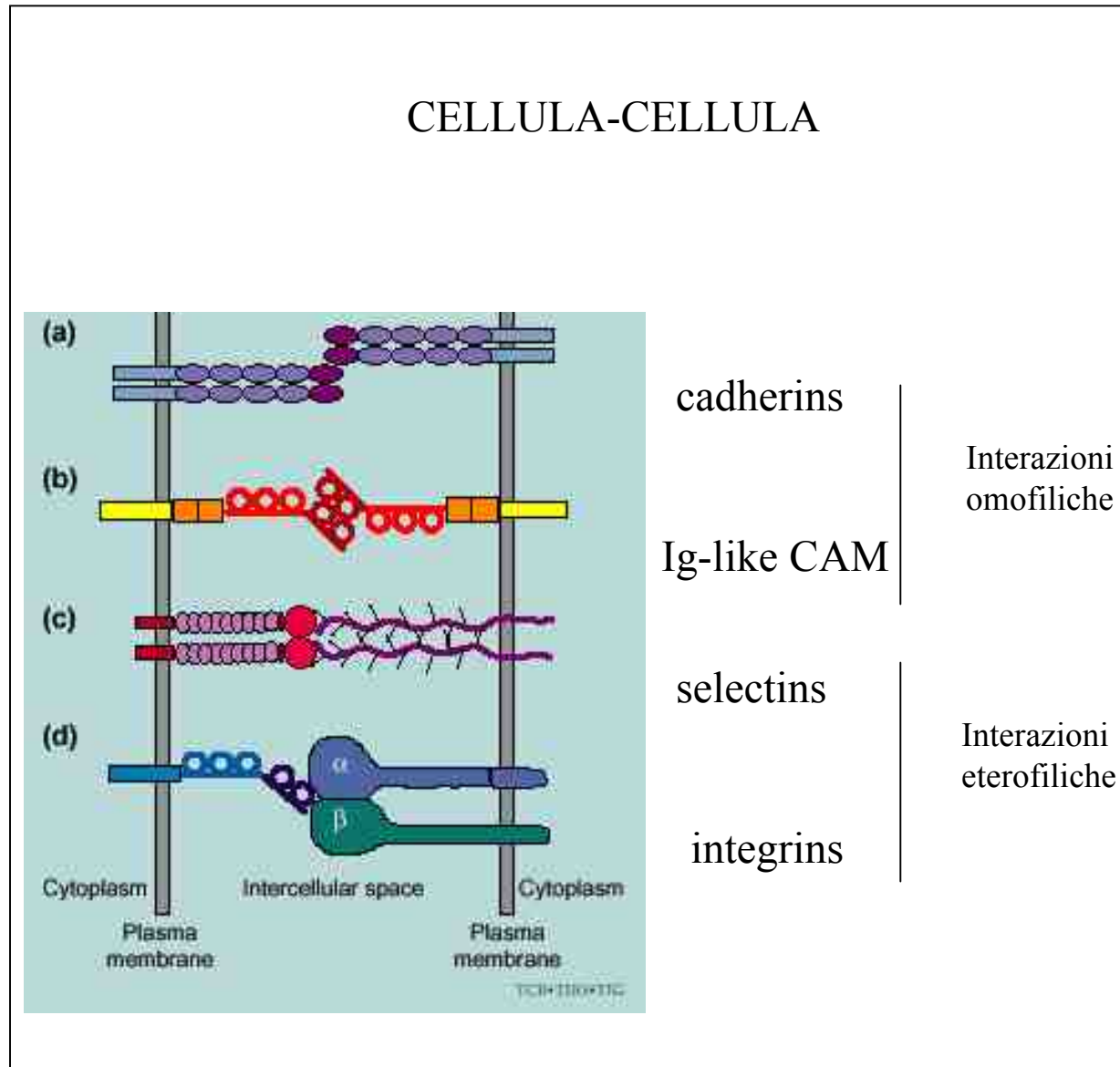


Figure 2-44 part 3 of 3 Immunobiology, 6/e. (© Garland Science 2005)

Vedi filmato sul sito



# Molecole di adesione

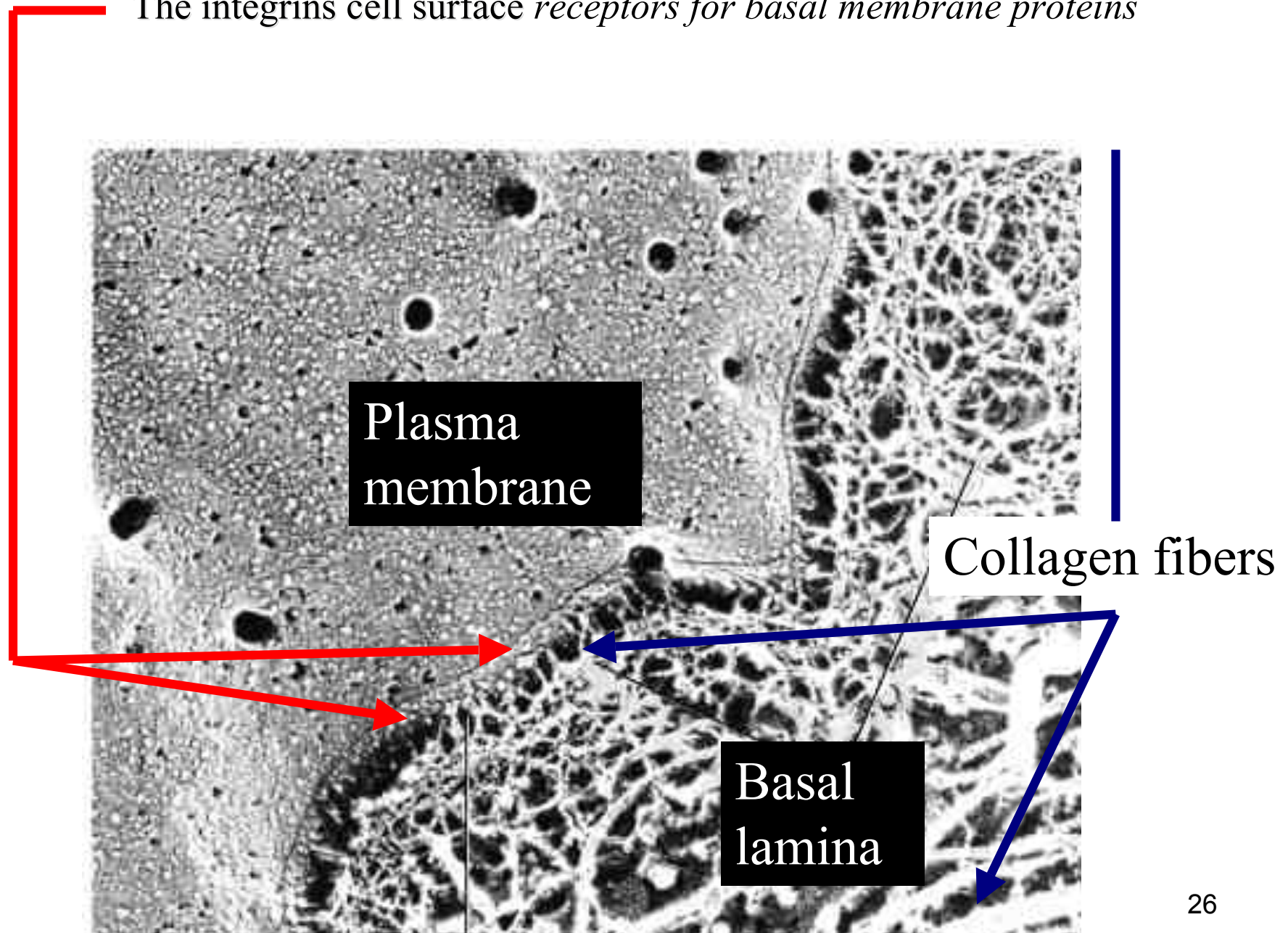




## MATRICE EXTRACELLULARE (ECM)

- **complessa rete di macromolecole extracellulari** secrete localmente che si aggregano in un reticolo organizzato in maniera compatta e connessa alla superficie della cellula che l'ha prodotta.
- ha un **ruolo attivo** e complesso nel comportamento delle cellule con cui è a contatto.
- ha **forma e composizione diversa** a seconda dei vari tessuti

The integrins cell surface *receptors for basal membrane proteins*



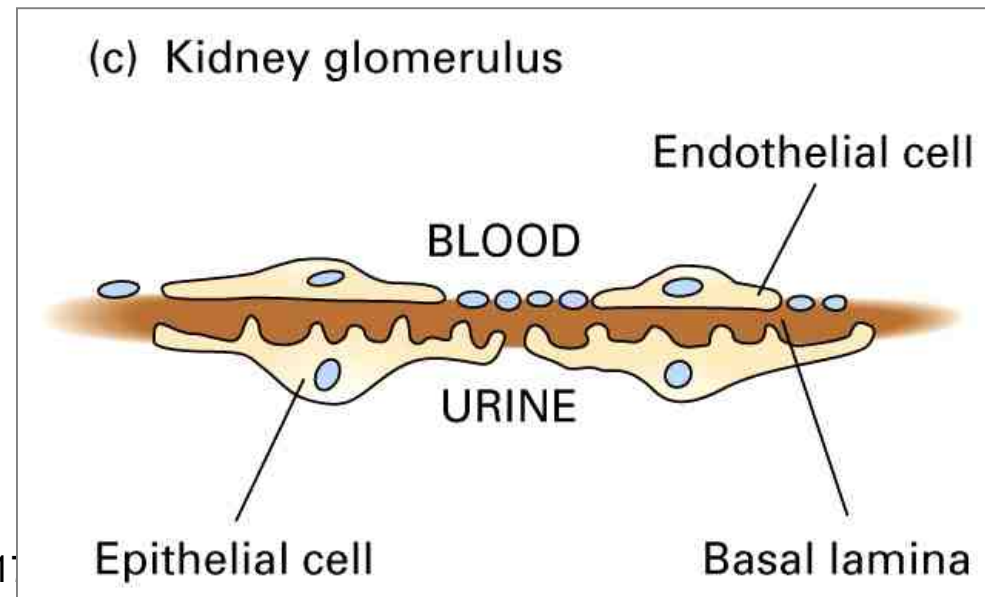
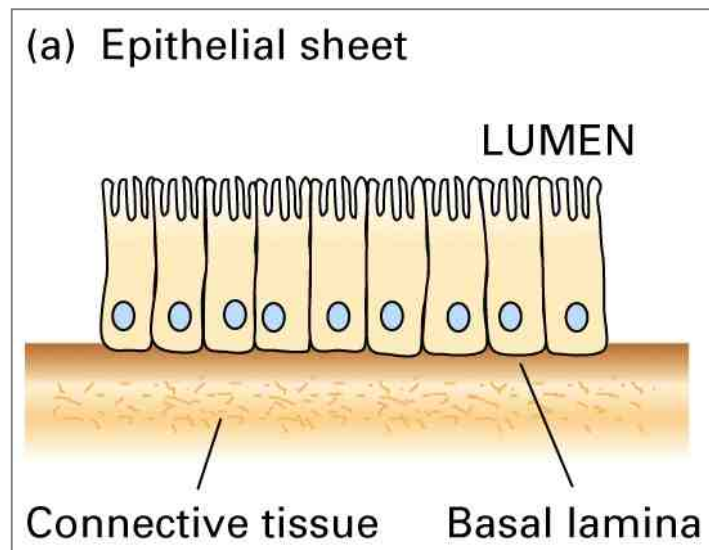
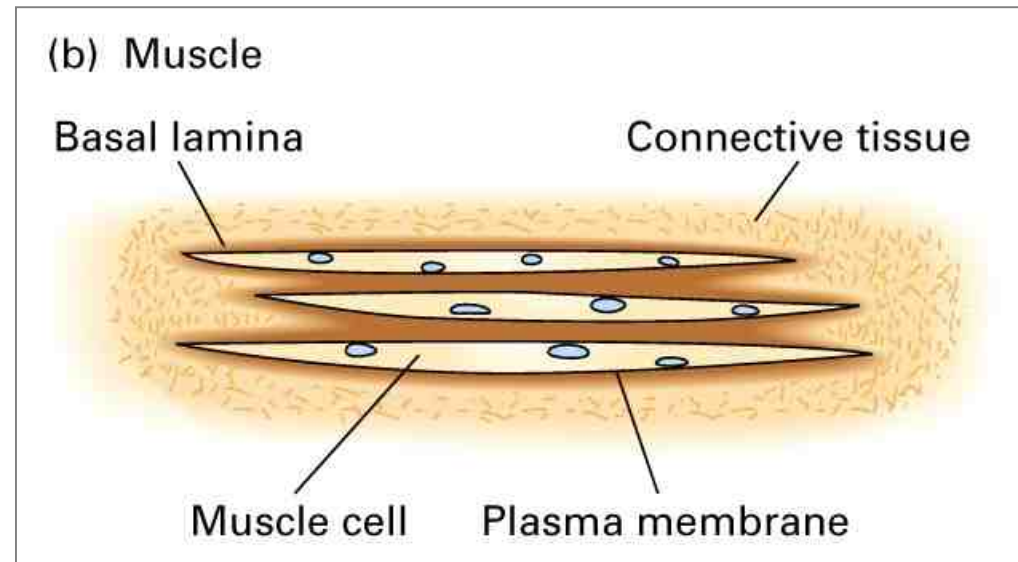
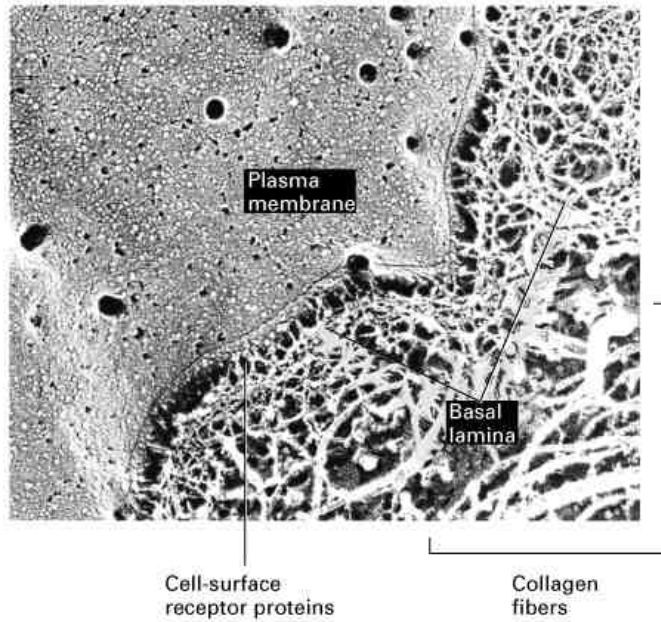
## **La matrice extracellulare**

- Associazione di macromolecole (proteine e polisaccaridi) organizzate in un reticolo connesso alla superficie cellulare
- Presente in tutti gli organismi pluricellulari, svolge un ruolo essenziale nell'organizzazione delle cellule in organi e tessuti
- E' particolarmente abbondante nei tessuti connettivi (cartilagine, osso, ...)
- E' secreta localmente da cellule specializzate:
  - Fibroblasti: tessuto connettivo
  - Condroblasti: cartilagine
  - Osteoblasti: osso

## **Funzioni della matrice extracellulare**

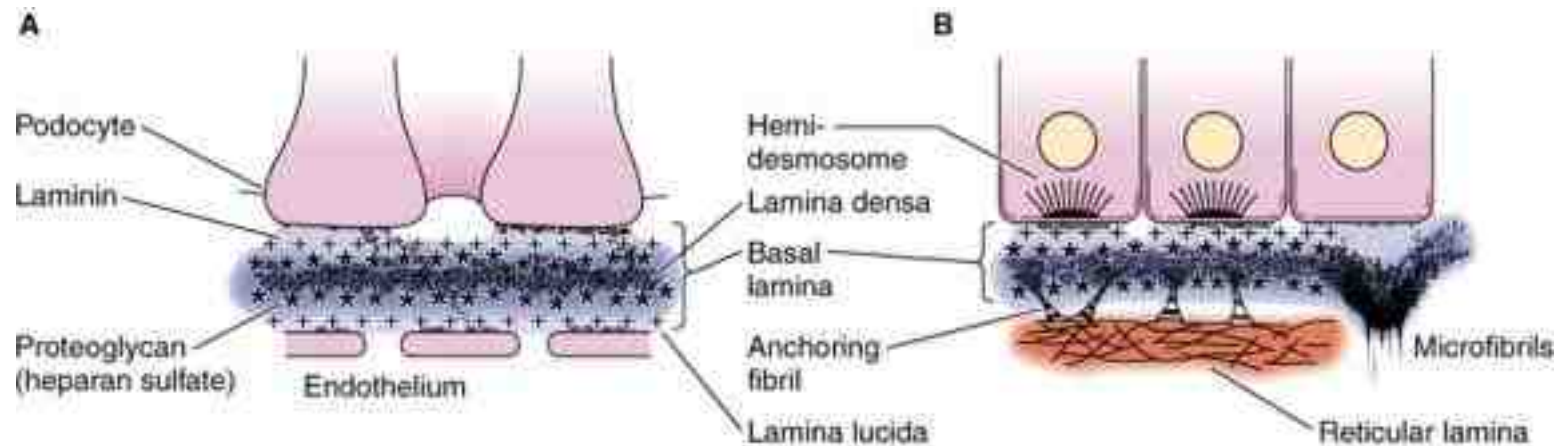
1. Sostegno: contribuisce a saldare le cellule e a sostenere i tessuti e gli organi
2. Regolazione della:
  - Forma delle cellule
  - Adesione cellulare
  - Migrazione cellulare
  - Proliferazione cellulare
  - Differenziamento cellulare
3. Regolazione dell'organizzazione tridimensionale dei tessuti e organi durante lo sviluppo embrionale

## Organizzazione della lamina basale di differenti tessuti



## Functions of Basal Laminae:

- **Compartmentalization:** Separates CT from epithelia, nerve or muscle tissues.
- **Filtration:** Regulates movement of substances to and from CT (mainly by ionic charges).
- **Polarity induction:** Basal lamina attributes specific properties to basal membrane surface.
- **Tissue scaffolding:** Basal lamina serves as guide or scaffold during regeneration of epithelium.



## Extracellular Matrix and Cell Adhesion Molecules

Recent research shows that ECM and associated CAMs are critical for the functioning of most cells. The integrity of tissues is also dependent on the adhesion, by CAMs, of cells to cells and cells to the Extracellular Matrix

Extracellular matrix (ECM)

All cells in solid tissue are surrounded by extracellular matrix.

Both plants and animals have ECM. The cell wall of plant cells is a type of extracellular matrix. In animals, the ECM can surround cells as fibrils that contact the cells on all sides, or as a sheet called the basement membrane that cells 'sit on'. Cells in animals are also linked directly to each other by cell adhesion molecules (CAMs) at the cell surface.

ECM is composed of proteins and polysaccharides. Connective tissue is largely ECM together with a few cells.

\* For cells ECM provides:

- o mechanical support
- o a biochemical barrier
- o a medium for:

1. extracellular communication that is assisted by CAMs
2. the stable positioning of cells in tissues through cell matrix adhesion
3. the repositioning of cells by cell migration during cell development and wound repair

\* ECM provides:

- o tensile strength for tendons
- o compressive strength for cartilage
- o hydraulic protection for many types of cells
- o elasticity to the walls of blood vessels

\* ECM can be calcified to form:

- o bones and teeth
- o the cell wall of bacteria
- o the shells of molluscs and
- o chitinised to form the exoskeleton of insects