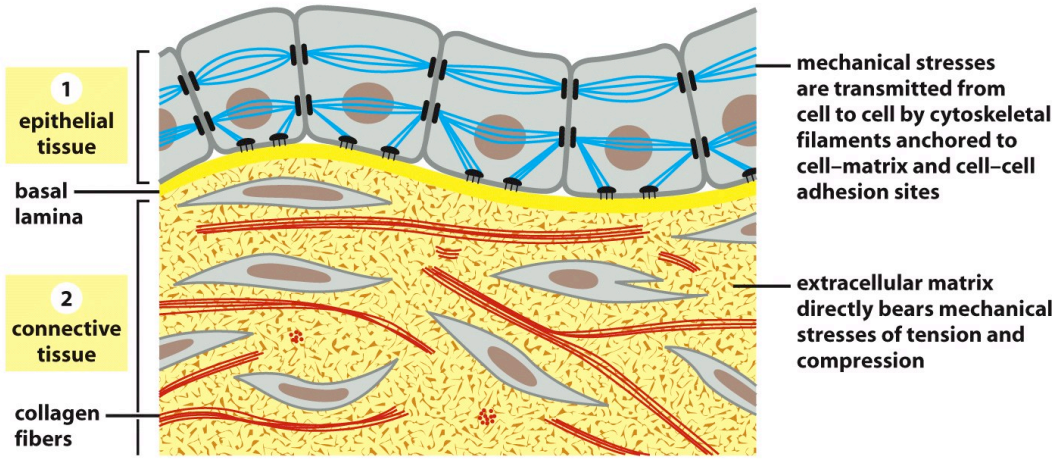
UNIONES CELULARES



El modelo más utilizado son las células epiteliales debido a que presentan polaridad, sin embargo, hay múltiples casos de gran importancia. Por ejemplo, las células musculares deben poder anclarse a su medio con mucha fuerza.

Figure 19-2 *Molecular Biology of the Cell* (© Garland Science 2008)

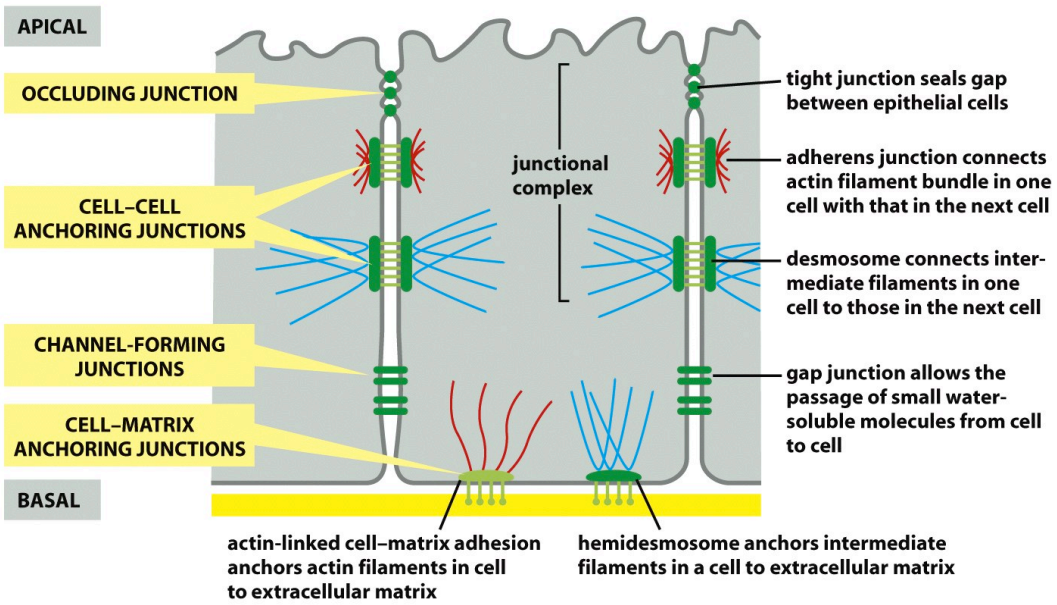
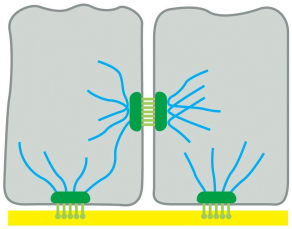
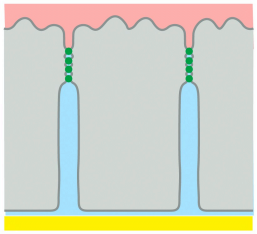


Figure 19-3 *Molecular Biology of the Cell* (© Garland Science 2008)



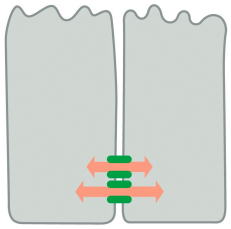
ANCHORING JUNCTIONS



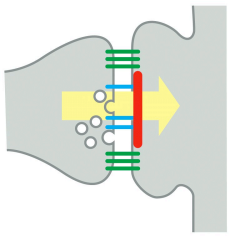
OCCLUDING JUNCTIONS

Table 19–1 A Functional Classification of Cell Junctions

ANCHORING JUNCTIONS
Actin filament attachment sites
1. cell–cell junctions (adherens junctions)
2. cell–matrix junctions (actin-linked cell–matrix adhesions)
Intermediate filament attachment sites
1. cell–cell junctions (desmosomes)
2. cell–matrix junctions (hemidesmosomes)
OCCLUDING JUNCTIONS
1. tight junctions (in vertebrates)
2. septate junctions (in invertebrates)



CHANNEL-FORMING JUNCTIONS



SIGNAL-RELAYING JUNCTIONS

CHANNEL-FORMING JUNCTIONS
1. gap junctions (in animals)
2. plasmodesmata (in plants)
SIGNAL-RELAYING JUNCTIONS
1. chemical synapses (in the nervous system)
2. immunological synapses (in the immune system)
3. transmembrane ligand–receptor cell–cell signaling contacts (Delta-Notch, ephrin-Eph, etc.). Anchoring, occluding, and channel-forming junctions can all have signaling functions in addition to their structural roles

UNIONES DE ANCLAJE

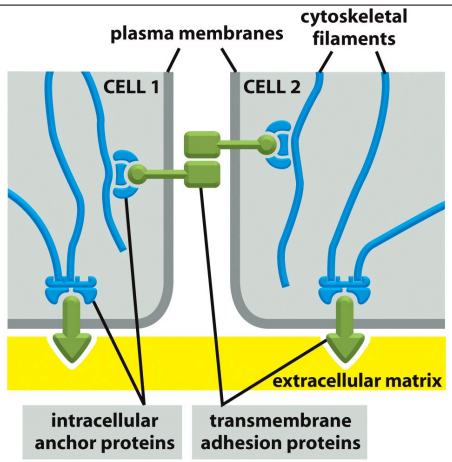
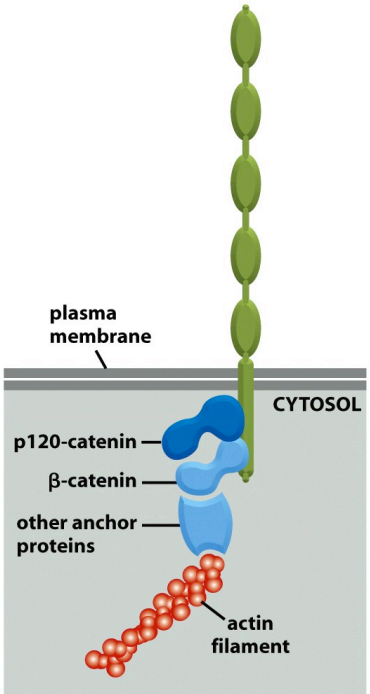
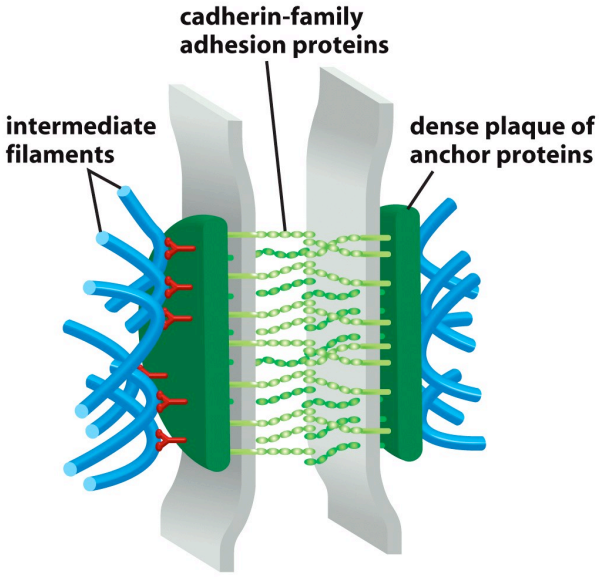


Table 19–2 Anchoring Junctions

JUNCTION	TRANSMEMBRANE ADHESION PROTEIN	EXTRACELLULAR LIGAND	INTRACELLULAR CYTOSKELETAL ATTACHMENT	INTRACELLULAR ANCHOR PROTEINS
Cell–Cell				
adherens junction	cadherin (classical cadherin)	cadherin in neighboring cell	actin filaments	α-catenin, β-catenin, plakoglobin (γ-catenin), p120-catenin, vinculin, α-actinin
desmosome	cadherin (desmoglein, desmocollin)	desmoglein and desmocollin in neighboring cell	intermediate filaments	plakoglobin (γ-catenin), plakophilin, desmoplakin
Cell–Matrix				
actin-linked cell–matrix adhesion	integrin	extracellular matrix proteins	actin filaments	talin, vinculin, α-actinin, filamin, paxillin, focal adhesion kinase (FAK)
hemidesmosome	integrin α6β4, type XVII collagen (BP180)	extracellular matrix proteins	intermediate filaments	plectin, dystonin (BP230)



"Zonula Adherens"
Unión adherente
(recordar, **A**dherente, **A**ctina



DESMOSOMA

Anclaje célula-célula a los filamentos intermedios

Anclajes del citoesqueleto de actina a la Matriz extracelular
(adhesión focal, shhh!!)

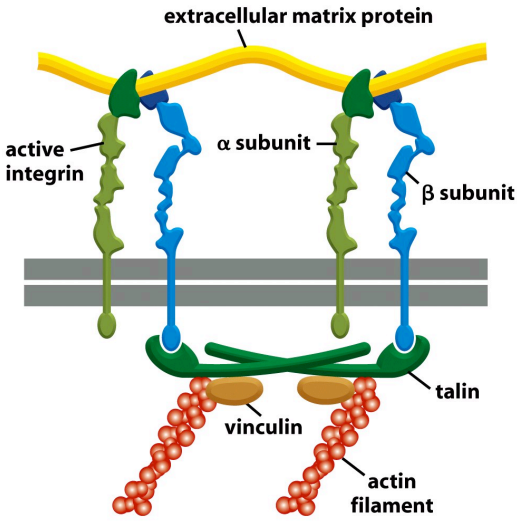
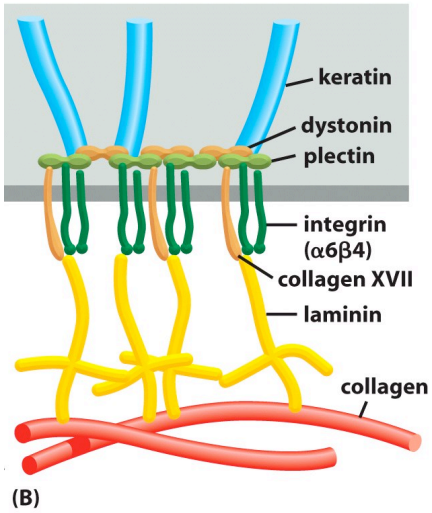


Figure 19-45 Molecular Biology of the Cell 5/e (© Garland Science 2008)

(el nombre adhesión focal no se utiliza por que se refiere a una estructura de células en cultivo)

Hemidesmosomas



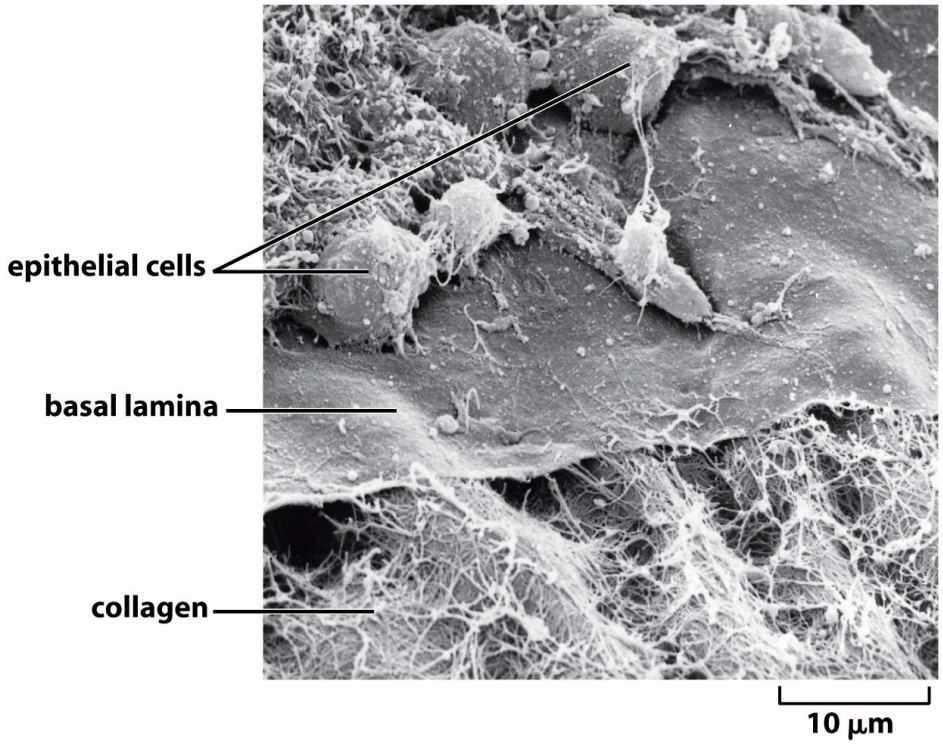


Figure 19-40 Molecular Biology of the Cell 5/e (© Garland Science 2008)

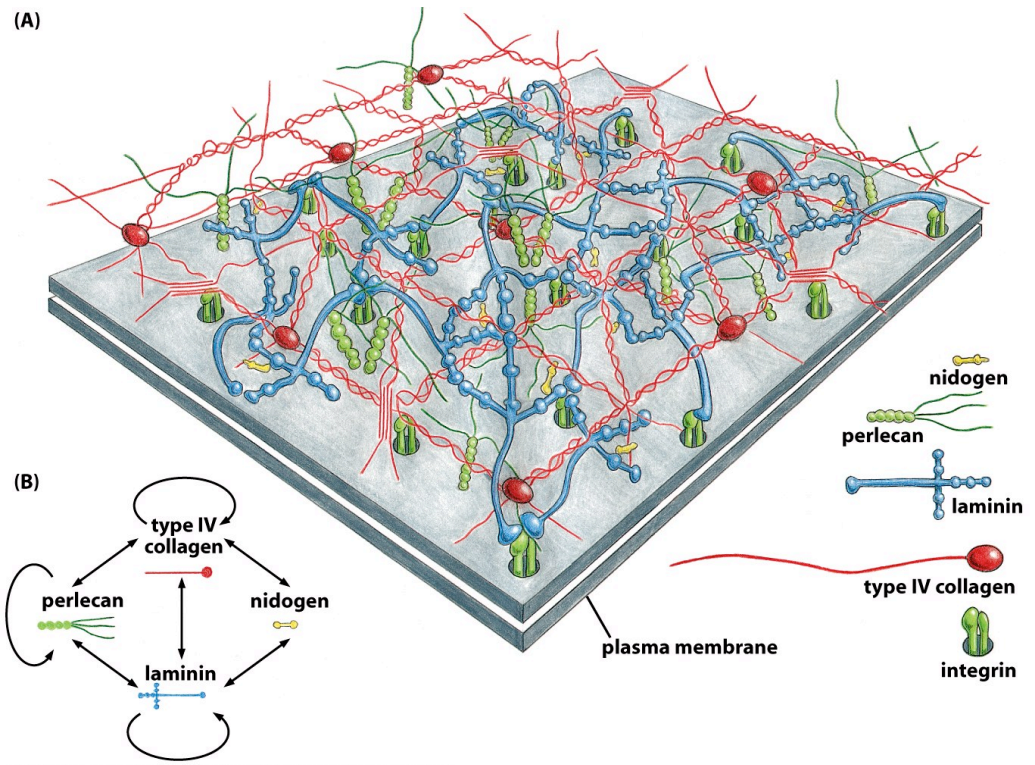


Figure 19-43 Molecular Biology of the Cell 5/e (© Garland Science 2008)

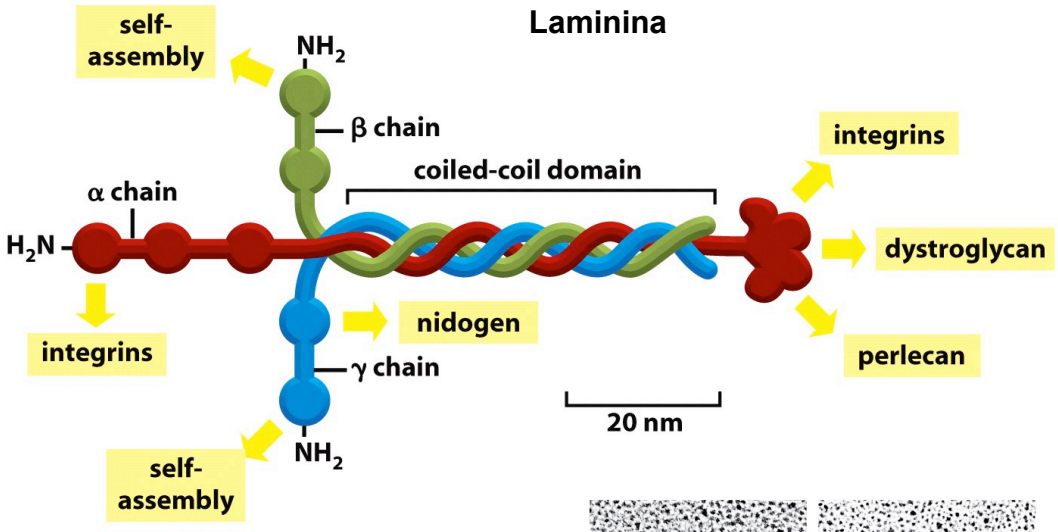


Figure 19-42a Molecular Biology of the Cell 5/e (© Garland Science 2008)

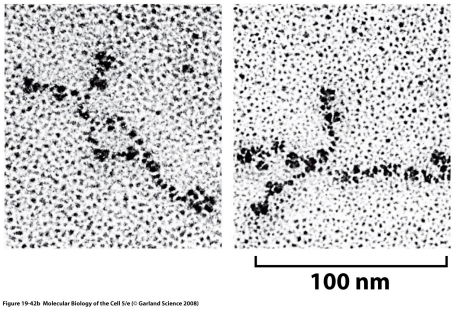


Figure 19-42b Molecular Biology of the Cell 5/e (© Garland Science 2008)

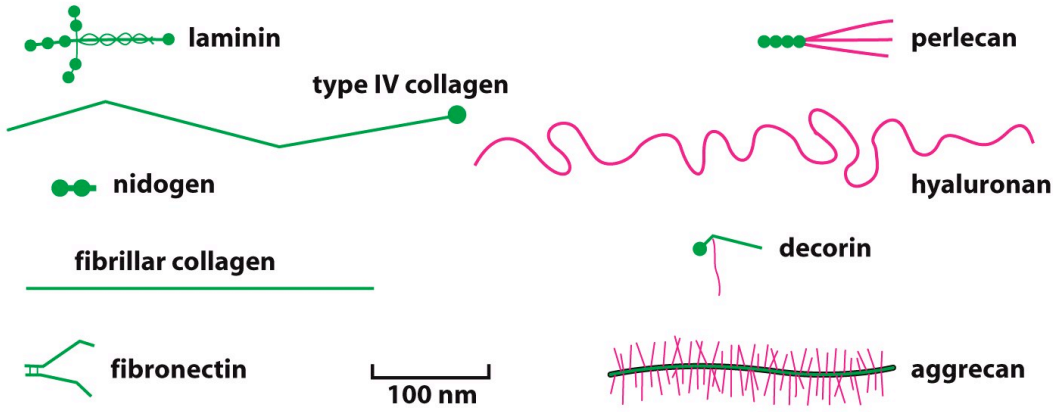


Figure 19-41 Molecular Biology of the Cell 5/e (© Garland Science 2008)

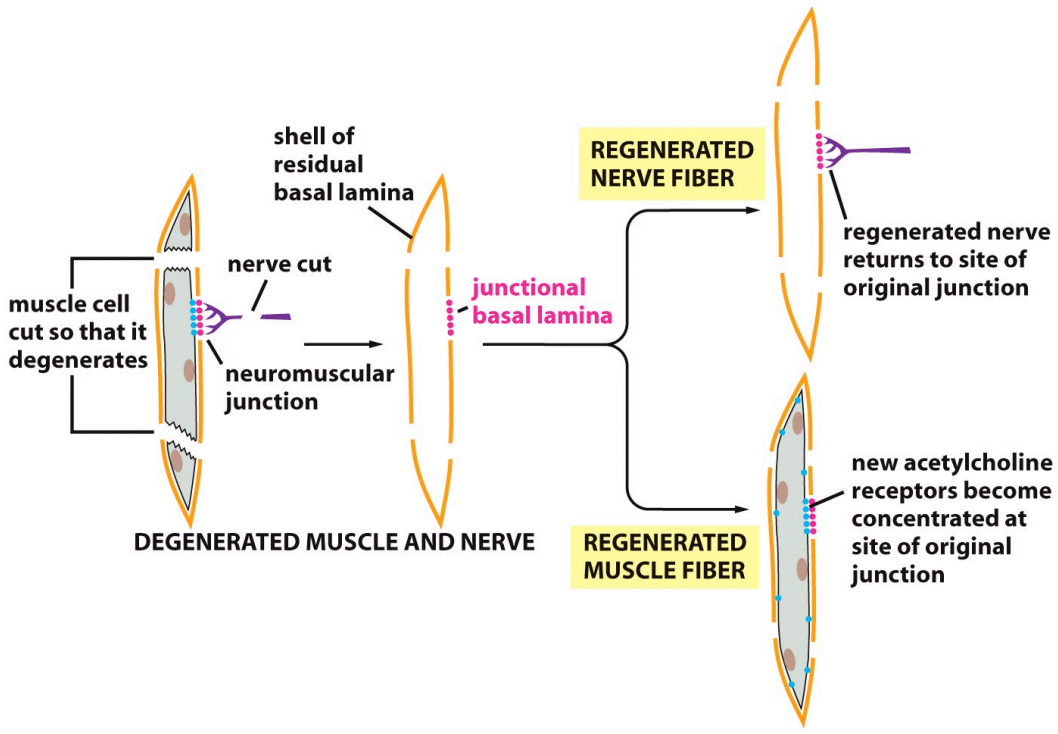


Figure 19-44 Molecular Biology of the Cell 5/e (© Garland Science 2008)

Uniones estrechas (zonula occludens o *tight junctions*)

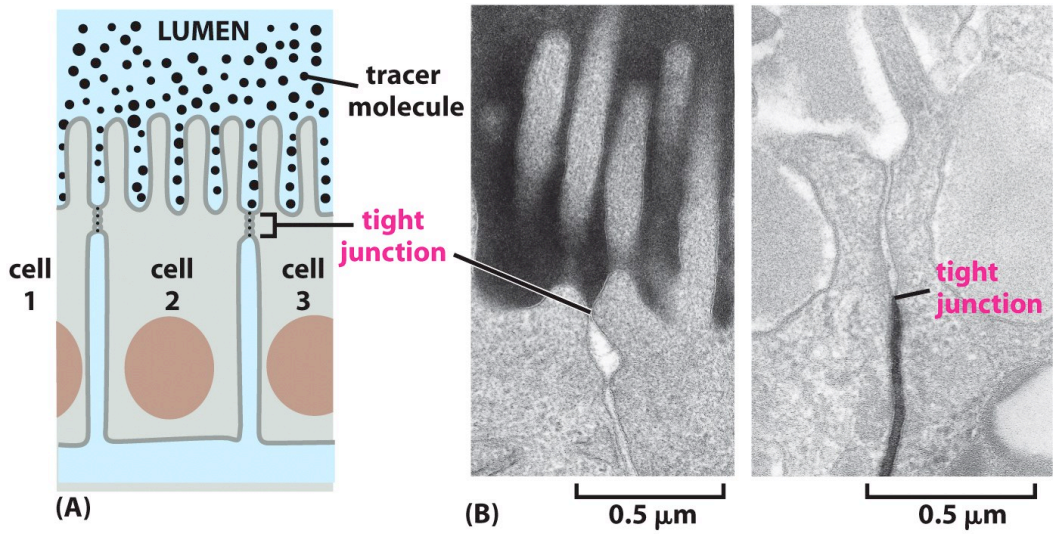
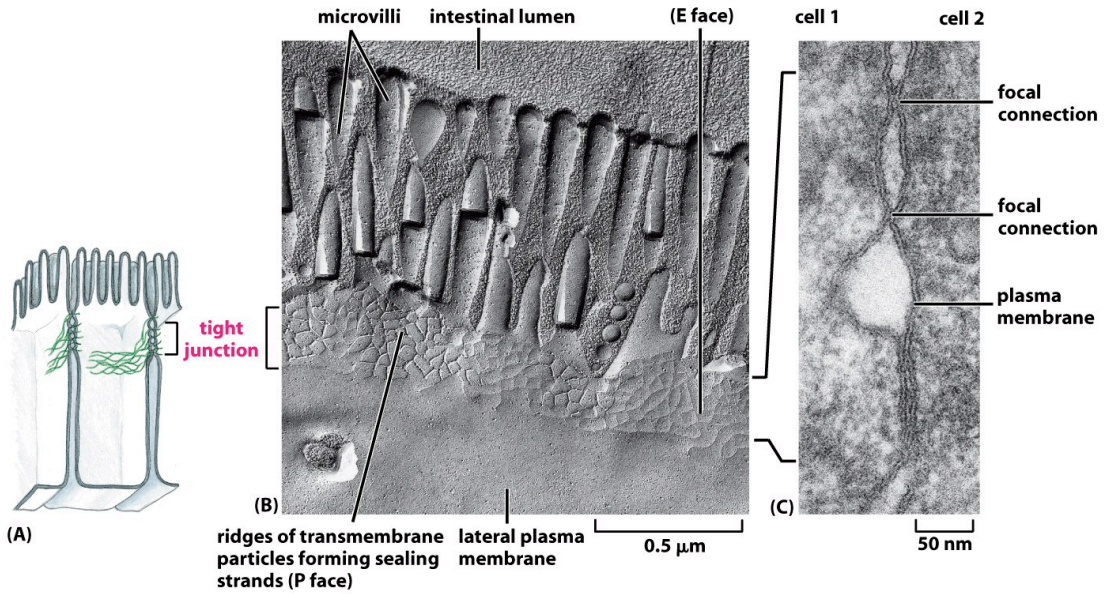
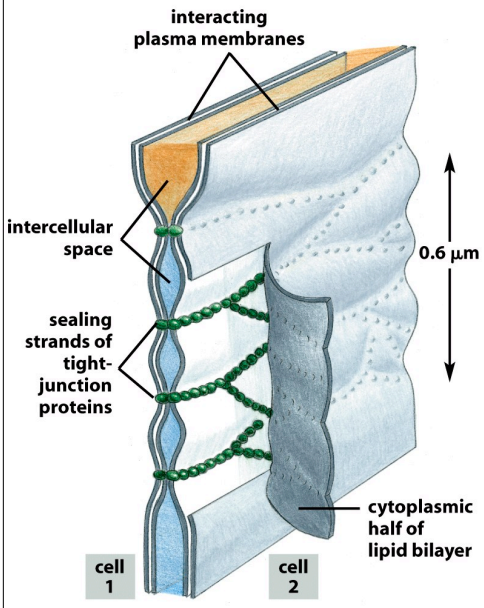
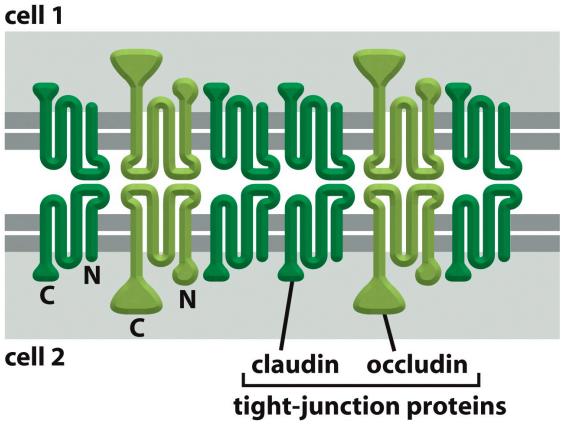


Figure 19-24 *Molecular Biology of the Cell* (© Garland Science 2008)

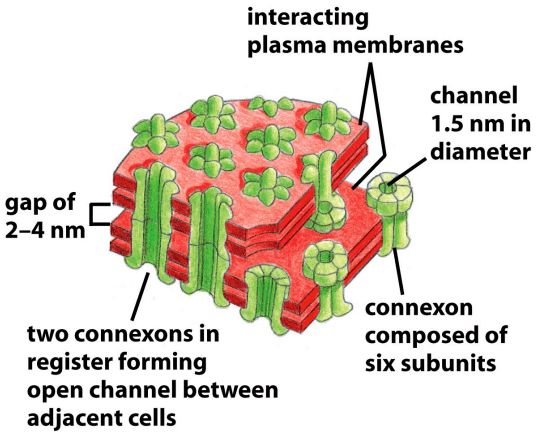


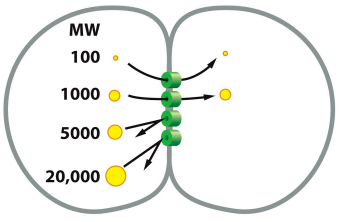


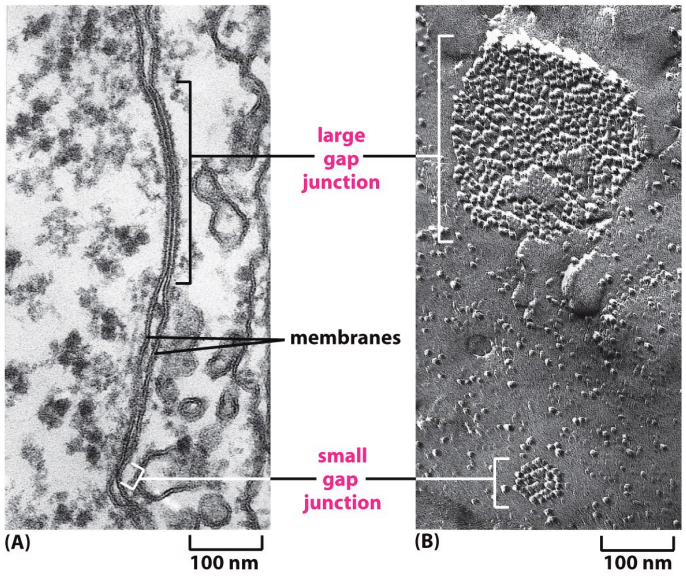


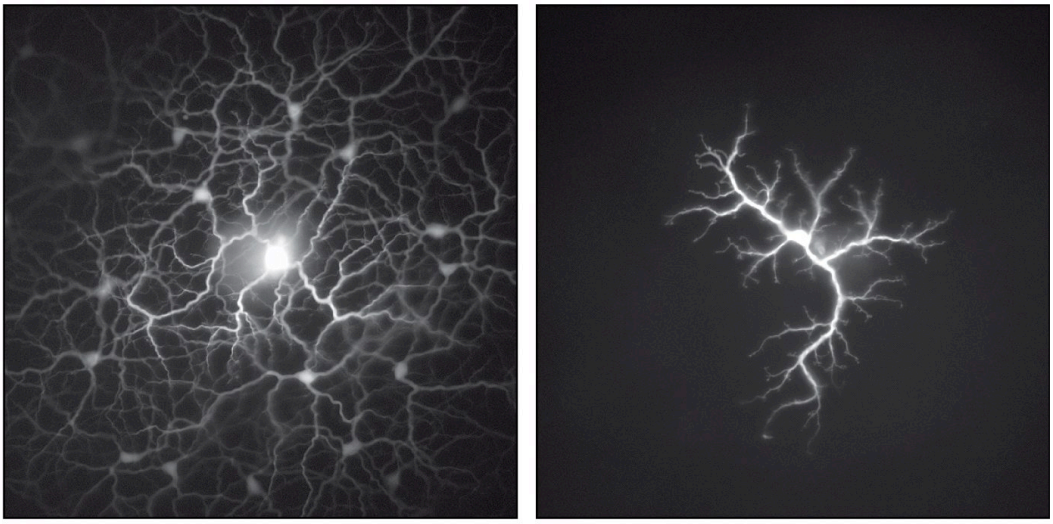
Uniones comunicantes

- Uniones en Hendidura (gap junctions) de células animales.
  - Conexión directa célula-célula.
  - Capacidad selectiva de paso
  - Regulación de apertura
  - Reconociento entre diferentes células
- Plasmodesmos de células vegetales.









(A) **(B)**

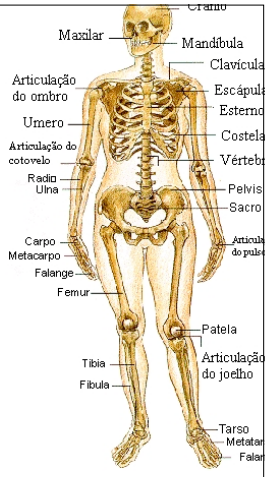
A. Neurona inyectada con “amarillo de lucifer”, colorante que atraviesa las uniones en hendidura y marca otras neuronas.

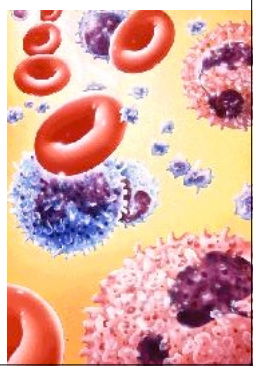
B. Neurona pre-tratada con dopamina (neurotransmisor), no deja pasar el colorante. Cierra sus Uniones en hendidura.

Tejido conectivo

TEJIDOS CONECTIVO: Unión

- Unen otras estructuras corporales y les dan sostén.
- Cubre casi todos los órganos, provee amortiguamiento.
- No es celular
  - Es clasificado por tejidos específicos mas que por tipos de células.
- Compuesto de fibras rodeadas por una matriz
  - En ocasiones esta matriz puede ser fluida como la sangre o el plasma.
  - O elástica como el cartílago.
- Es originado en el mesénquima del embrión





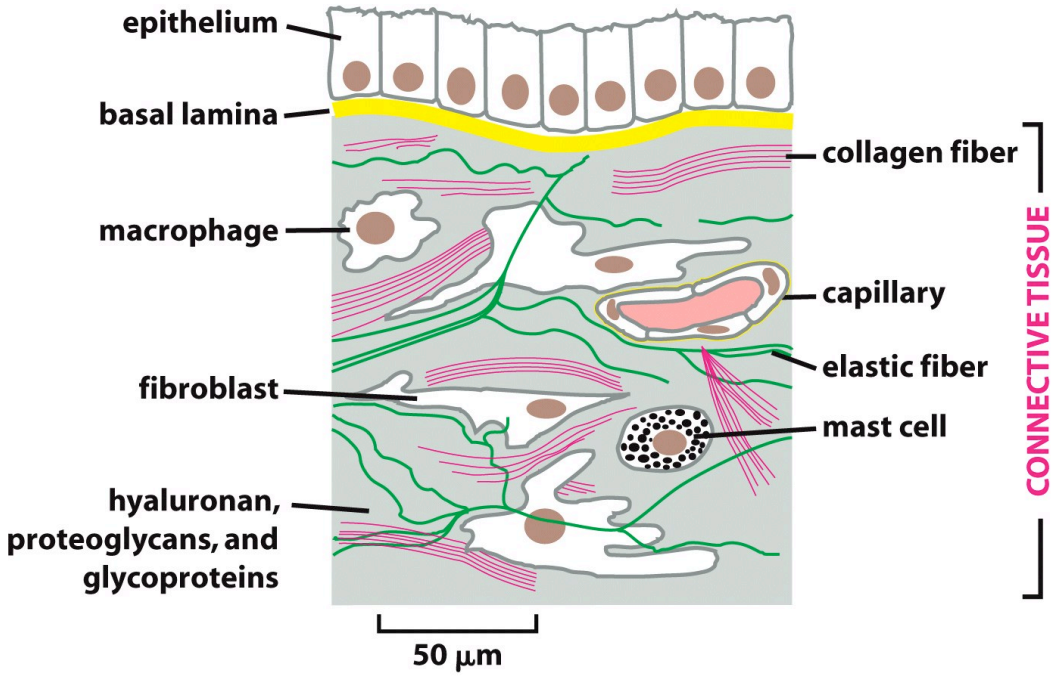
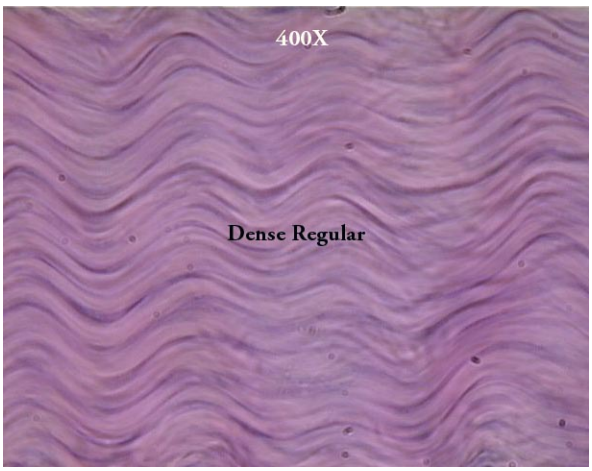


Figure 19-53 Molecular Biology of the Cell 5/e (© Garland Science 2008)

Tipos de Tejido Conectivo

<u>T.C. Denso y suelto</u>:

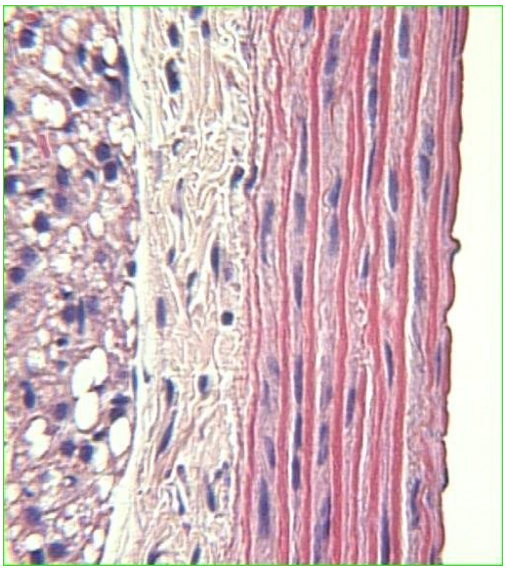
- Para conectar órganos y servir de reserva de sales y fluídos



Tipos de Tejido Conectivo

T.C. Elástico:

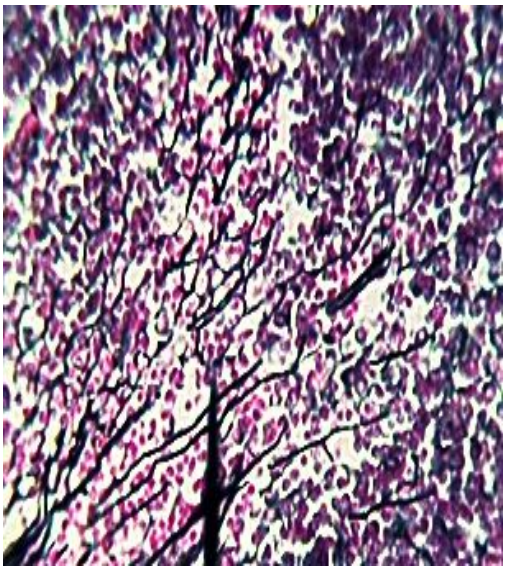
- Para estructuras que se tienen que expandir y contraer (Ej. Pulmones y arterias).



Tipos de Tejido Conectivo

T.C. Reticular:

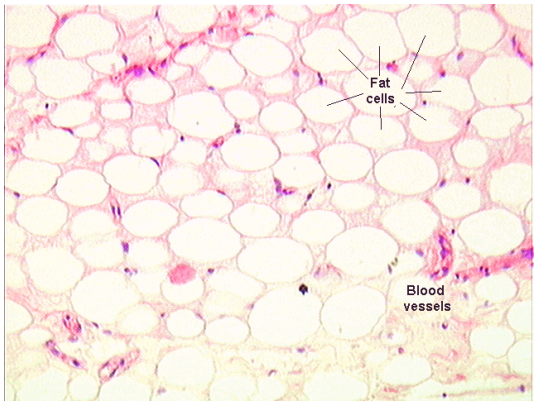
- Forma una base de apoyo para muchos órganos (Ej. Hígado y Nodo linfático).

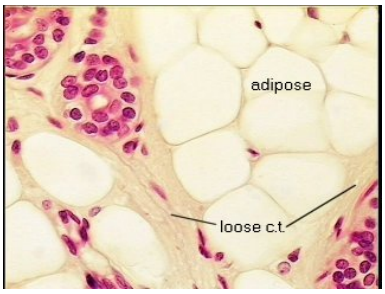


Tipos de Tejido Conectivo

Tejido Adiposo:

- Almacenar grasa

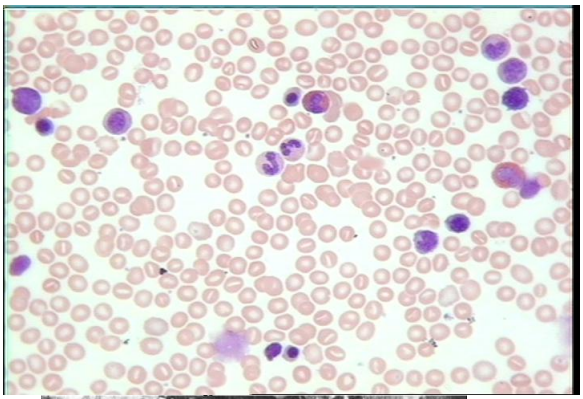


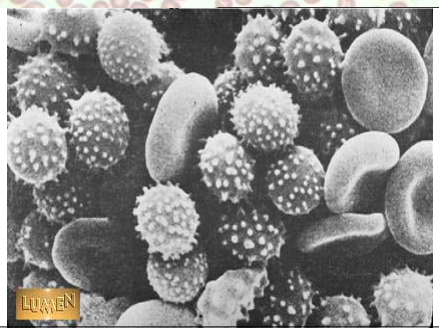


Tipos de Tejido Conectivo

Sangre y Linfa:

- Tejido de circulación que provee comunicación a diferentes partes del cuerpo

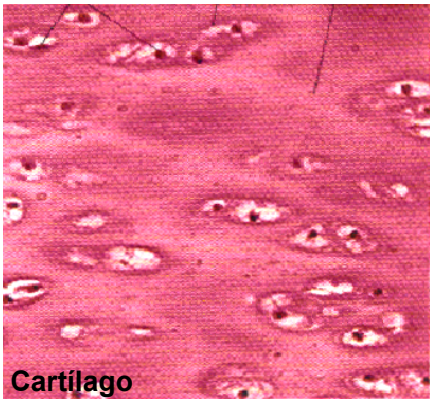


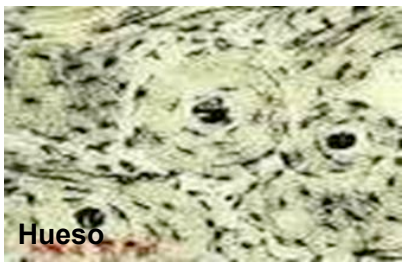


Tipos de Tejido Conectivo

Cartílago y Hueso:

- Formar el esqueleto de los vertebrados.





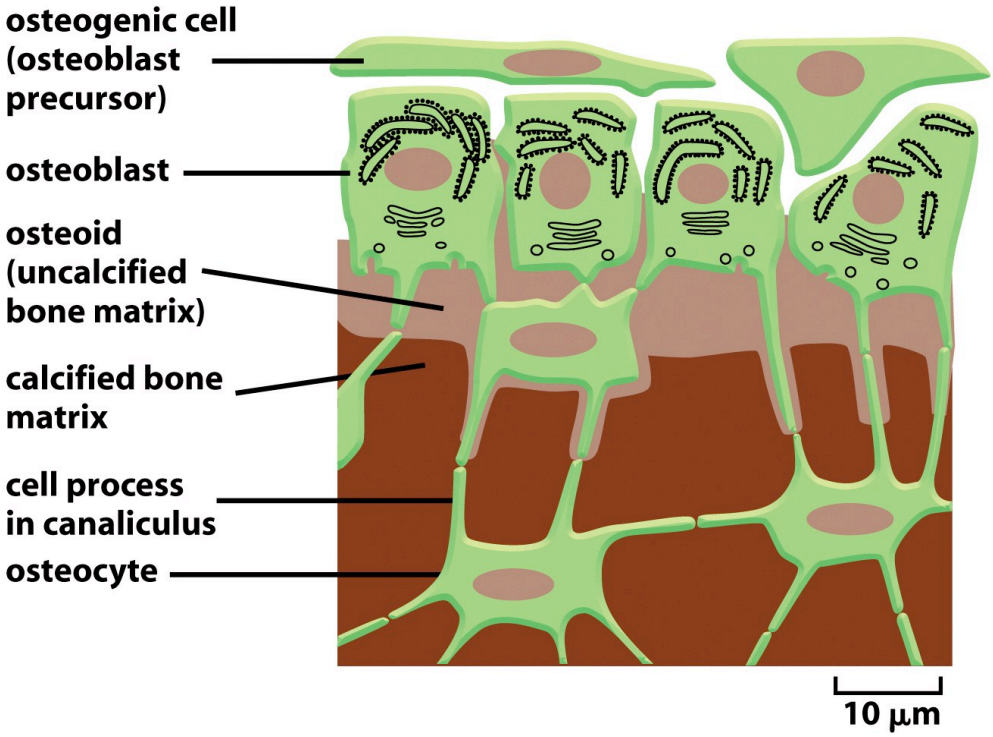


Figure 23-55 *Molecular Biology of the Cell* (© Garland Science 2008)

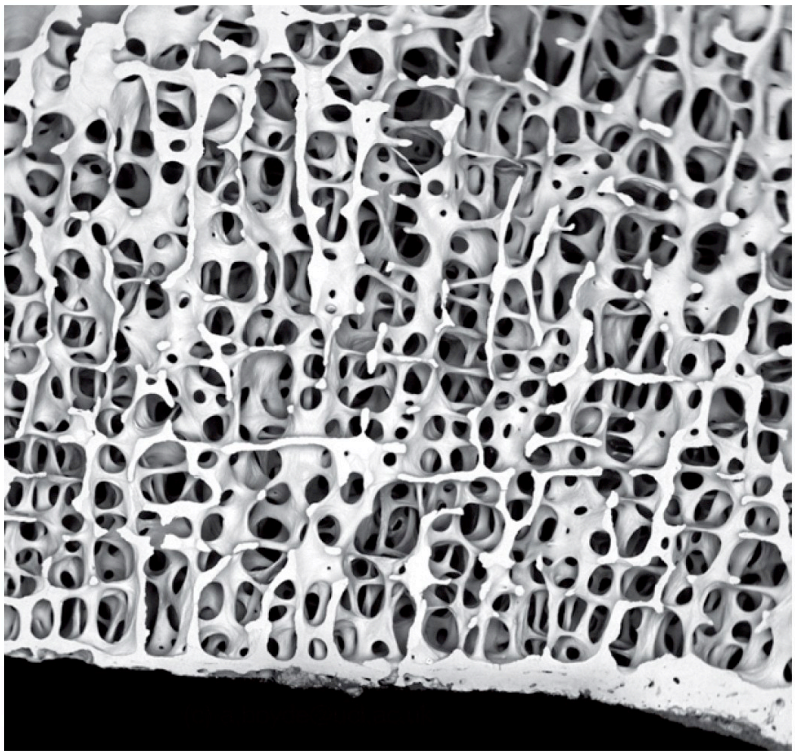


Figure 23-56a *Molecular Biology of the Cell* (© Garland Science 2008)

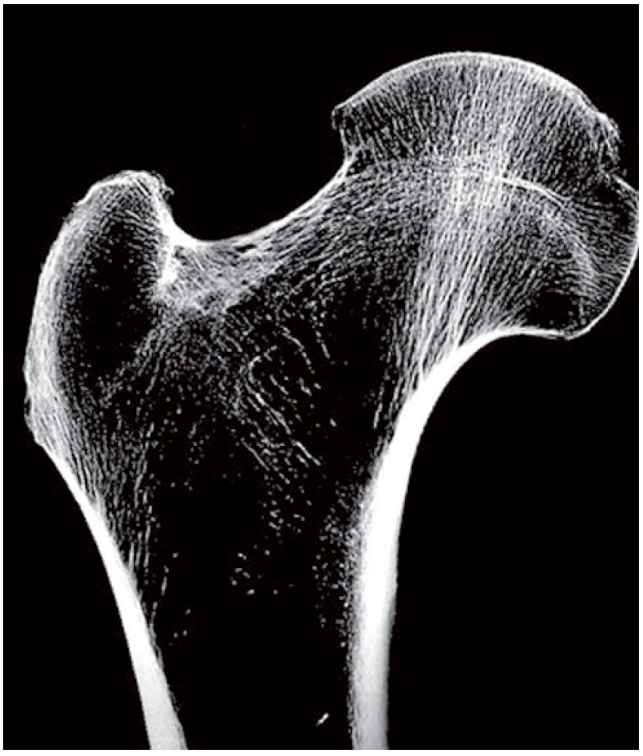


Figure 23-56b *Molecular Biology of the Cell* (© Garland Science 2008)

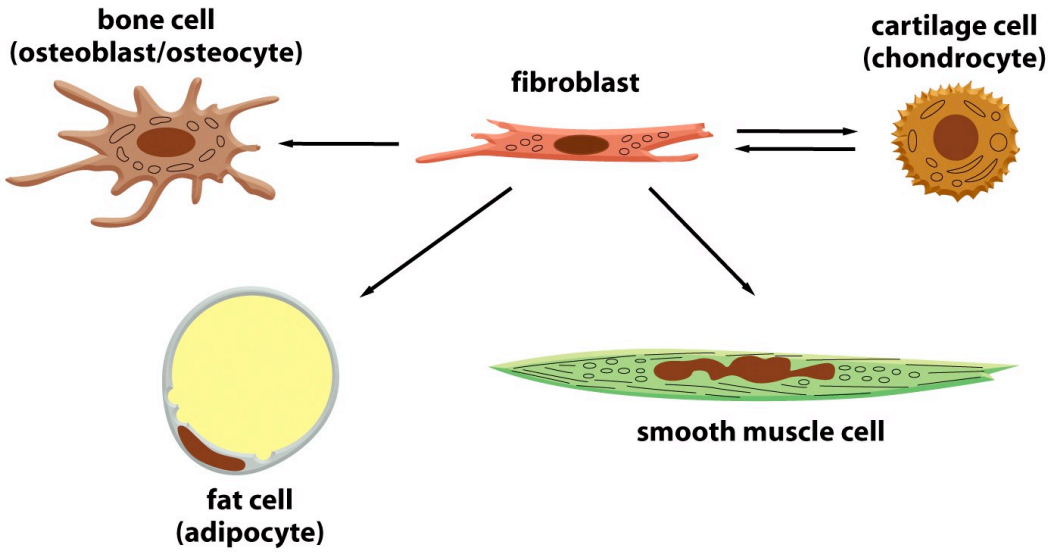
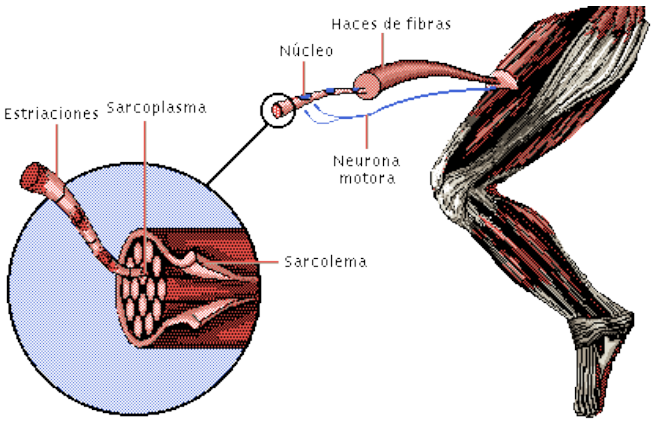


Figure 23-52 *Molecular Biology of the Cell* (© Garland Science 2008)

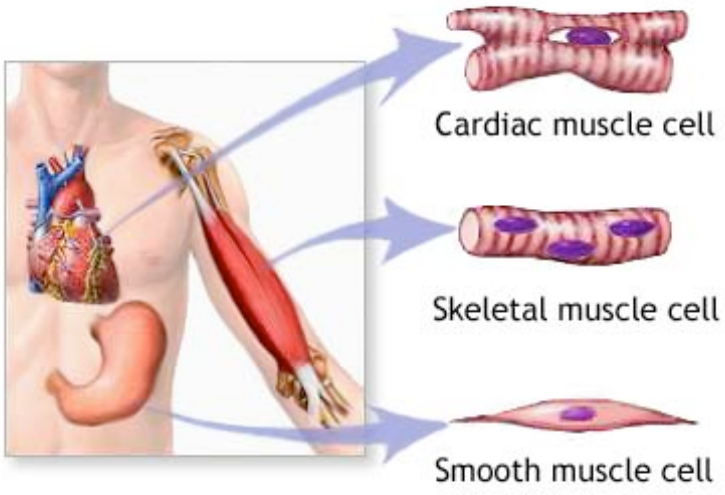
Tejido muscular

EL **TEJIDO MUSCULAR** SE ESPECIALIZA EN LA



Fibra: célula del tejido.
Cada fibra: muchas fibras paralelas: **miofibrilas.**
Actina y miosina: proteínas principales de las miofibrilas.

Tipos de Tejido Muscular



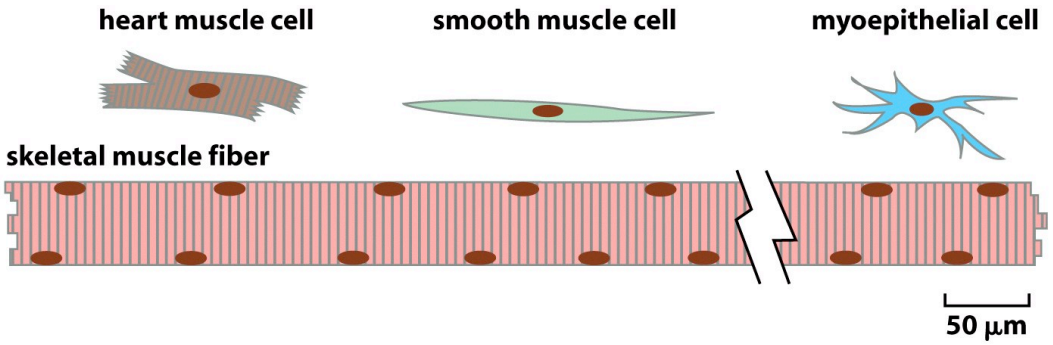


Figure 23-47a *Molecular Biology of the Cell* (© Garland Science 2008)

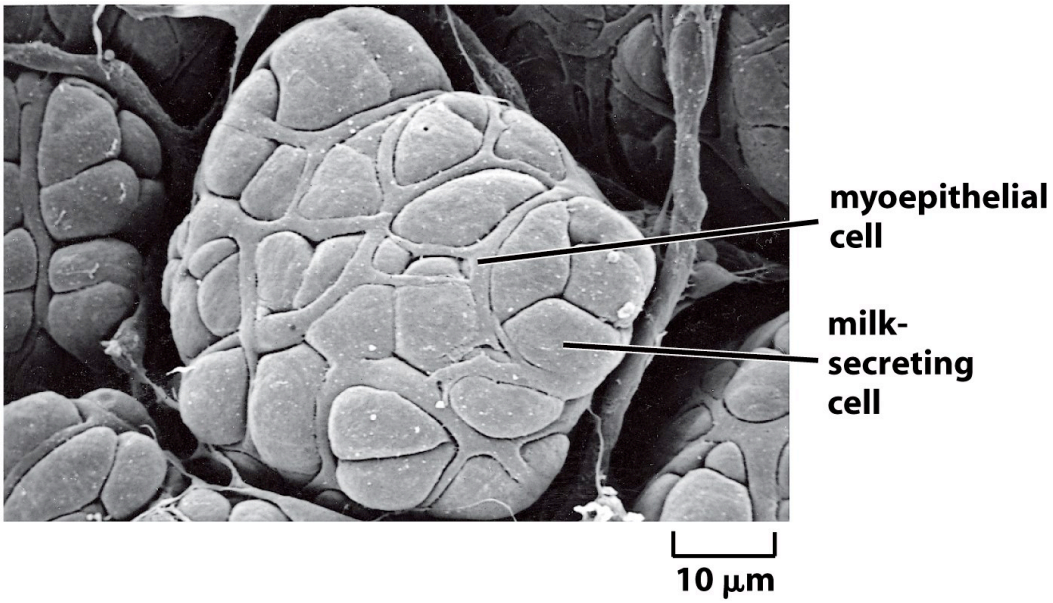
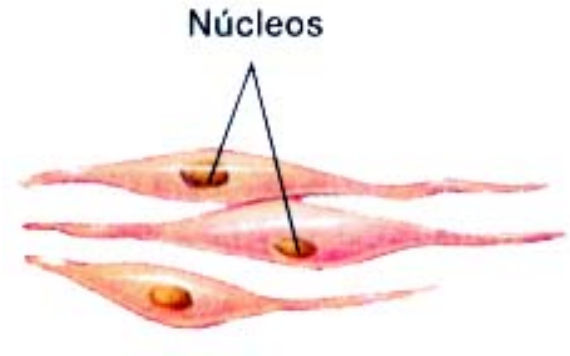
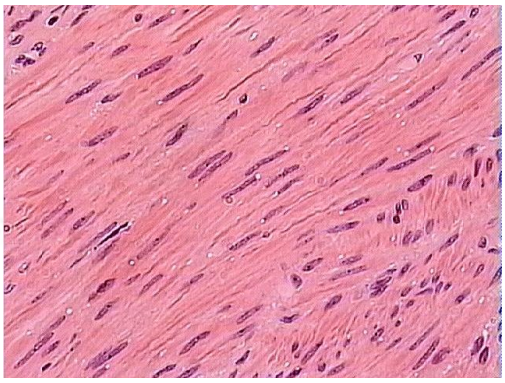


Figure 23-47e *Molecular Biology of the Cell* (© Garland Science 2008)

Músculo liso

- Fibras alargadas, ahusadas, con las puntas agudas, cuyo movimiento es involuntario. Poseen sólo un núcleo por fibra, localizado en el centro de la misma.
- **Localizaciones:** paredes de estómago, intestinos, etc.





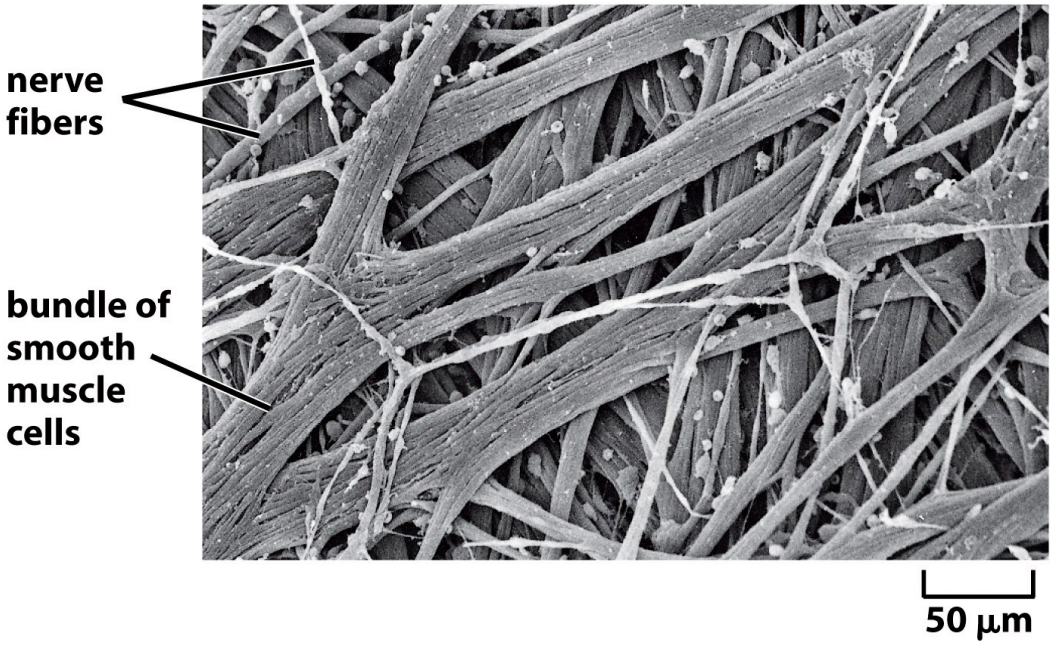
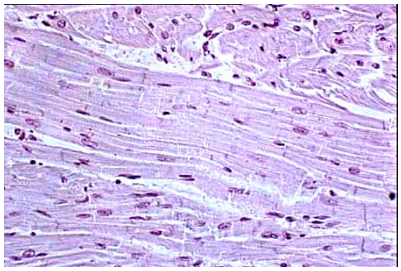
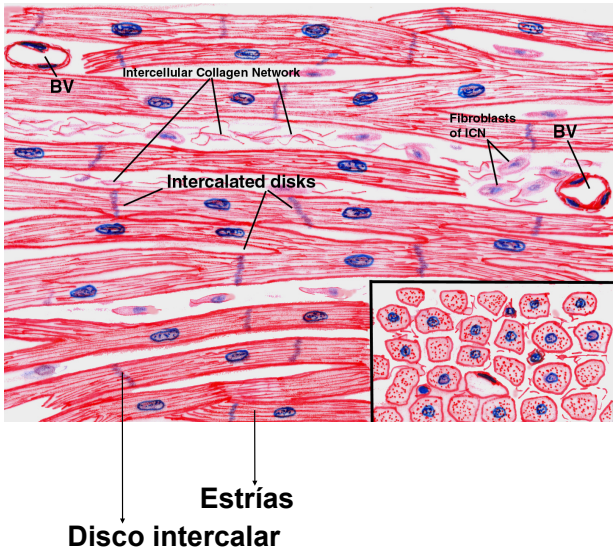


Figure 23-47d *Molecular Biology of the Cell* (© Garland Science 2008)

Músculo cardiaco

- Tejido principal del corazón.
- Fibras unidas por discos intercalares.





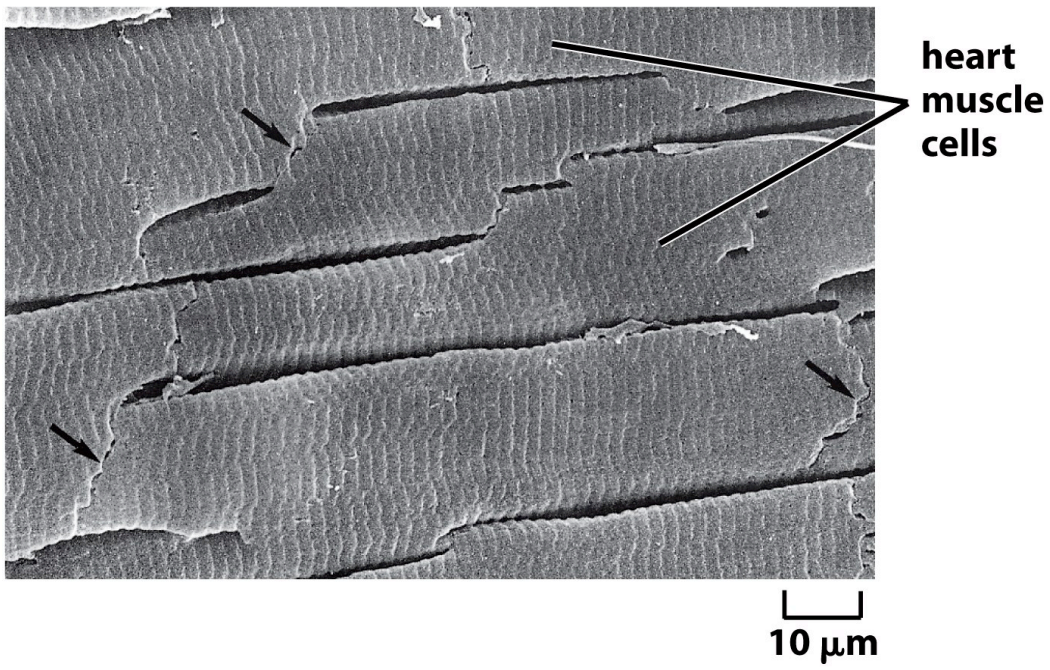
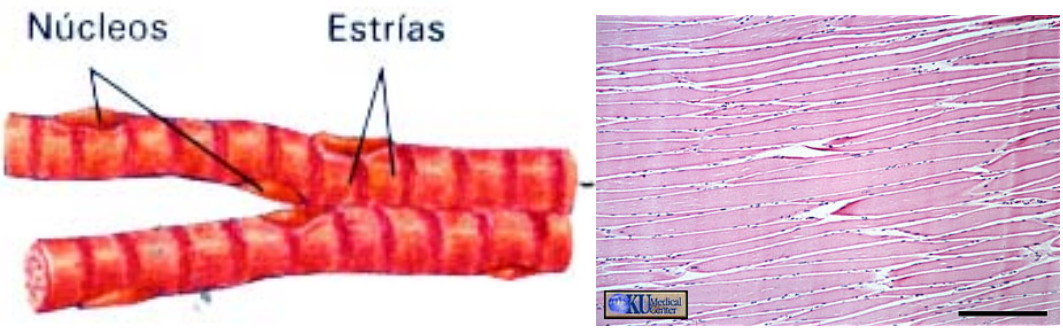


Figure 23-47c *Molecular Biology of the Cell* (© Garland Science 2008)

Músculo esqueletal

- Fibras cilíndricas alargadas cuyo movimiento es voluntario. Se pueden apreciar estrías al igual que muchos núcleos periferales en cada fibra.
- **Localización:** unido al esqueleto.



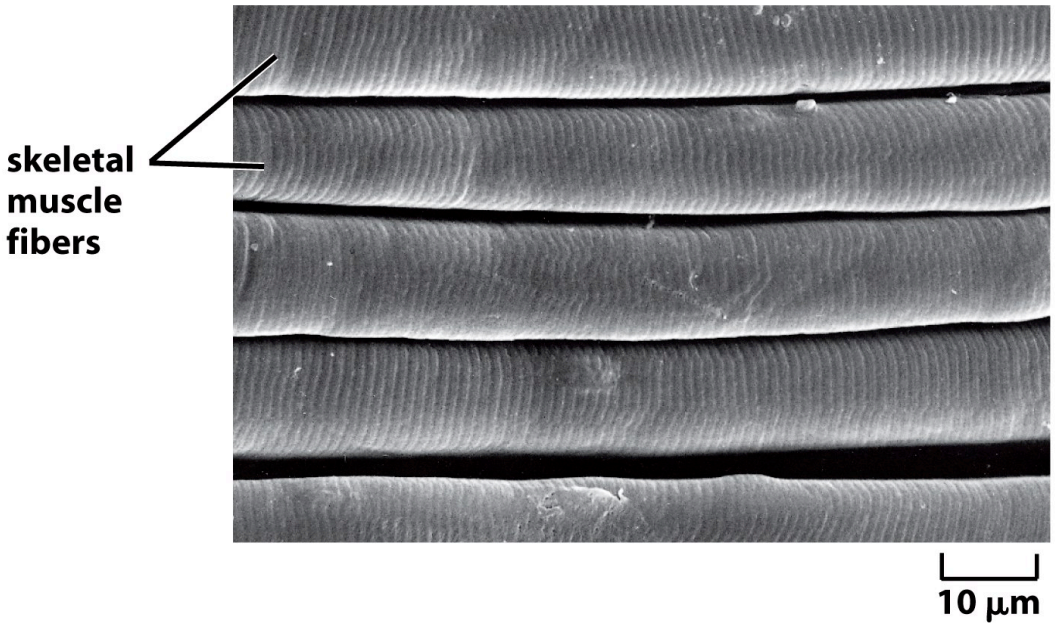
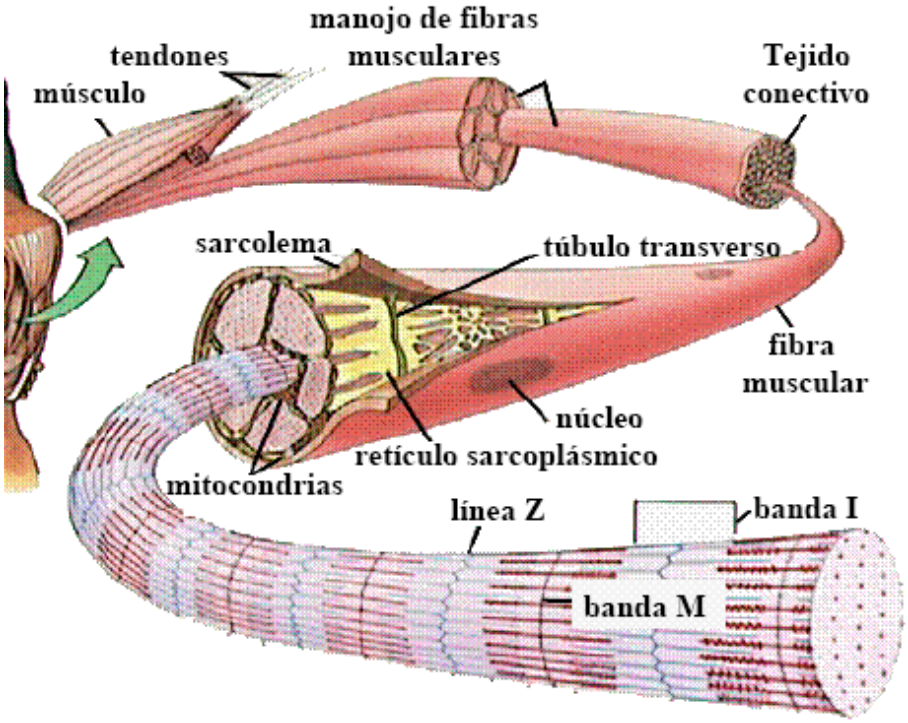


Figure 23-47b *Molecular Biology of the Cell* (© Garland Science 2008)

Contracción Muscular



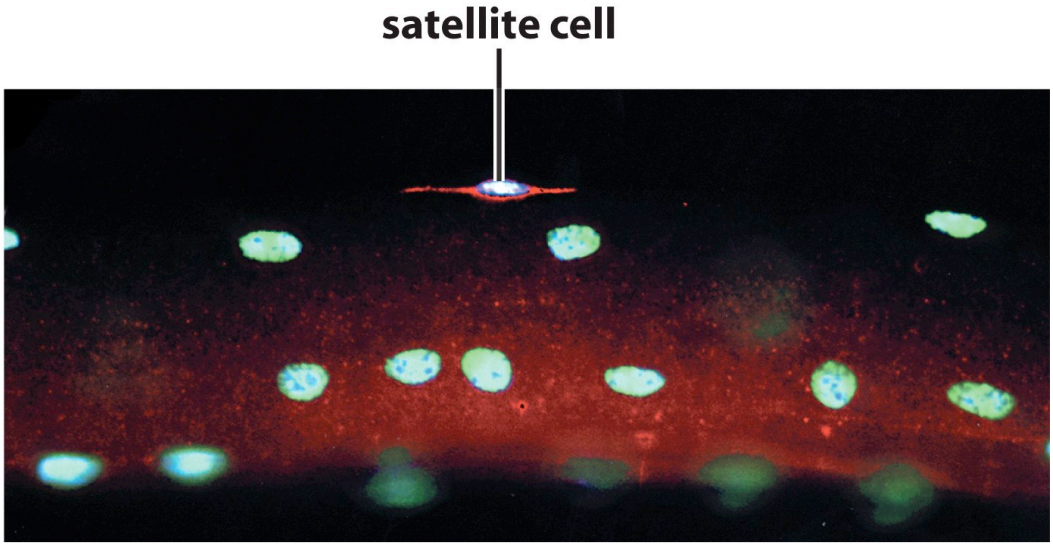
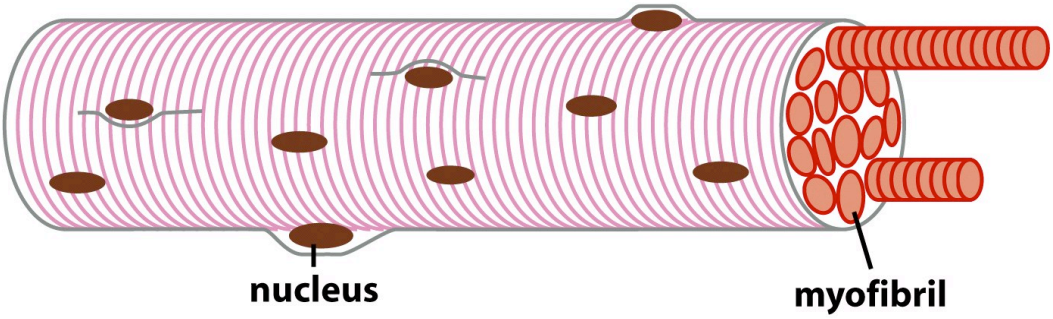
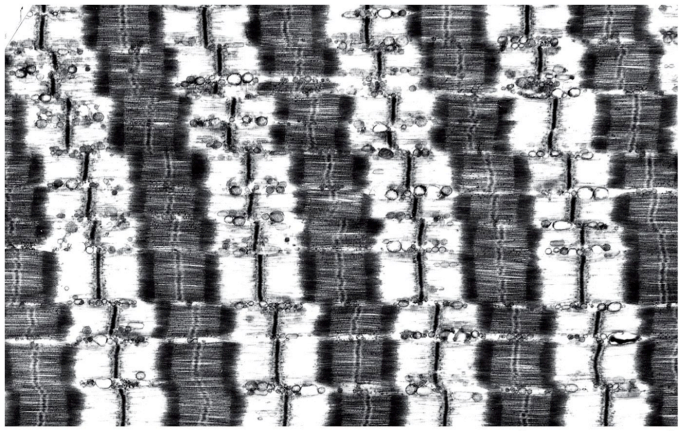
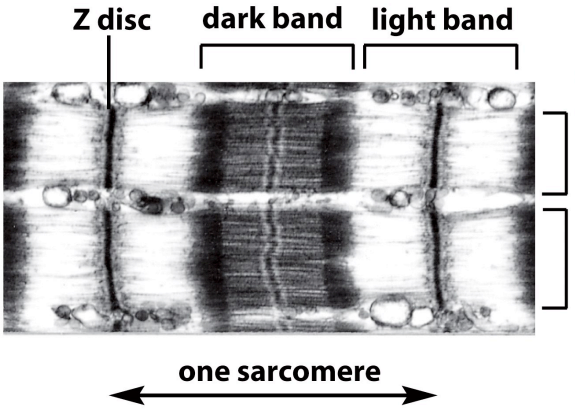
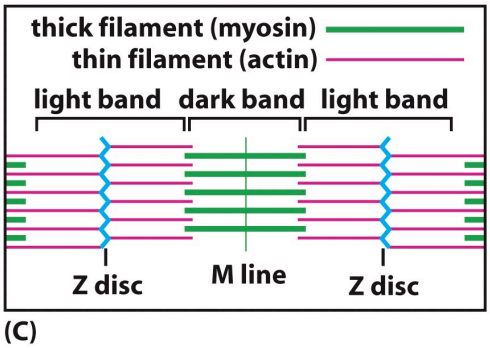


Figure 23-51 *Molecular Biology of the Cell* (© Garland Science 2008)

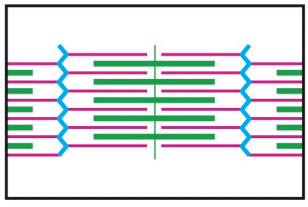

nucleus
myofibril


2 μm

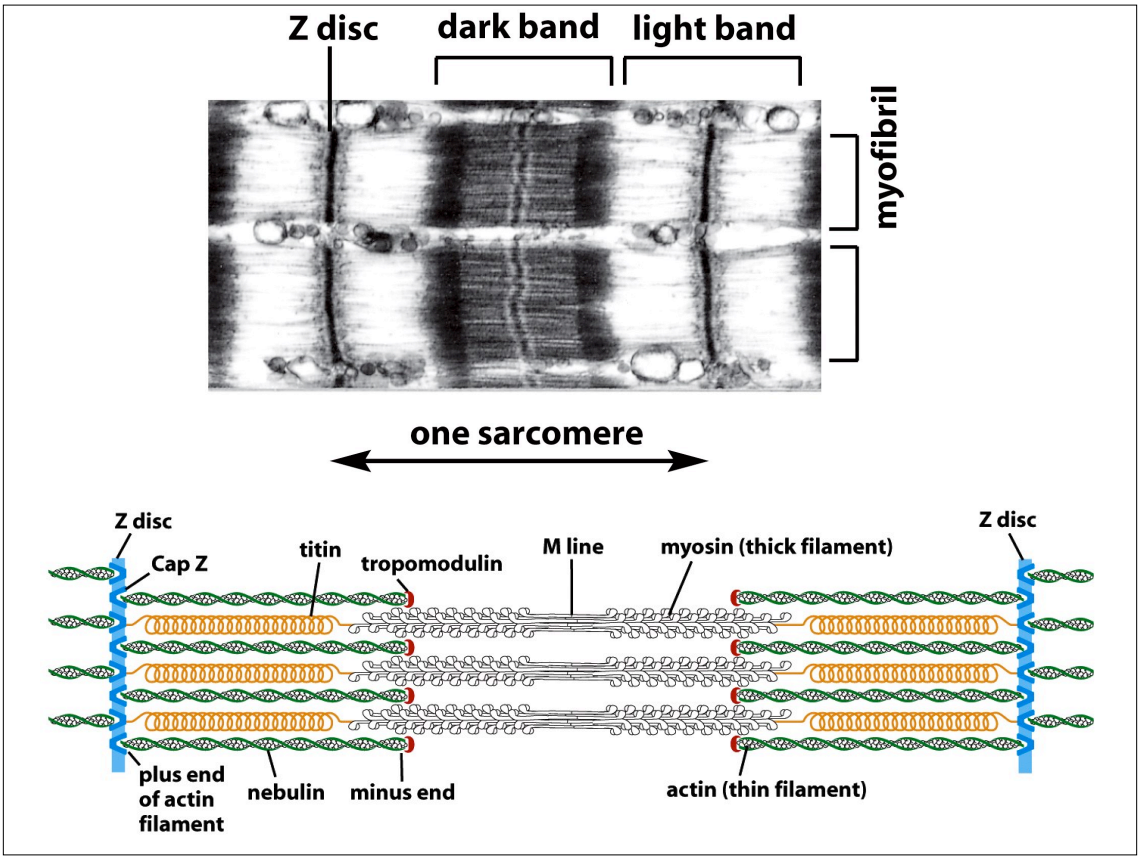

Z disc
dark band
light band
myofibril
one sarcomere


thick filament (myosin)
thin filament (actin)
light band
dark band
light band
Z disc
M line
Z disc

(C)



(D)



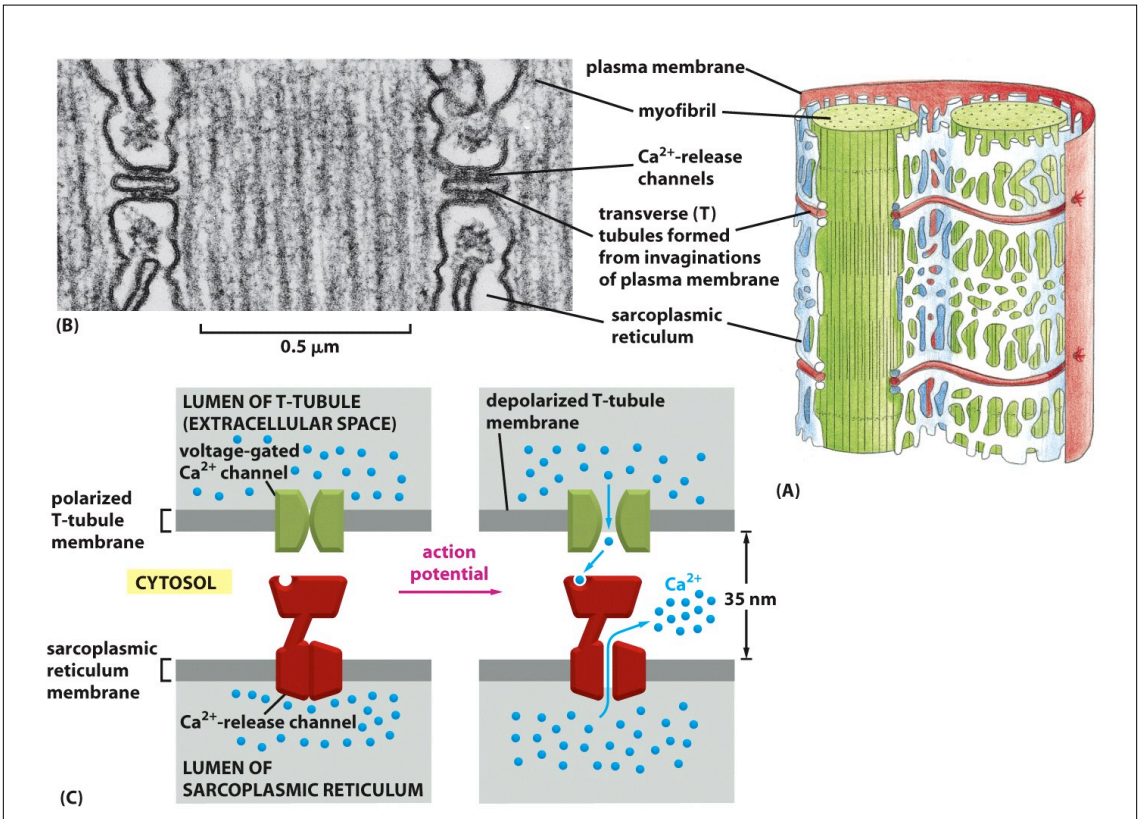
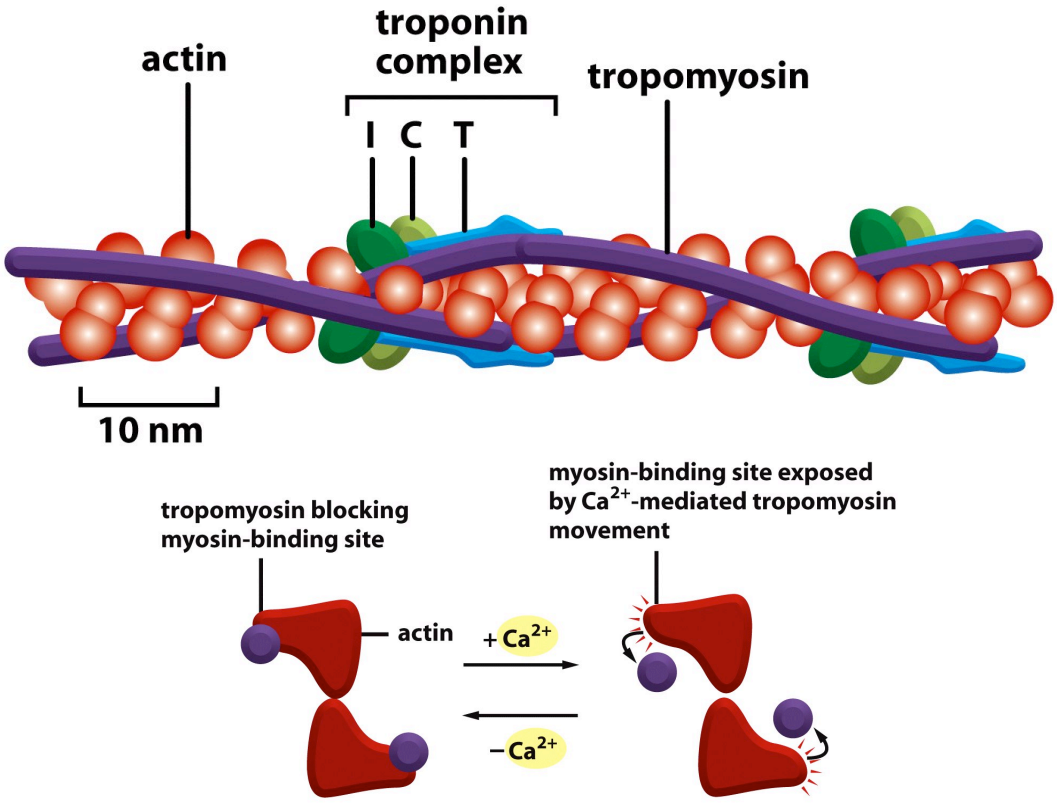
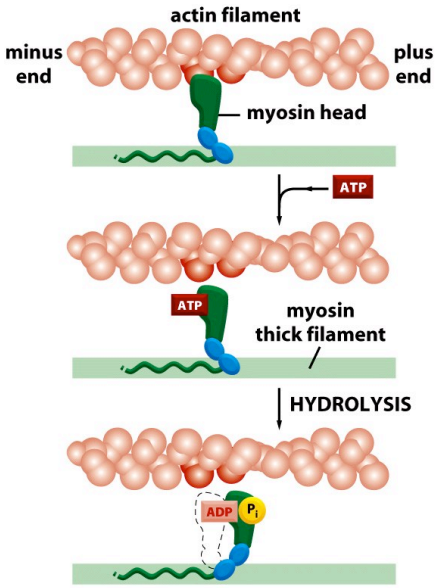


Figure 16-77 *Molecular Biology of the Cell* (© Garland Science 2008)



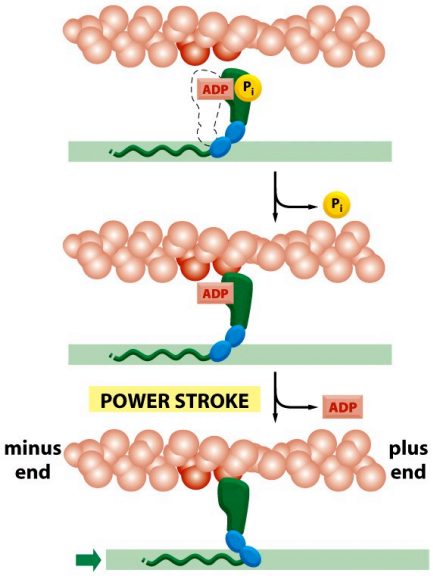
Contracción Muscular



ATTACHED At the start of the cycle shown in this figure, a myosin head lacking a bound nucleotide is locked tightly onto an actin filament in a *rigor* configuration (so named because it is responsible for *rigor mortis*, the rigidity of death). In an actively contracting muscle, this state is very short-lived, being rapidly terminated by the binding of a molecule of ATP.

RELEASED A molecule of ATP binds to the large cleft on the "back" of the head (that is, on the side furthest from the actin filament) and immediately causes a slight change in the conformation of the domains that make up the actin-binding site. This reduces the affinity of the head for actin and allows it to move along the filament. (The space drawn here between the head and actin emphasizes this change, although in reality the head probably remains very close to the actin.)

COCKED The cleft closes like a clam shell around the ATP molecule, triggering a large shape change that causes the head to be displaced along the filament by a distance of about 5 nm. Hydrolysis of ATP occurs, but the ADP and inorganic phosphate (P_i) produced remain tightly bound to the protein.



COCKED The cleft closes like a clam shell around the ATP molecule, triggering a large shape change that causes the head to be displaced along the filament by a distance of about 5 nm. Hydrolysis of ATP occurs, but the ADP and inorganic phosphate (P_i) produced remain tightly bound to the protein.

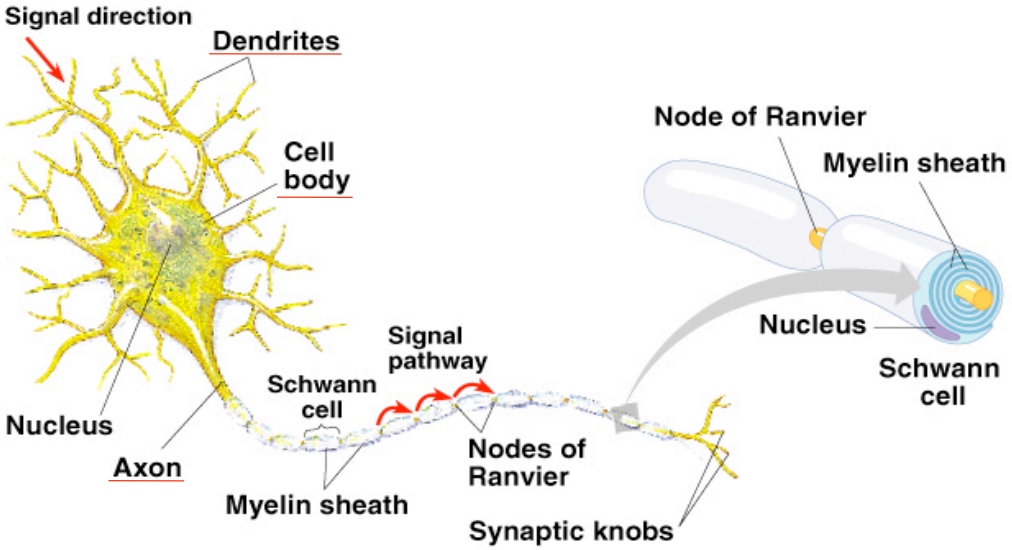
FORCE-GENERATING A weak binding of the myosin head to a new site on the actin filament causes release of the inorganic phosphate produced by ATP hydrolysis, concomitantly with the tight binding of the head to actin. This release triggers the power stroke—the force-generating change in shape during which the head regains its original conformation. In the course of the power stroke, the head loses its bound ADP, thereby returning to the start of a new cycle.

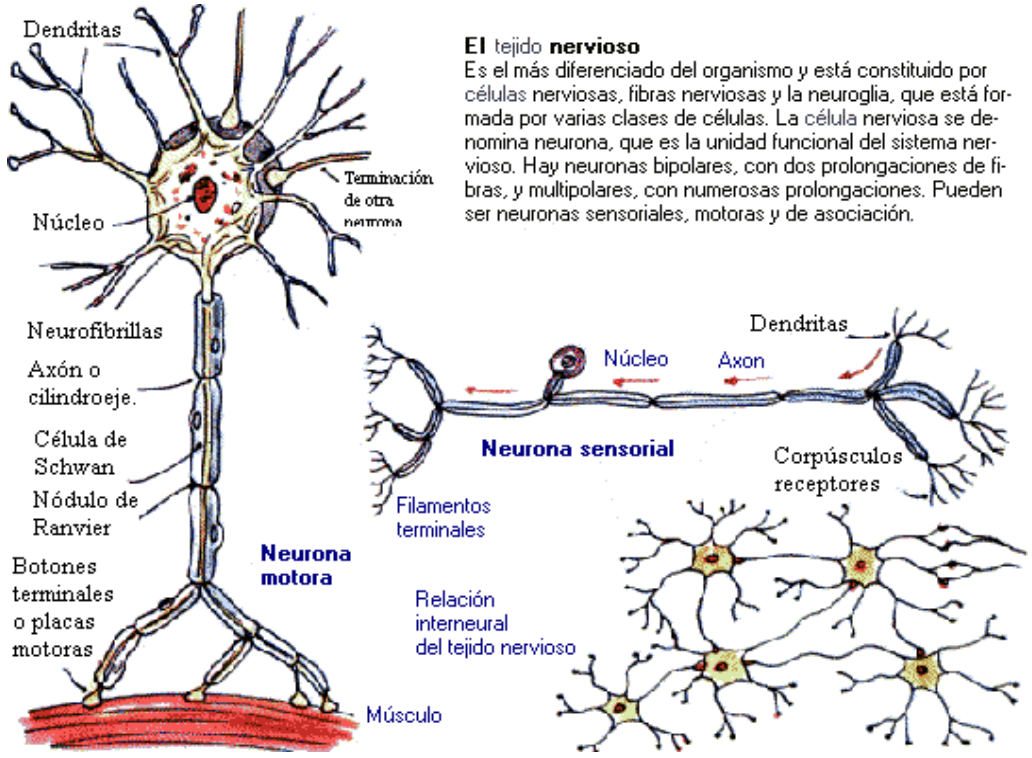
ATTACHED At the end of the cycle, the myosin head is again locked tightly to the actin filament in a rigor configuration. Note that the head has moved to a new position on the actin filament.

Tejido Nervioso

Tejido Nervioso: controla músculos, glándulas y otros órganos

- Las neuronas transmiten impulsos. Las células gliales sostienen y nutren a las neuronas.



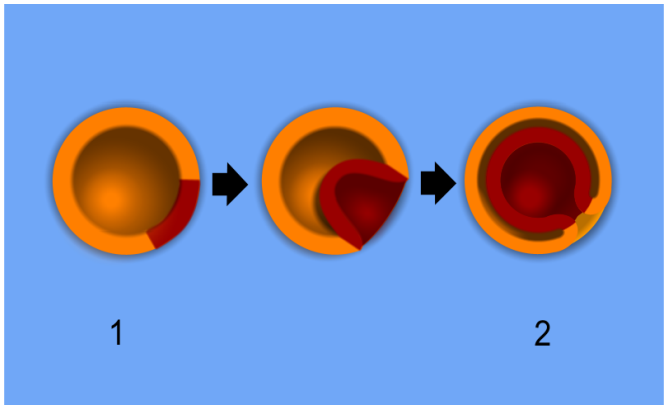


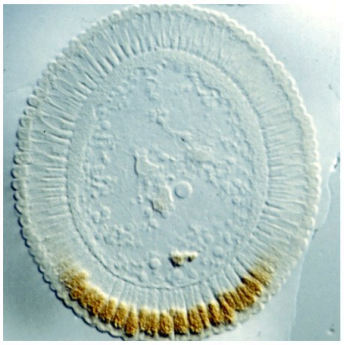
Diferenciación de tejido Nervioso

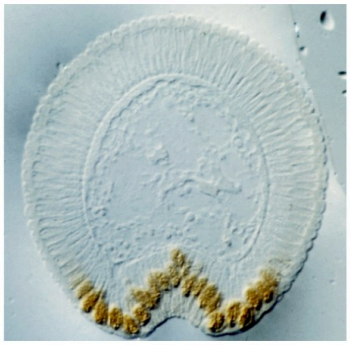
- Derivado de Neuro-ectodermo
-

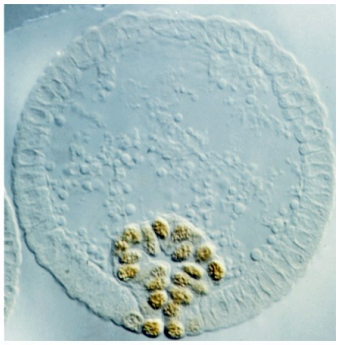
Gastrulación

La gastrulación es el proceso formativo mediante el cual el embrión adquiere tres capas germinales (ectodermo,mesodermo y endodermo) y adquiere una orientación axial.









Gastrulación

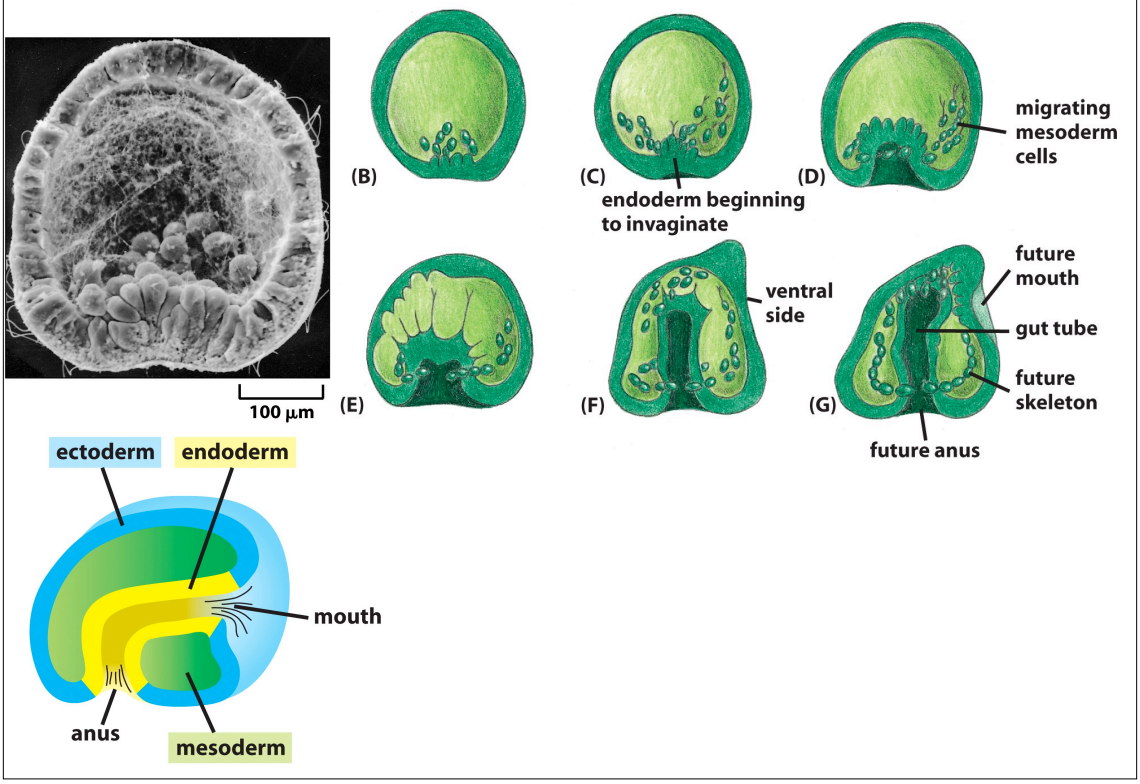


Figure 22-67 *Molecular Biology of the Cell* (© Garland Science 2008)

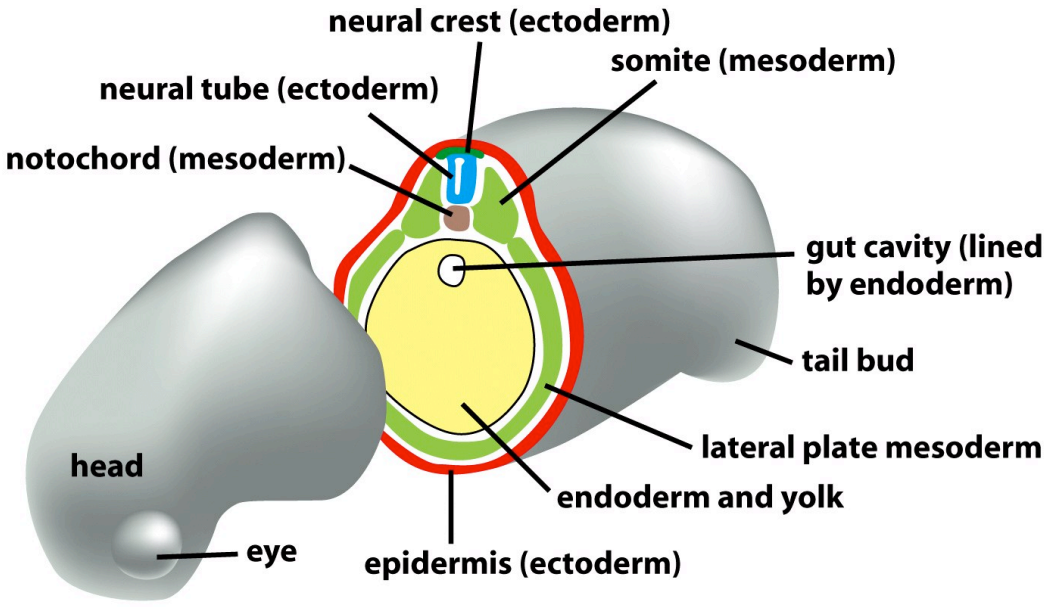


Figure 22-72 *Molecular Biology of the Cell* (© Garland Science 2008)

Neurulación

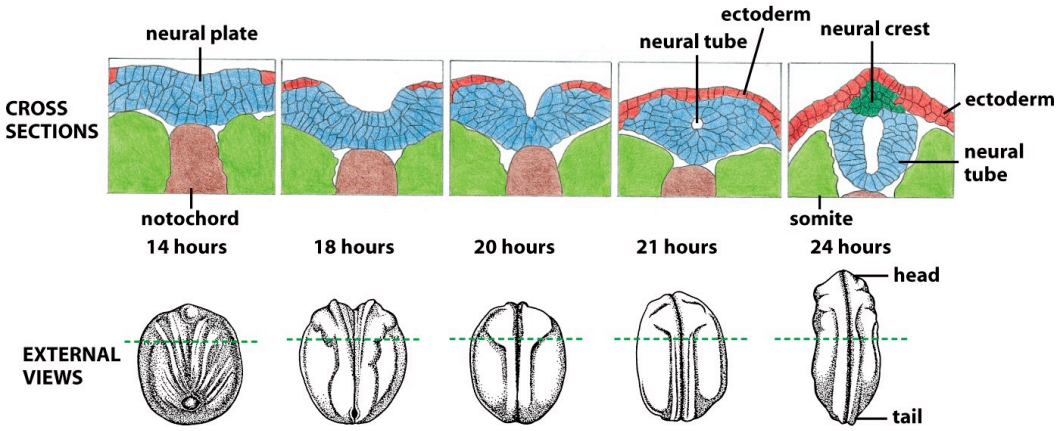


Figure 22-3 (part 2 of 3) *Molecular Biology of the Cell* (© Garland Science 2008)

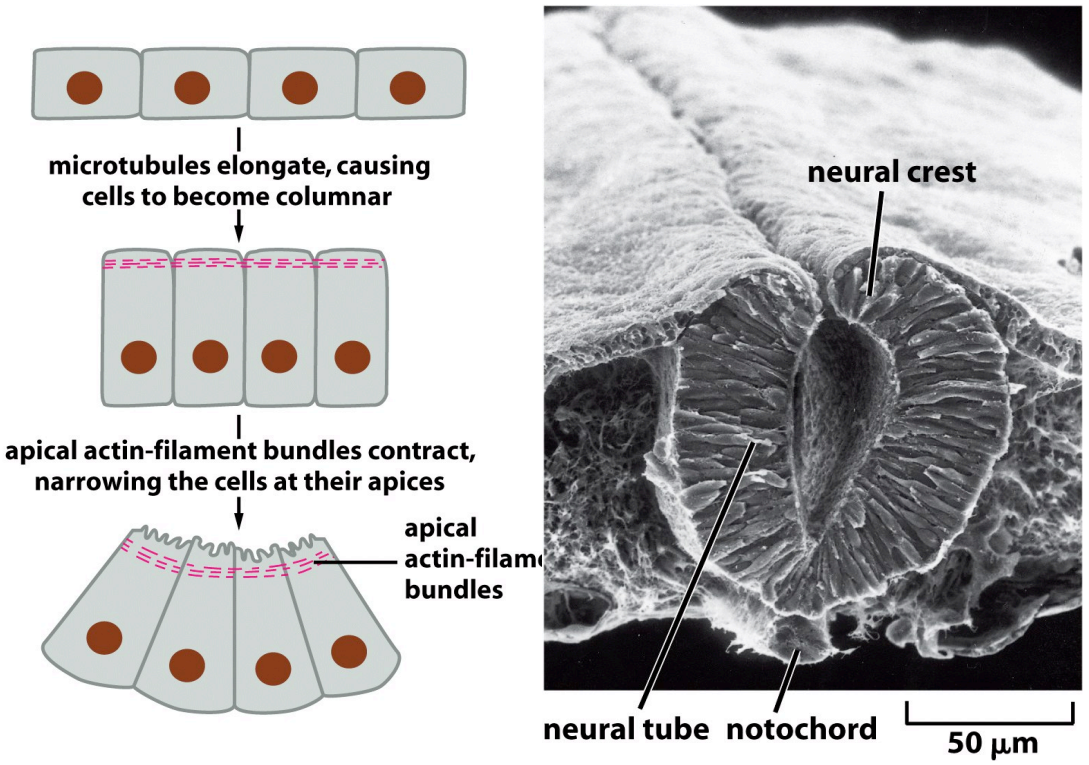
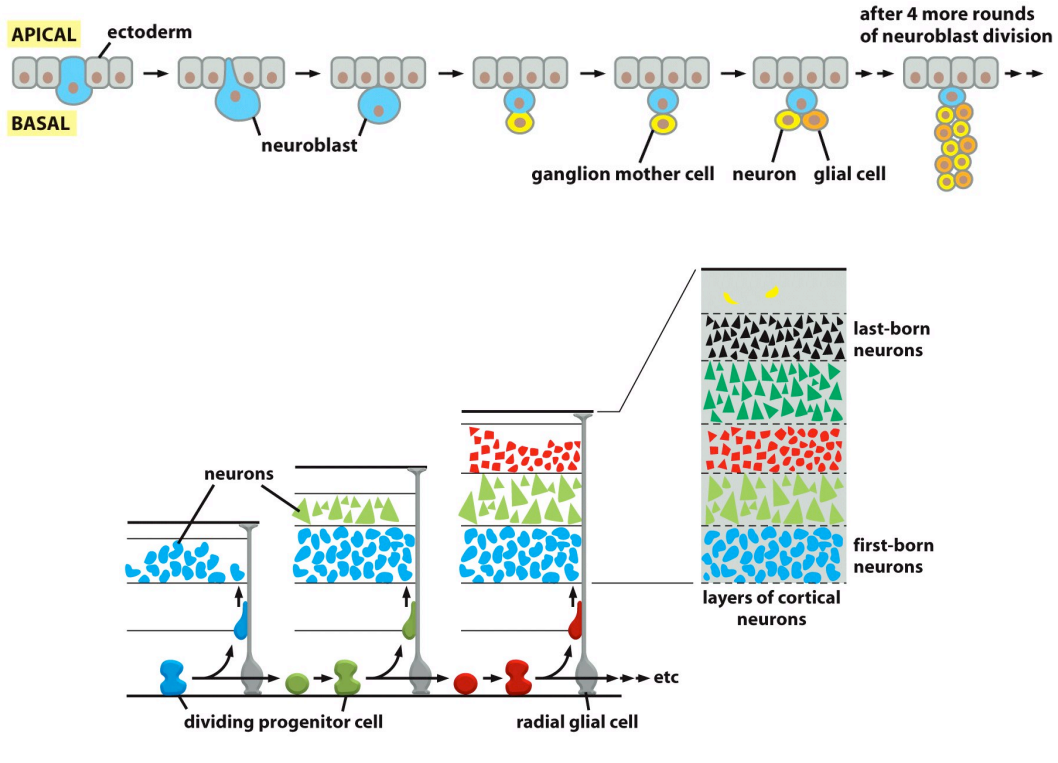


Figure 22-79 *Molecular Biology of the Cell* (© Garland Science 2008)



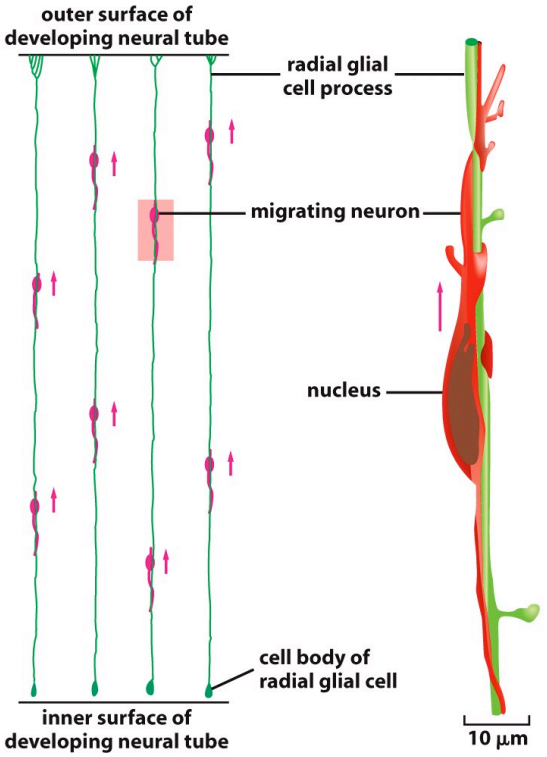


Figure 22-98 *Molecular Biology of the Cell* (© Garland Science 2008)

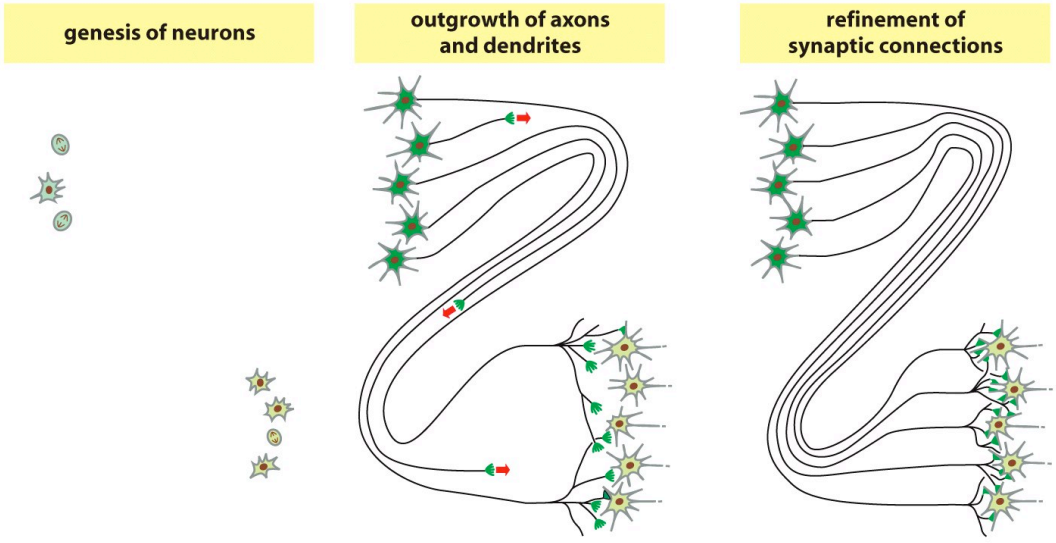


Figure 22-95 *Molecular Biology of the Cell* (© Garland Science 2008)

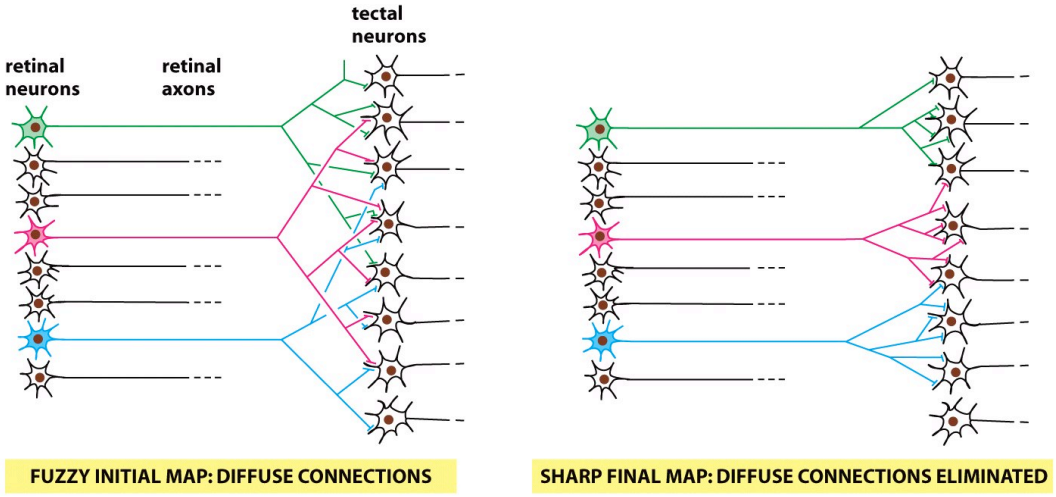


Figure 22-107 *Molecular Biology of the Cell* (© Garland Science 2008)

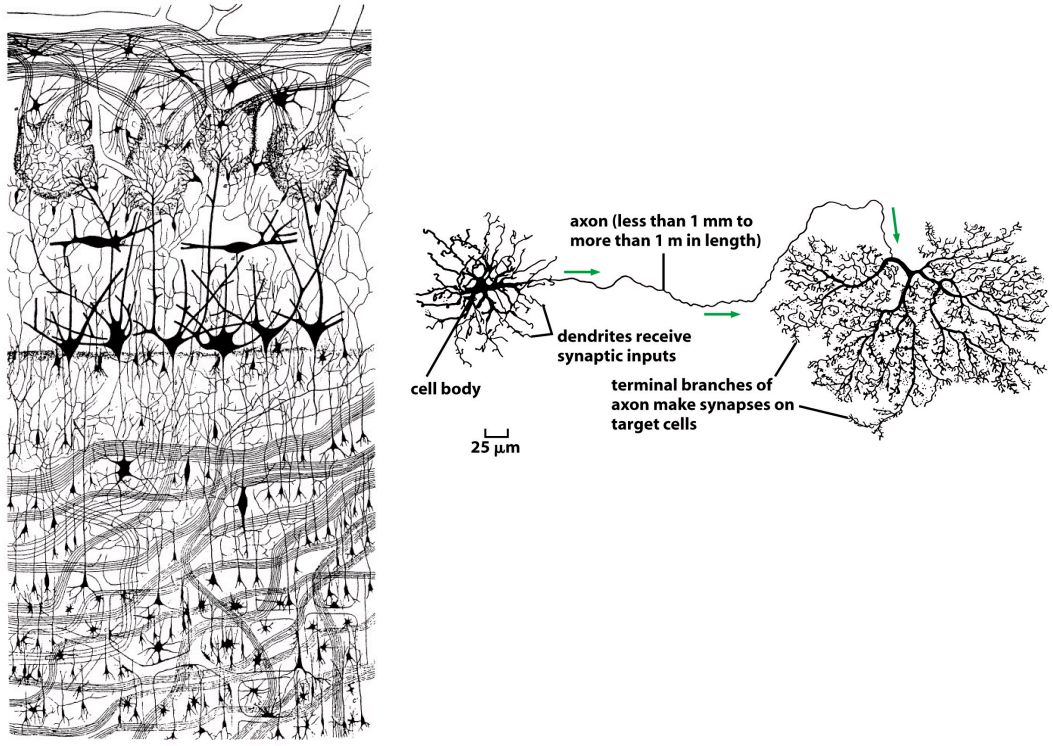
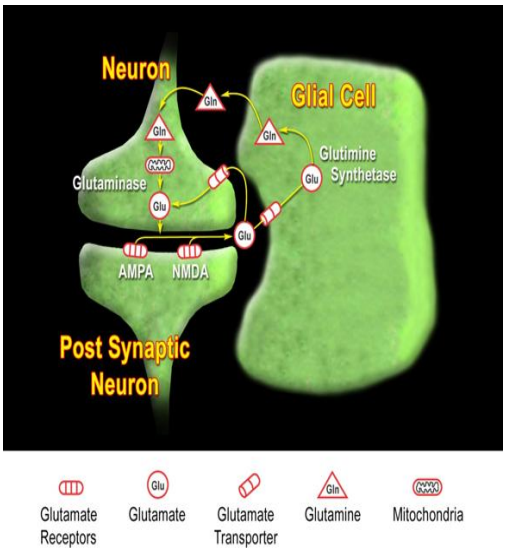


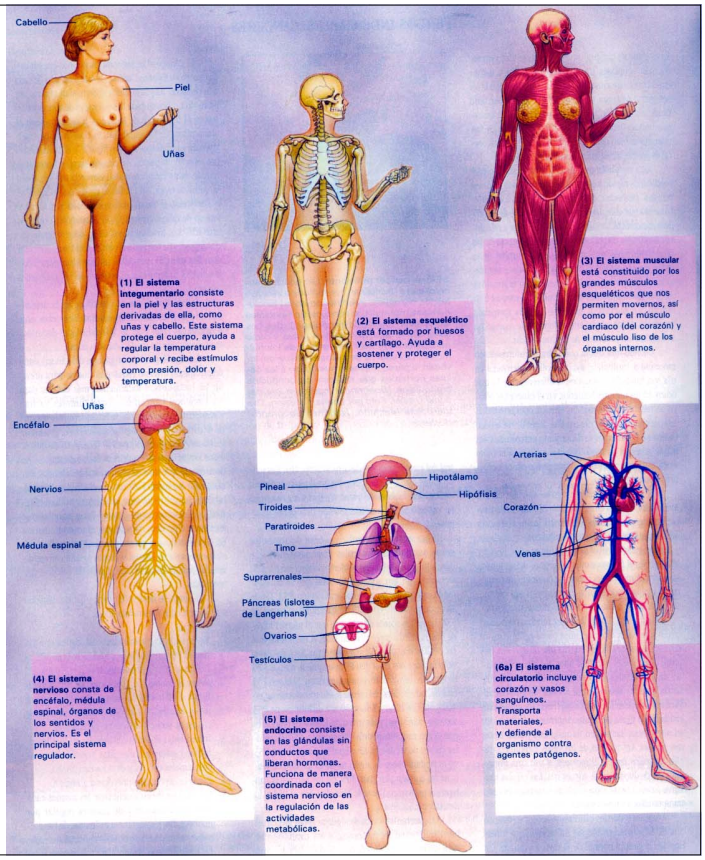
Figure 22-94 *Molecular Biology of the Cell* (© Garland Science 2008)

Células gliales

- Células de soporte.
- No conducen impulsos pero regulan y apoyan el funcionamiento de la neurona.

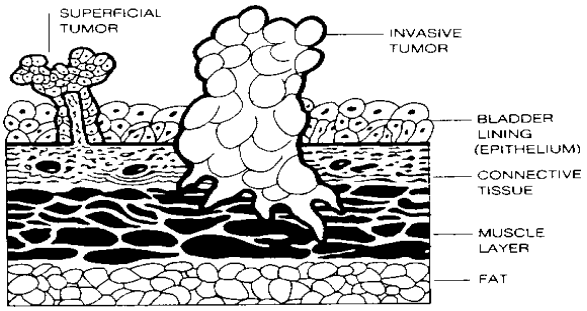


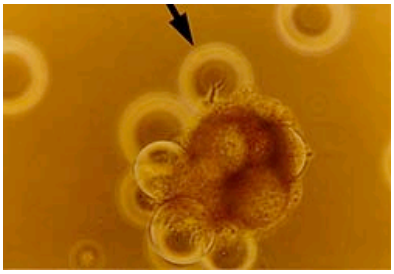
- Los tejidos se asocian para formar **órganos**, como el corazón, pulmones y riñones.
- Grupos de tejidos y órganos forman los **aparatos** y **sistemas** del cuerpo.



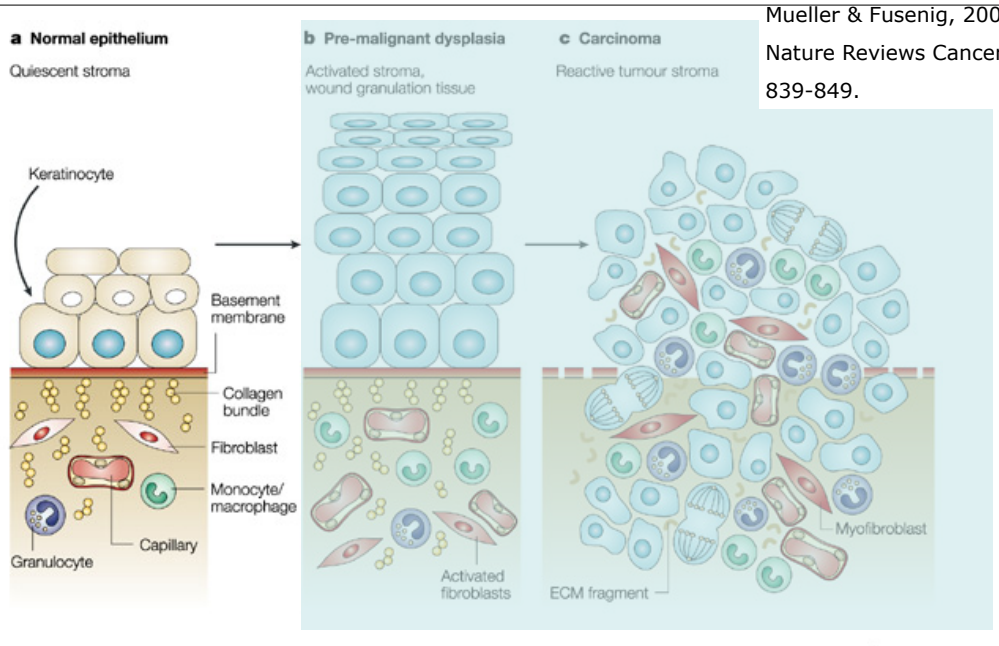
Tejidos Anormales (Cáncer):

- Neoplasma o Tumor- masa anormal de células
- Benigno- crecimiento lento y localizado
- Maligno o canceroso- crecimiento rápido e invasivo
- Tumor maligno no tiene mecanismo de regulación, mala interacción con otras células y puede infiltrarse en tejido sano
- Personas mueren por metástasis: migración de células cancerosas a otras partes del cuerpo a través de la sangre o la linfa.



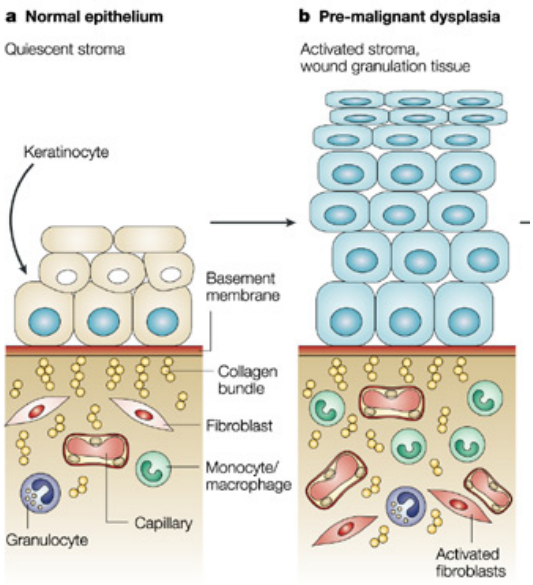


Mueller & Fusenig, 2004. Nature Reviews Cancer 4, 839-849.



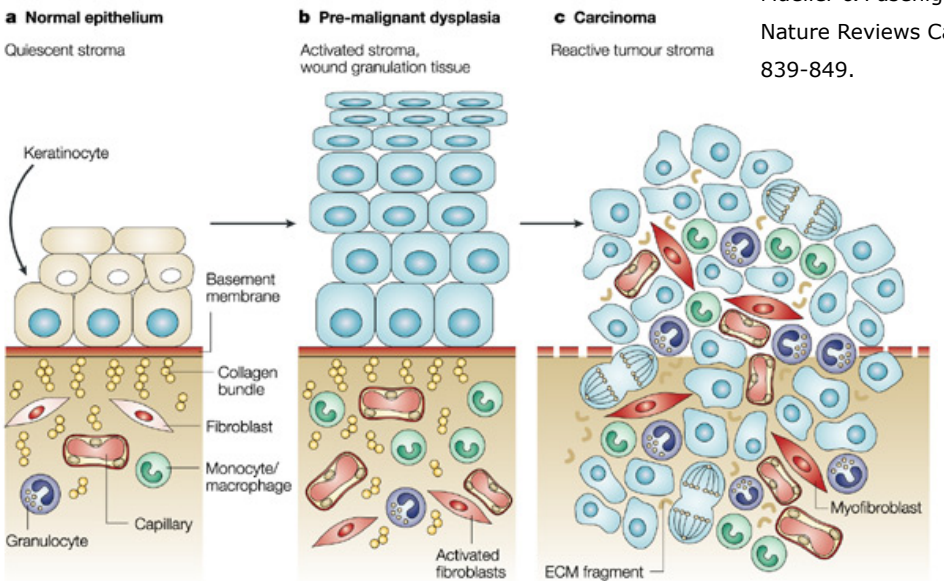
a | A normal well-differentiated stratified epithelium, made up of cells such as keratinocytes in the epidermis, is separated by a well-delineated basement membrane from the dermal or stromal compartment. This stromal compartment normally contains collagen bundles that surround resting fibroblasts, mature blood vessels encircled by an uninterrupted basement membrane (capillary), and a few resident leukocytes (monocytes and macrophages).

Mueller & Fusenig, 2004. Nature Reviews Cancer 4, 839-849.



b | During transition to pre-malignant dysplasia, differentiation of epithelial cells is disturbed, resulting in a hyperplastic epithelium (accumulation of blue cells). The basement membrane remains intact, separating the epithelium from a stromal compartment, which contains intact collagen bundles. Fibroblasts, however, become activated, and the number of macrophages increases. The transient angiogenesis that occurs initially during establishment of the transplant is followed by vessel maturation, resulting in a vasculature similar to the one seen with normal epithelia. and blood vessels infiltrate the tumour tissue

Mueller & Fusenig, 2004. Nature Reviews Cancer 4, 839-849.



c | Progression to a carcinoma is associated with proliferation of epithelial cells (mitotic cells) along with the development of an activated tumour stroma. In this case, extracellular-matrix (ECM) components such as collagen bundles are degraded, because of increased turnover. The number of inflammatory cells increases and fibroblasts differentiate into myofibroblasts, resulting in their expression of growth factors, matrix components and degrading proteases. Angiogenesis is maintained, resulting in a high number of leaky tumour vessels. Following activation of a tumour stroma with persistent angiogenesis, invasion by tumour cells begins through the degraded basement membrane, and blood vessels infiltrate the tumour tissue.