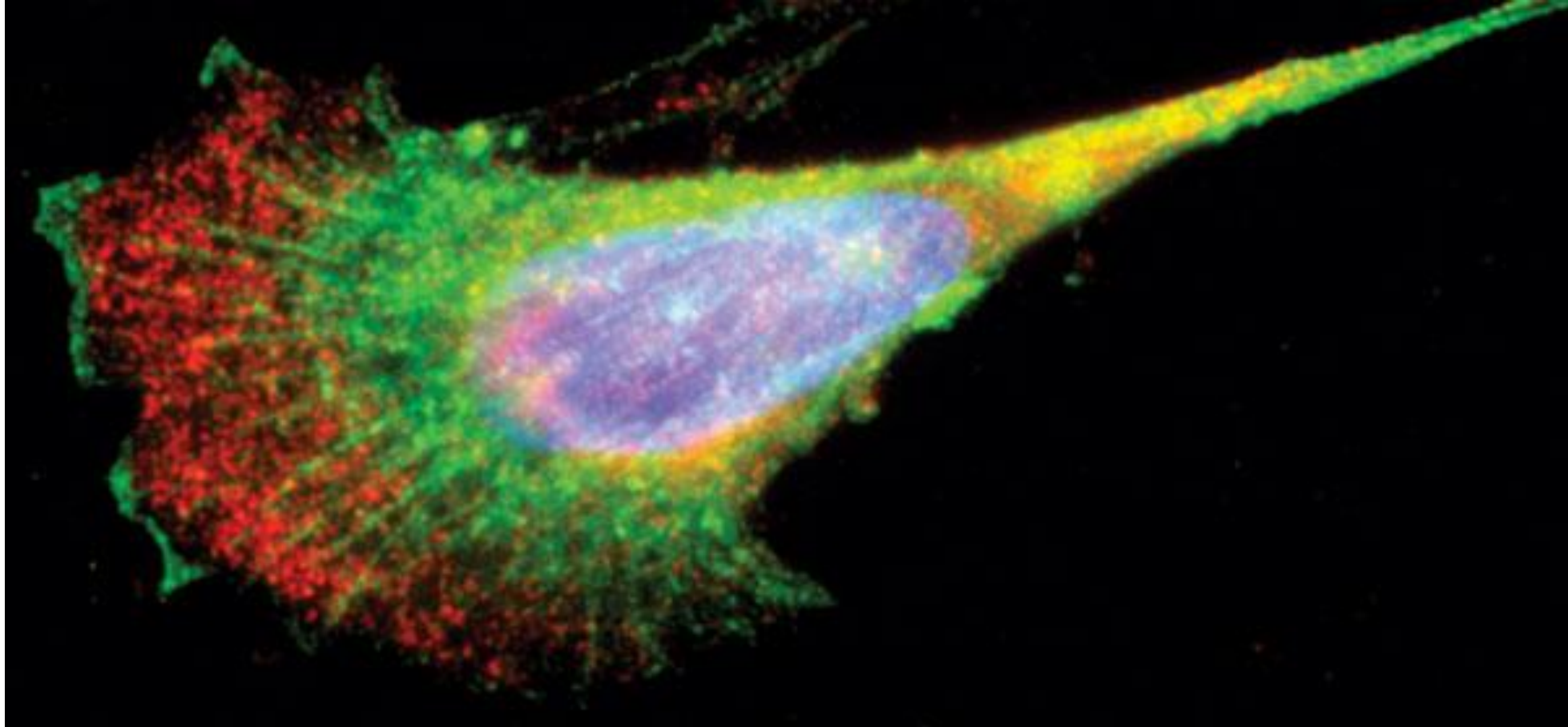


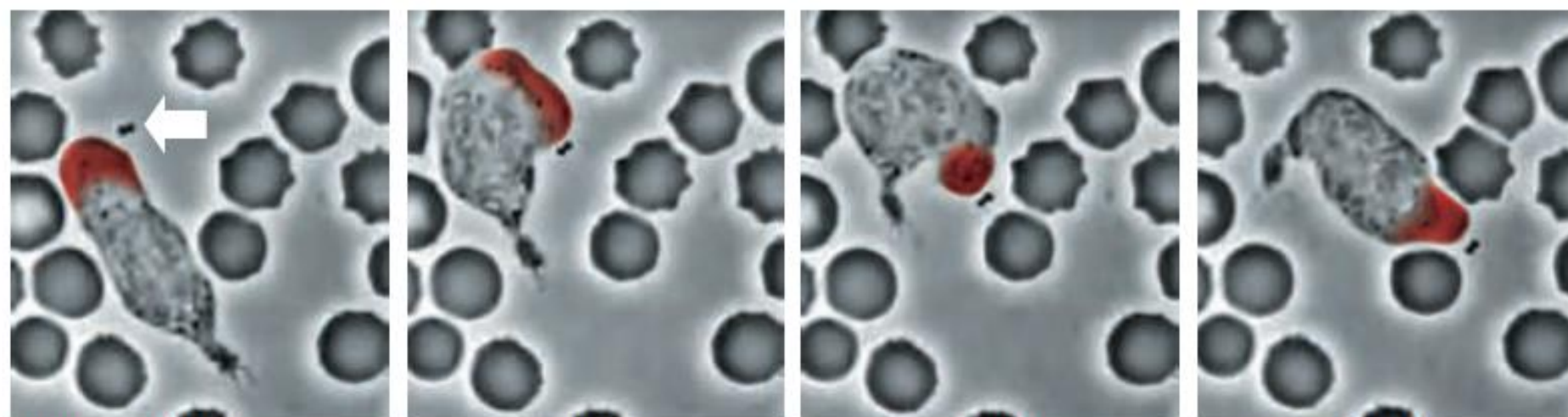
Motilidad celular



Uriel Koziol
ukoziol@fcien.edu.uy



<https://www.youtube.com/watch?v=JnlULOjUhsQ>



time 0 min

1 min

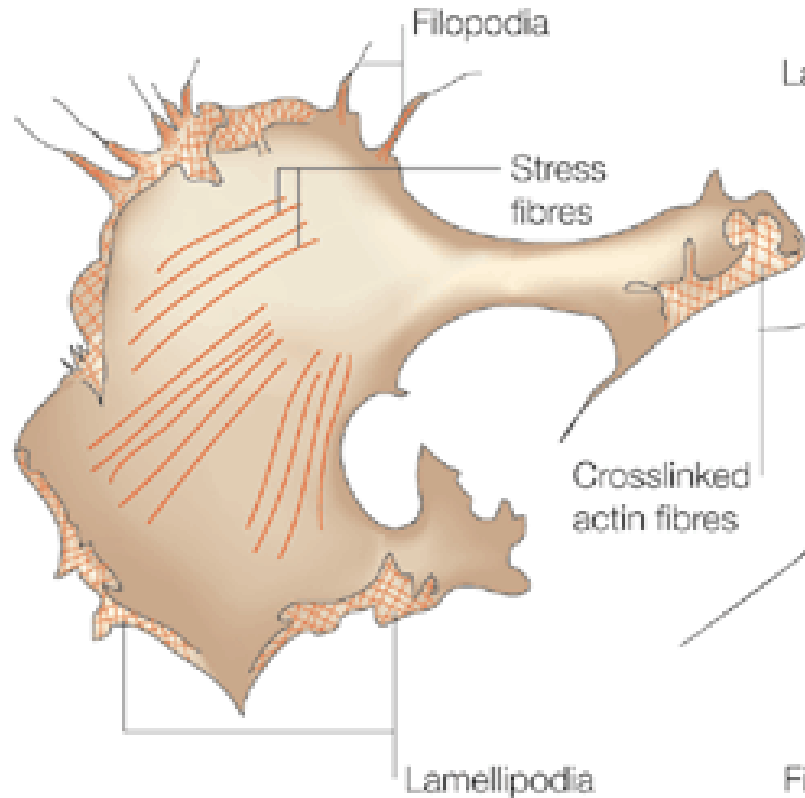
2 min

3 min

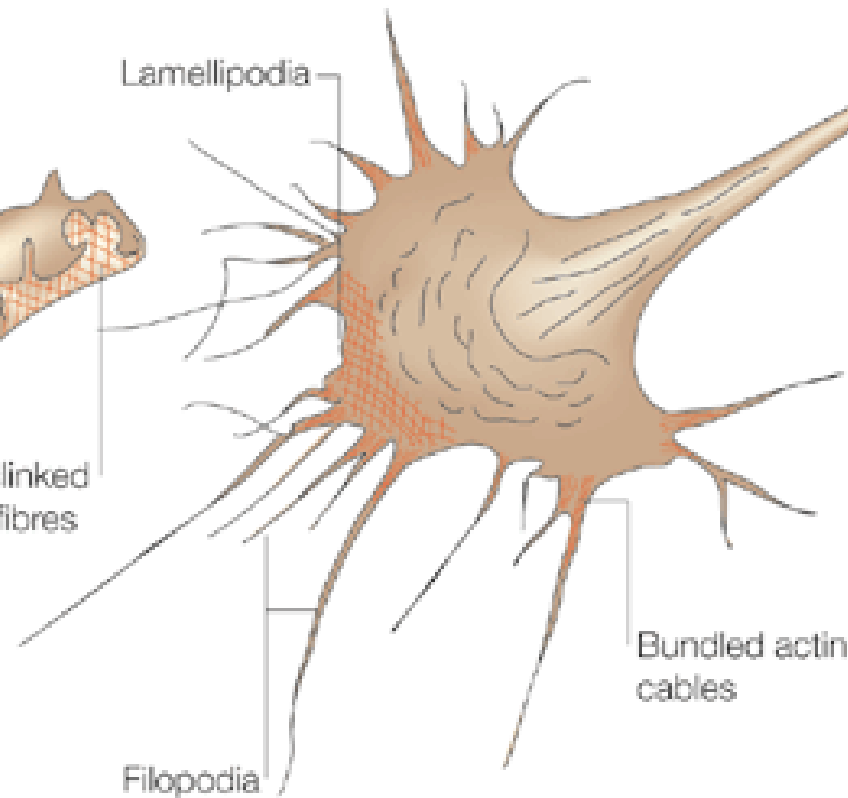
MIGRACIÓN CELULAR

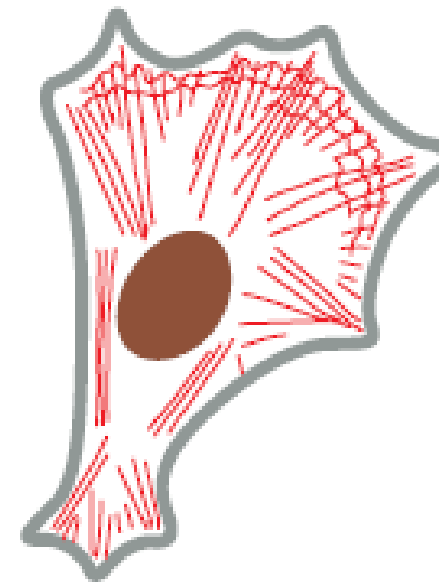
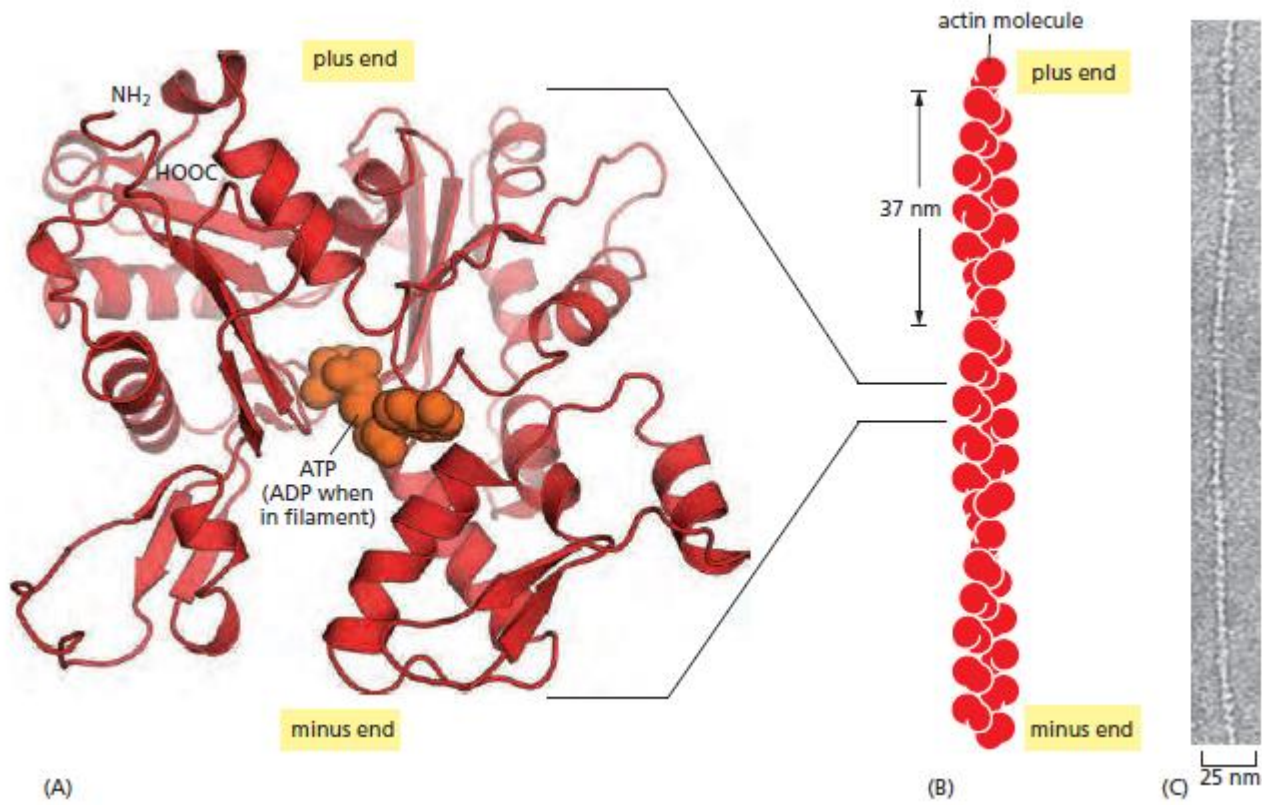
Proyecciones celulares

a Fibroblast

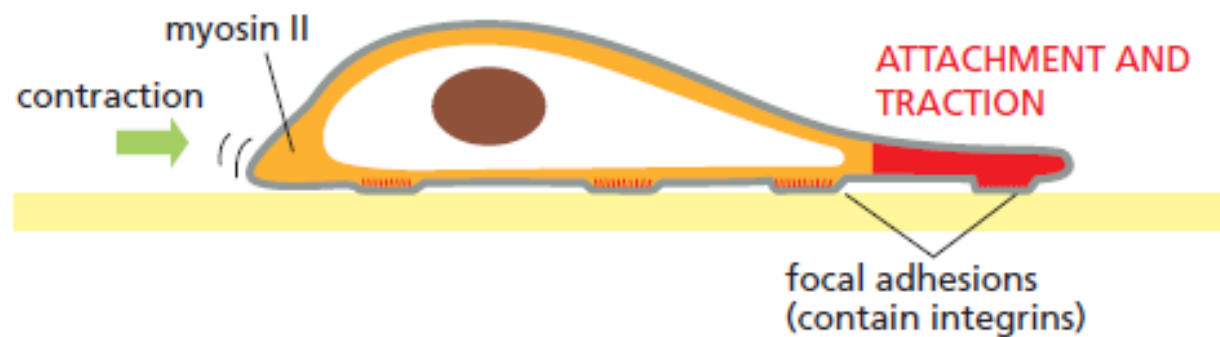
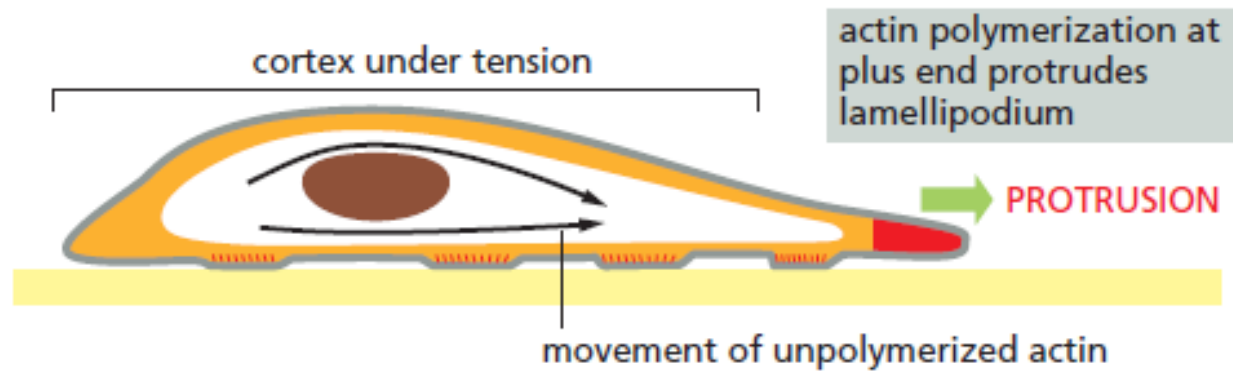
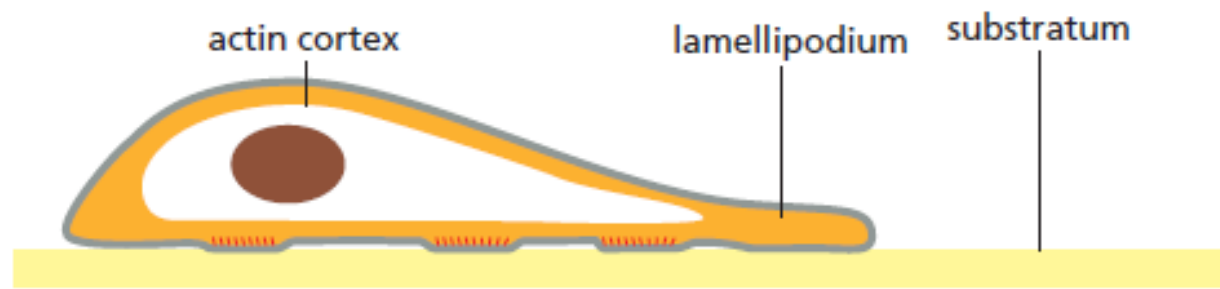


b Neuron growth cone





Microfilamentos de Actina



Queratocitos como modelo de migración celular

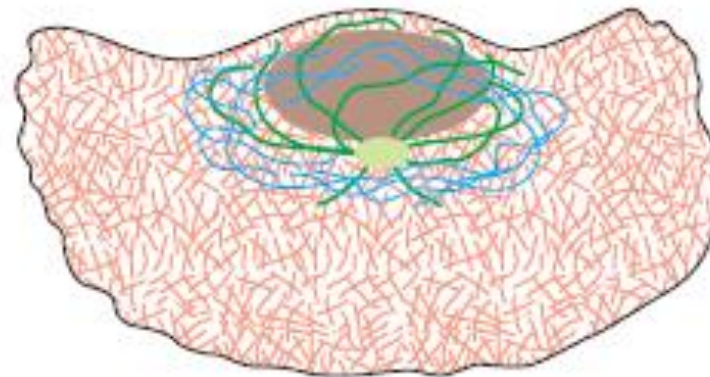


(A)

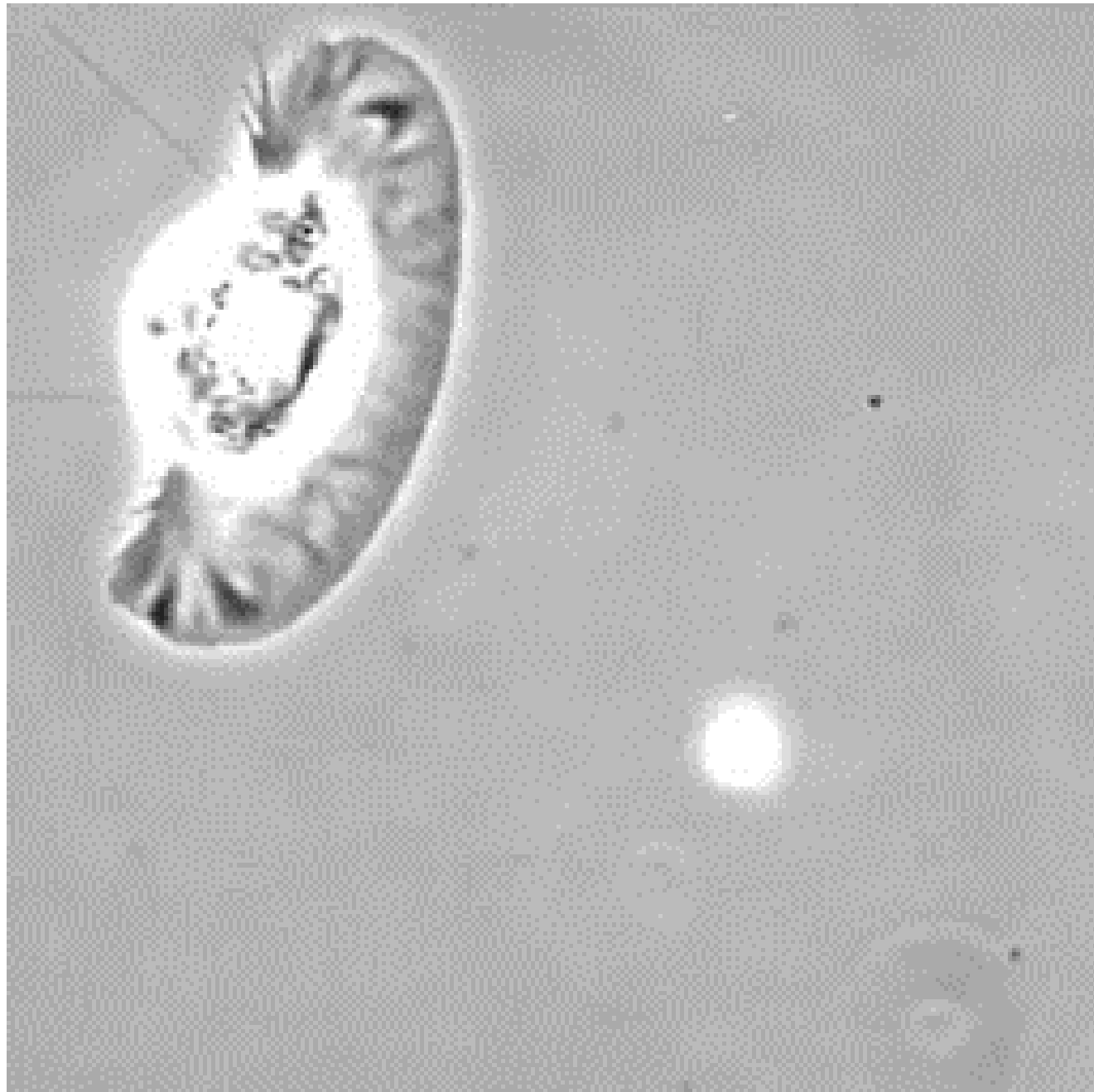


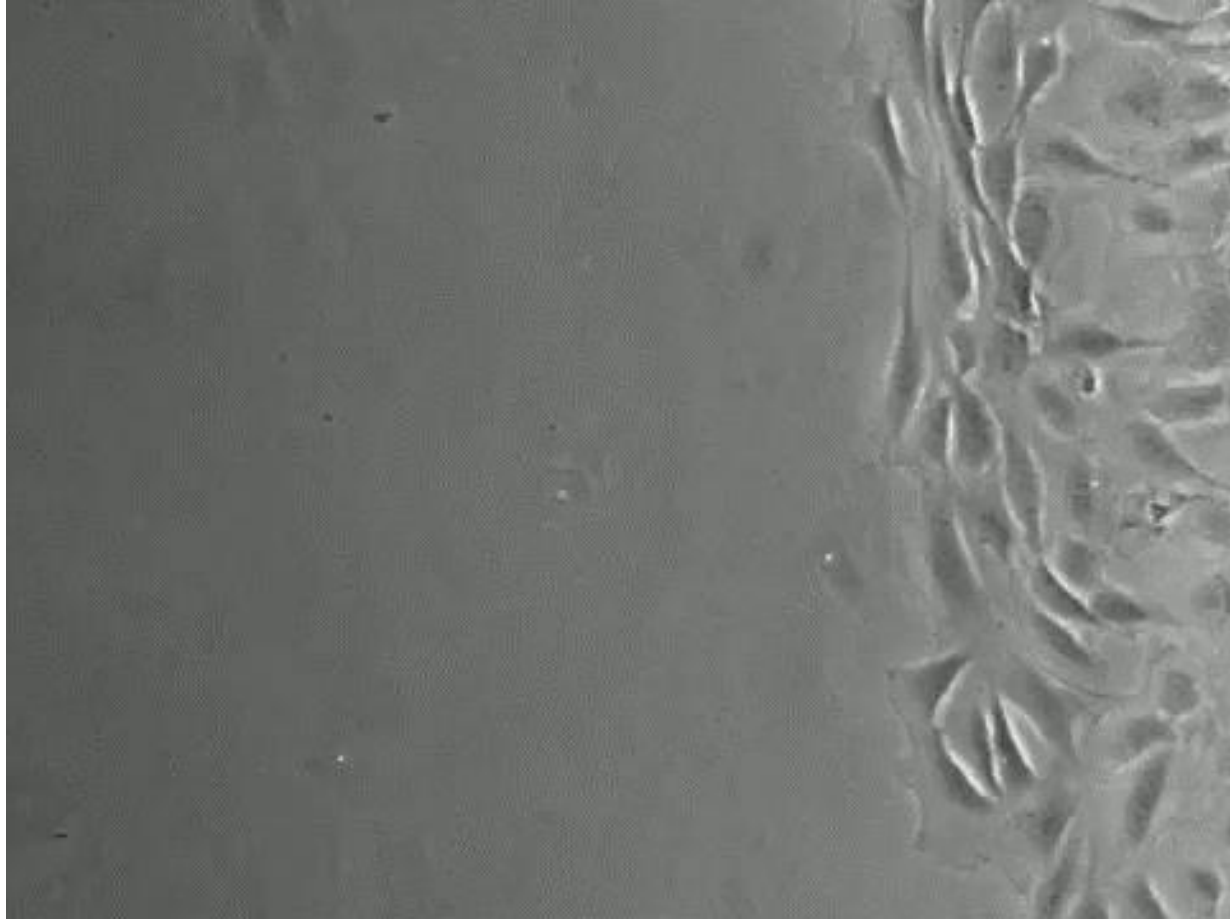
(B)

10 μm

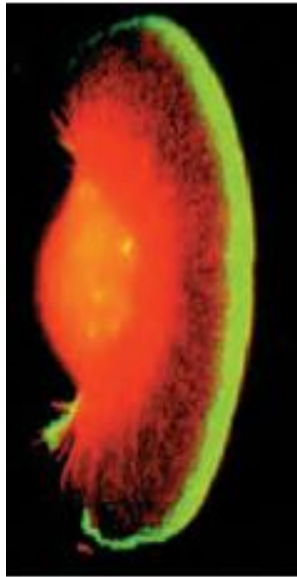


(C)

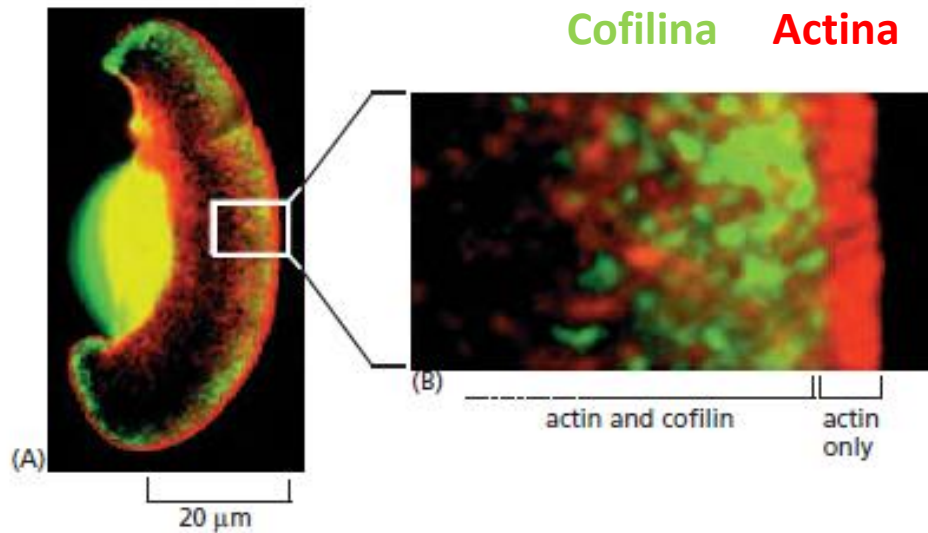




Protrusión del lamellipodio

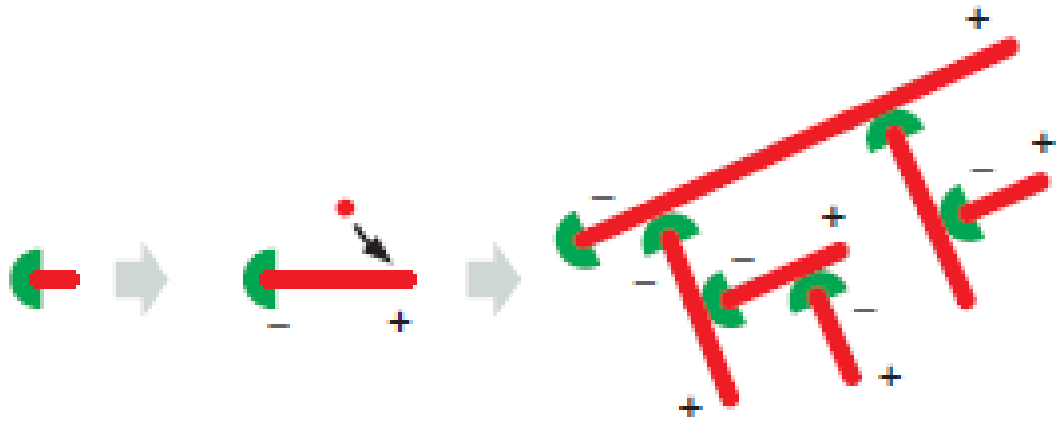


Arp2/3 en borde líder
Actina



Cofilina Actina





Arp2/3 complex

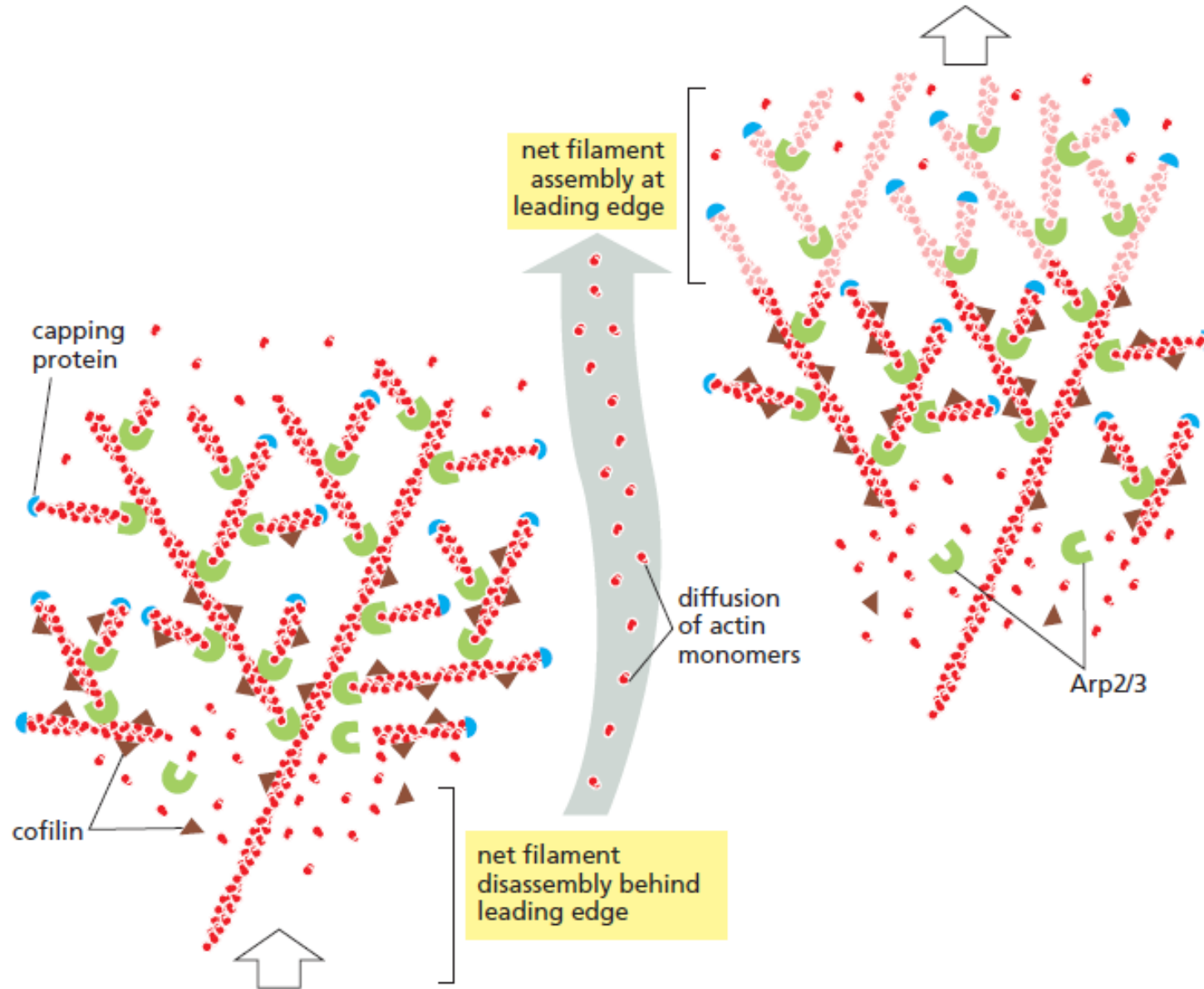
nucleates assembly
to form a web and remains
associated with the minus end



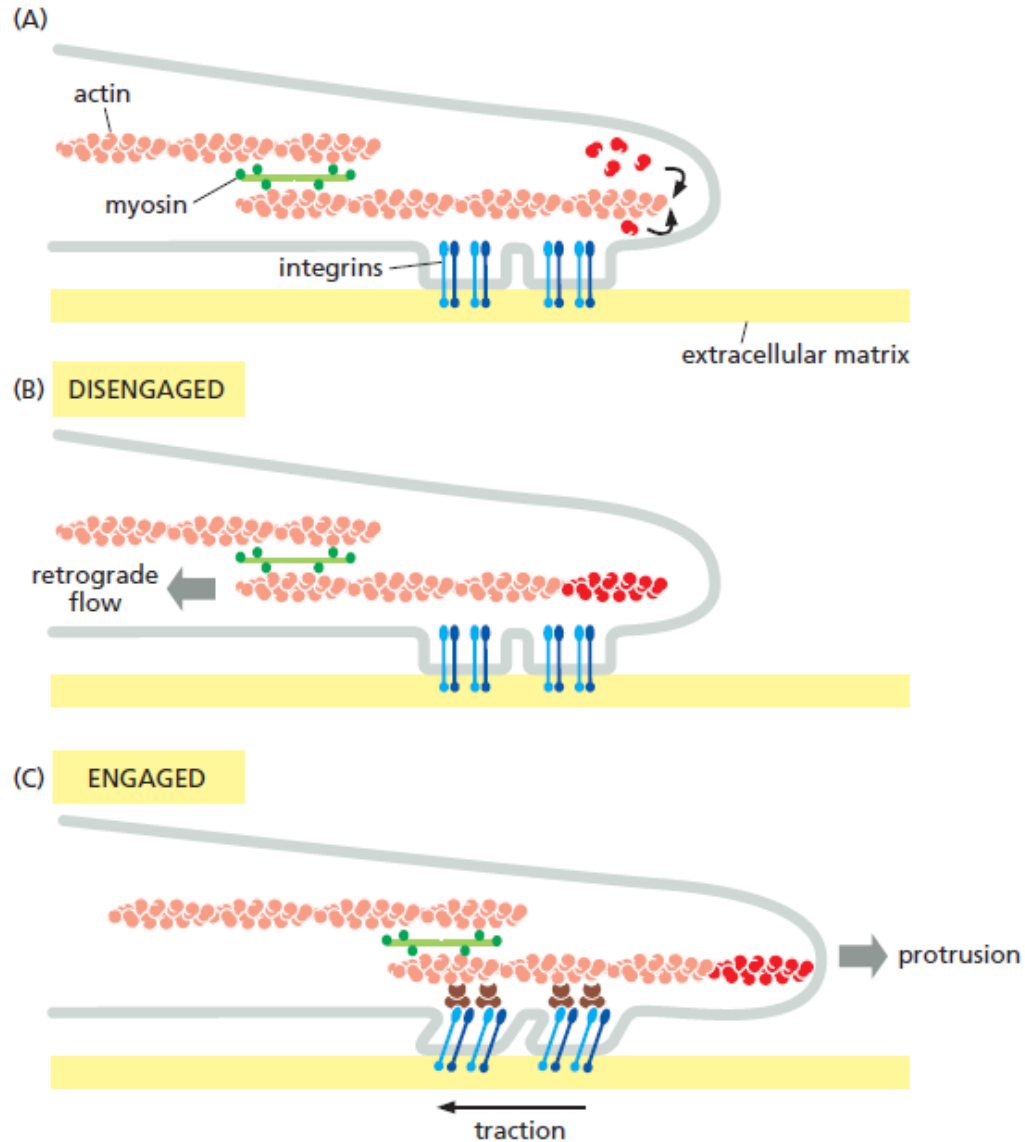
cofilin

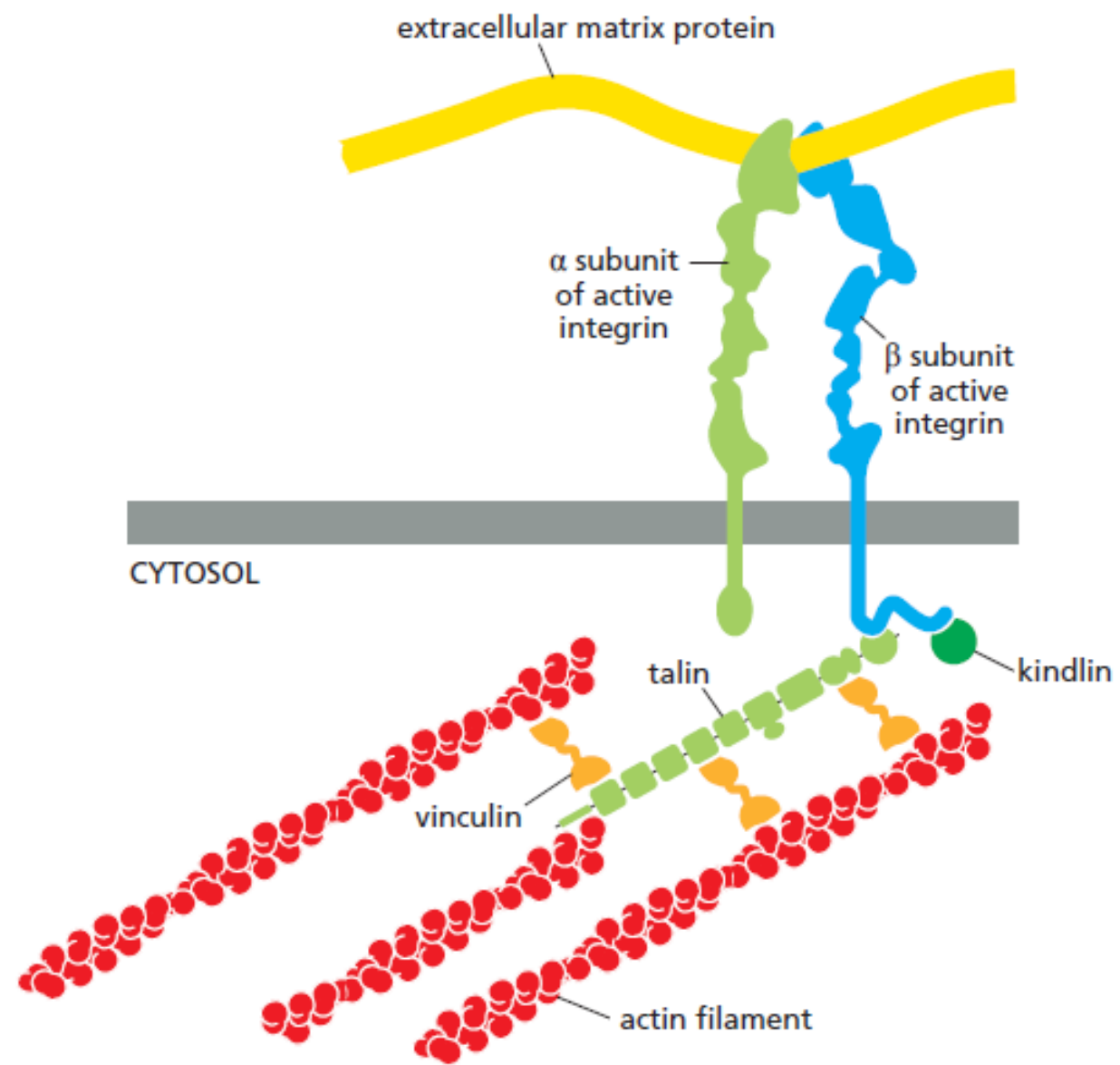
binds ADP-actin filaments,
accelerates disassembly

Protrusión del lamellipodio

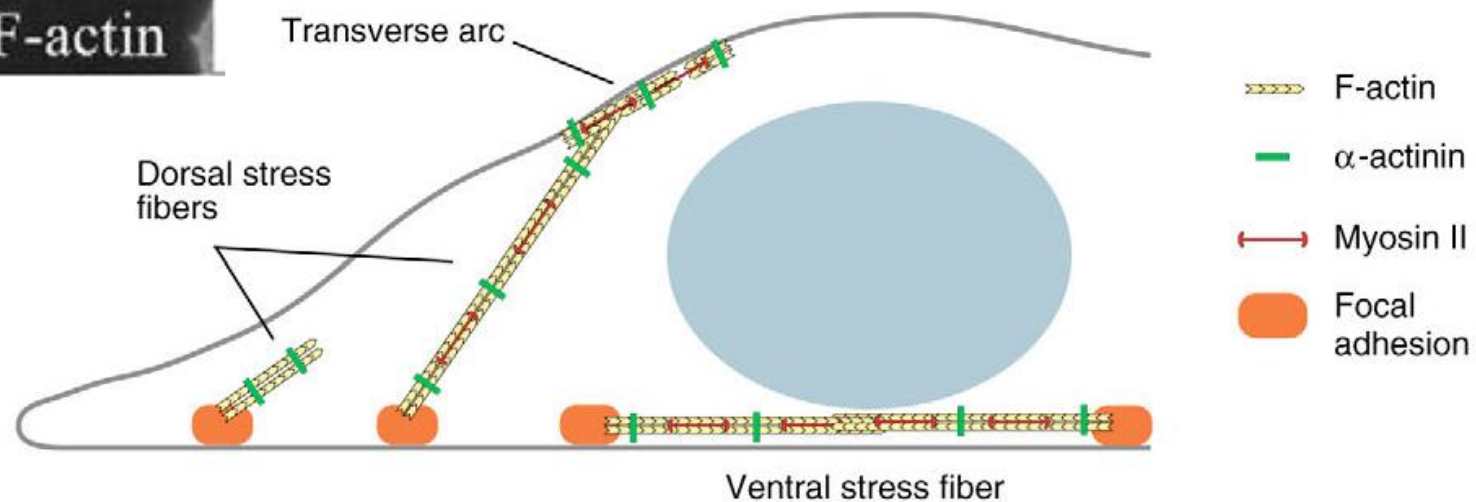
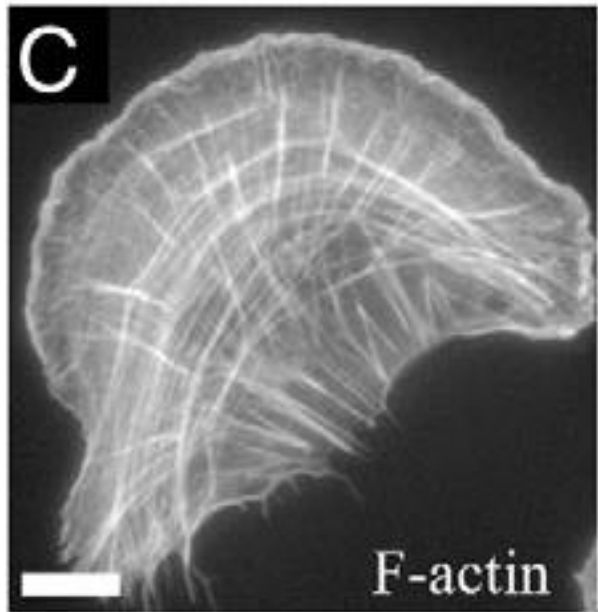


Unión a sustrato – adhesión a la matriz extracelular



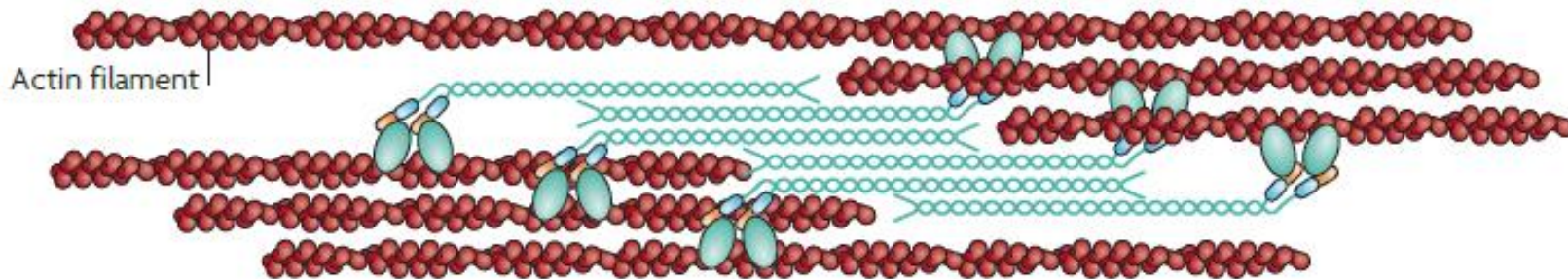
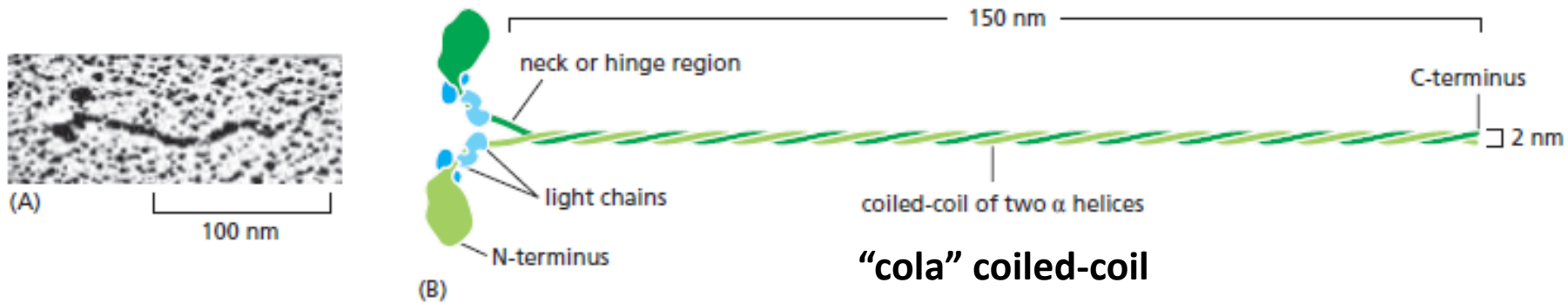


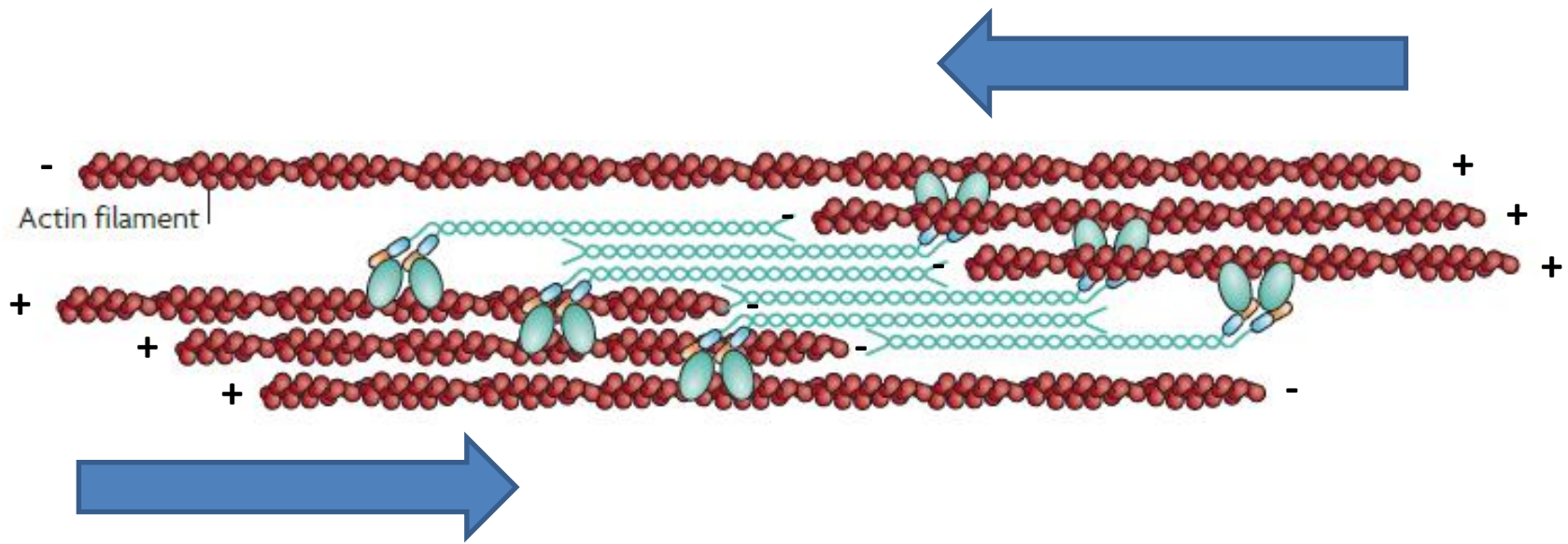
Tensión y retracción del borde posterior: fibras de tensión

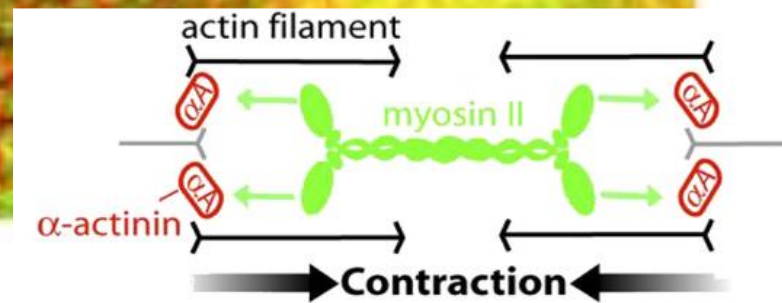
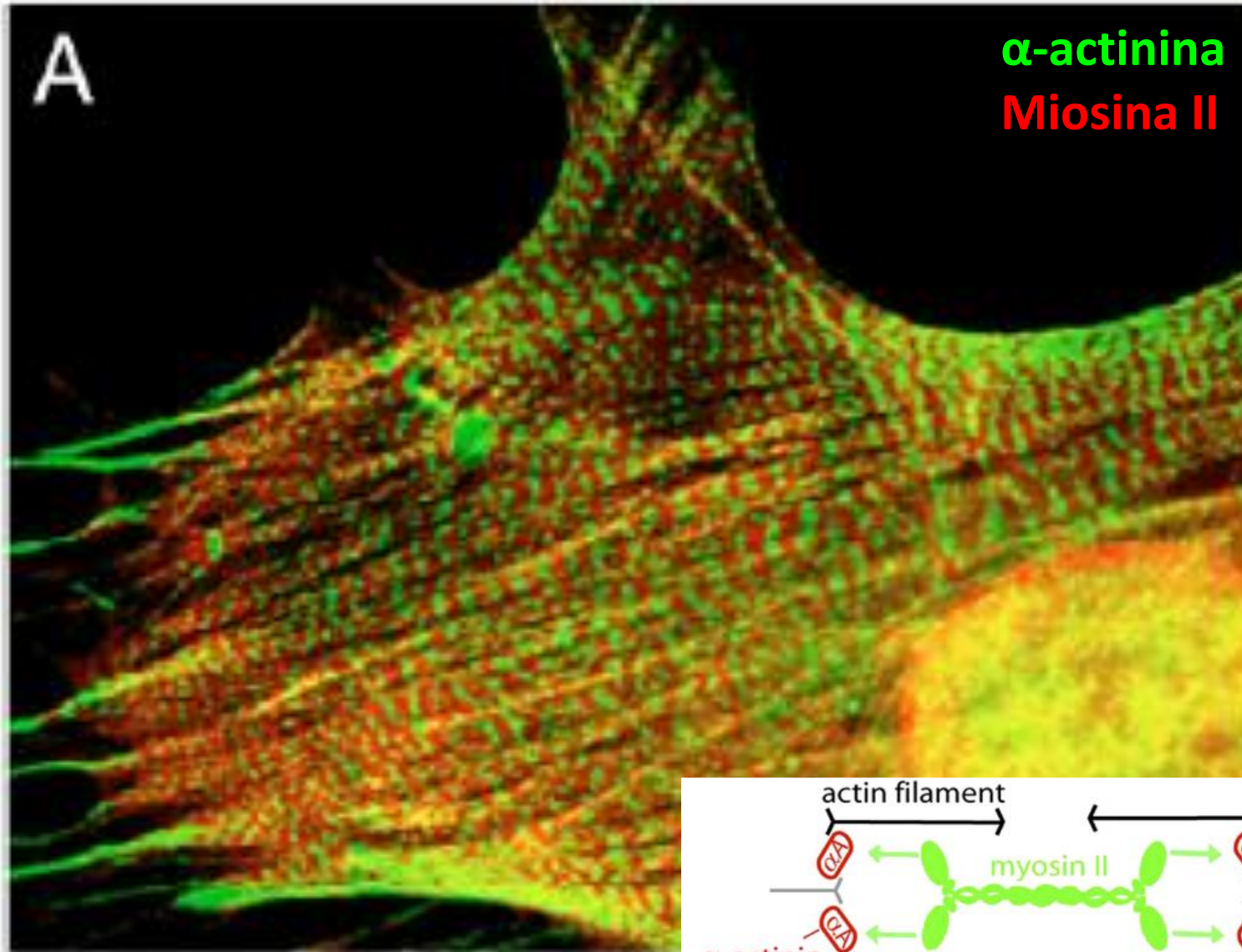


Miosina II forma haces que se intercalan con los filamentos de actina en fibras de tensión (y en el músculo)

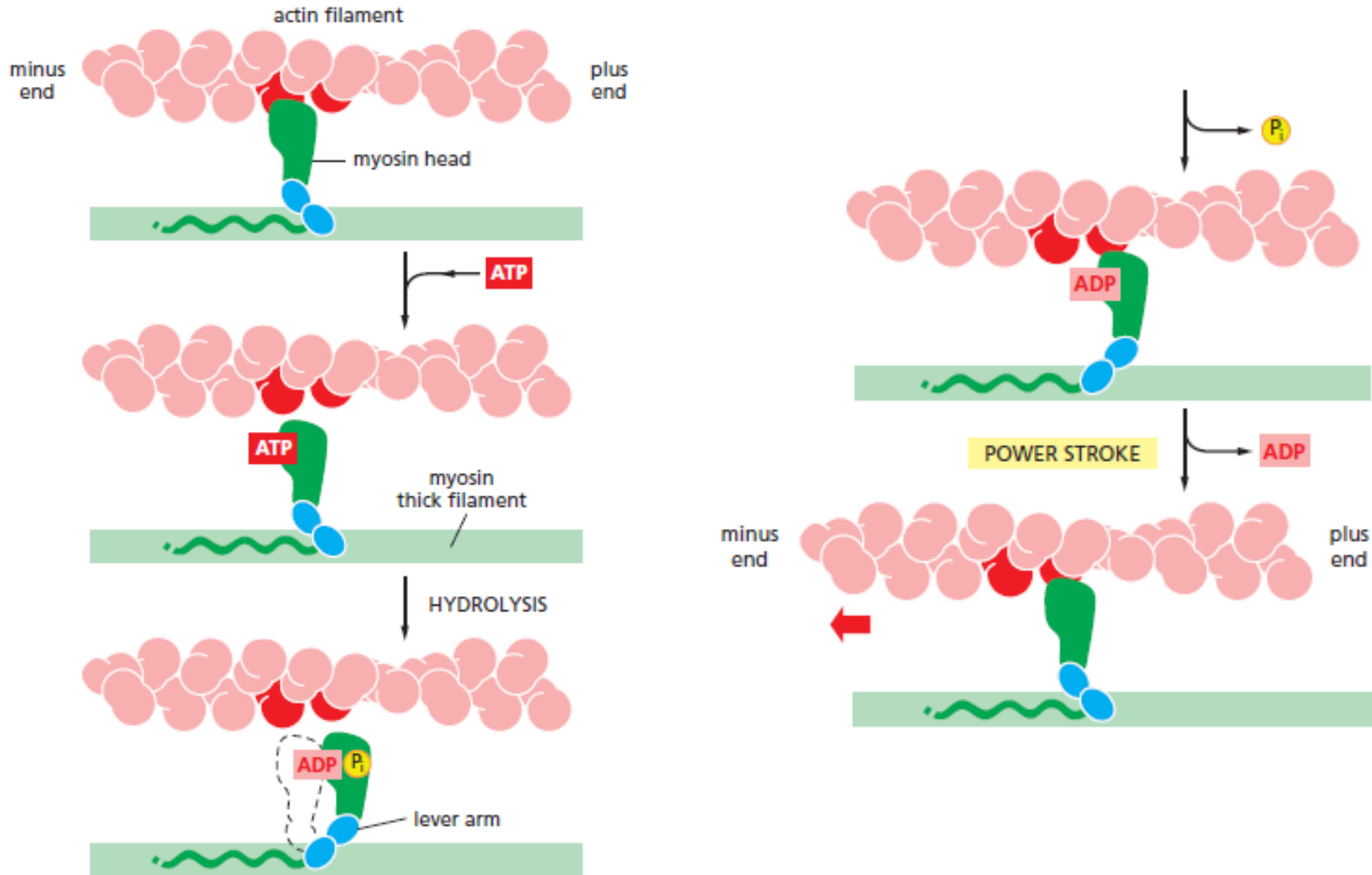
“cabezas” globulares







Generación de fuerza por miosina II sobre filamentos de actina

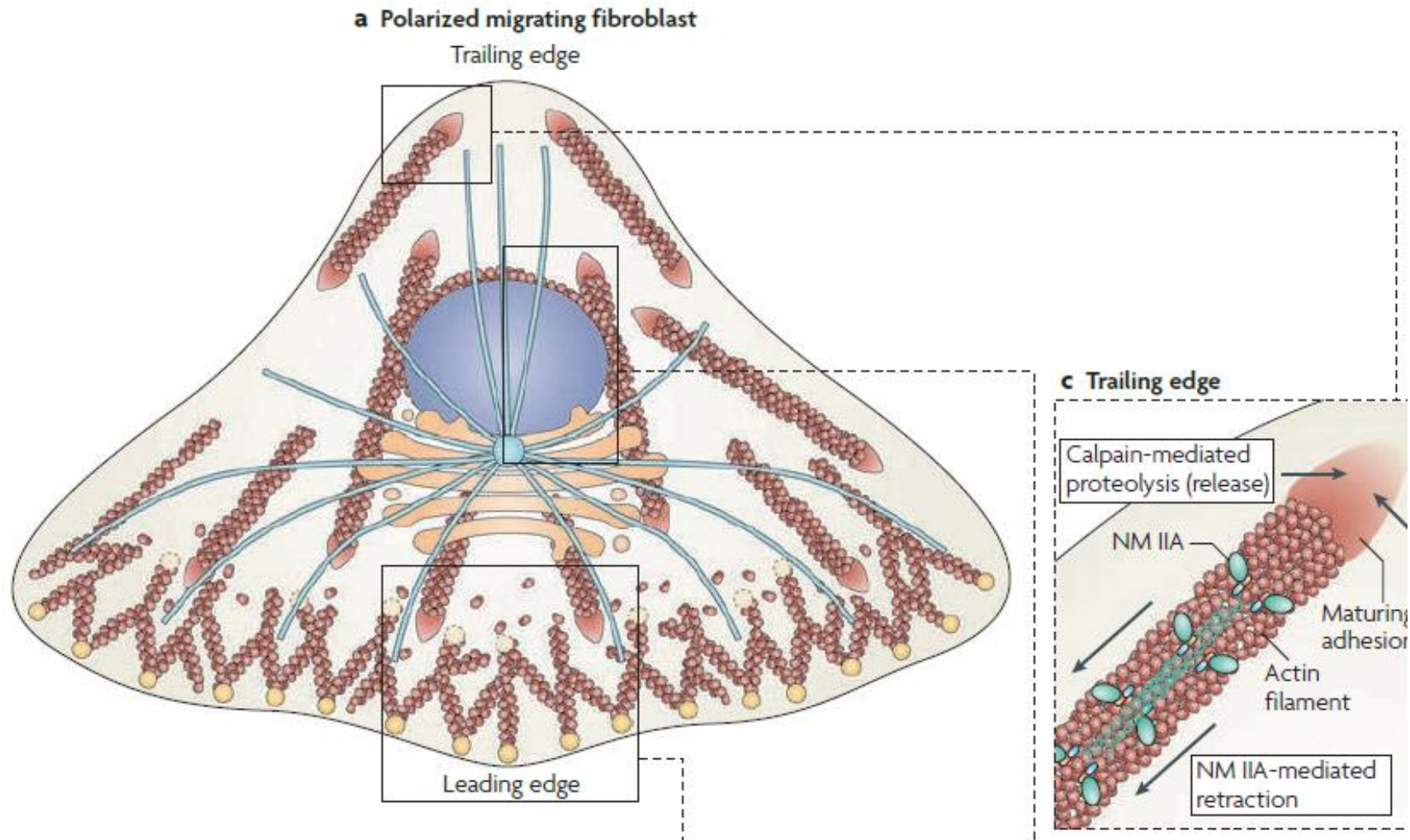


Myosin

F I V T H
element

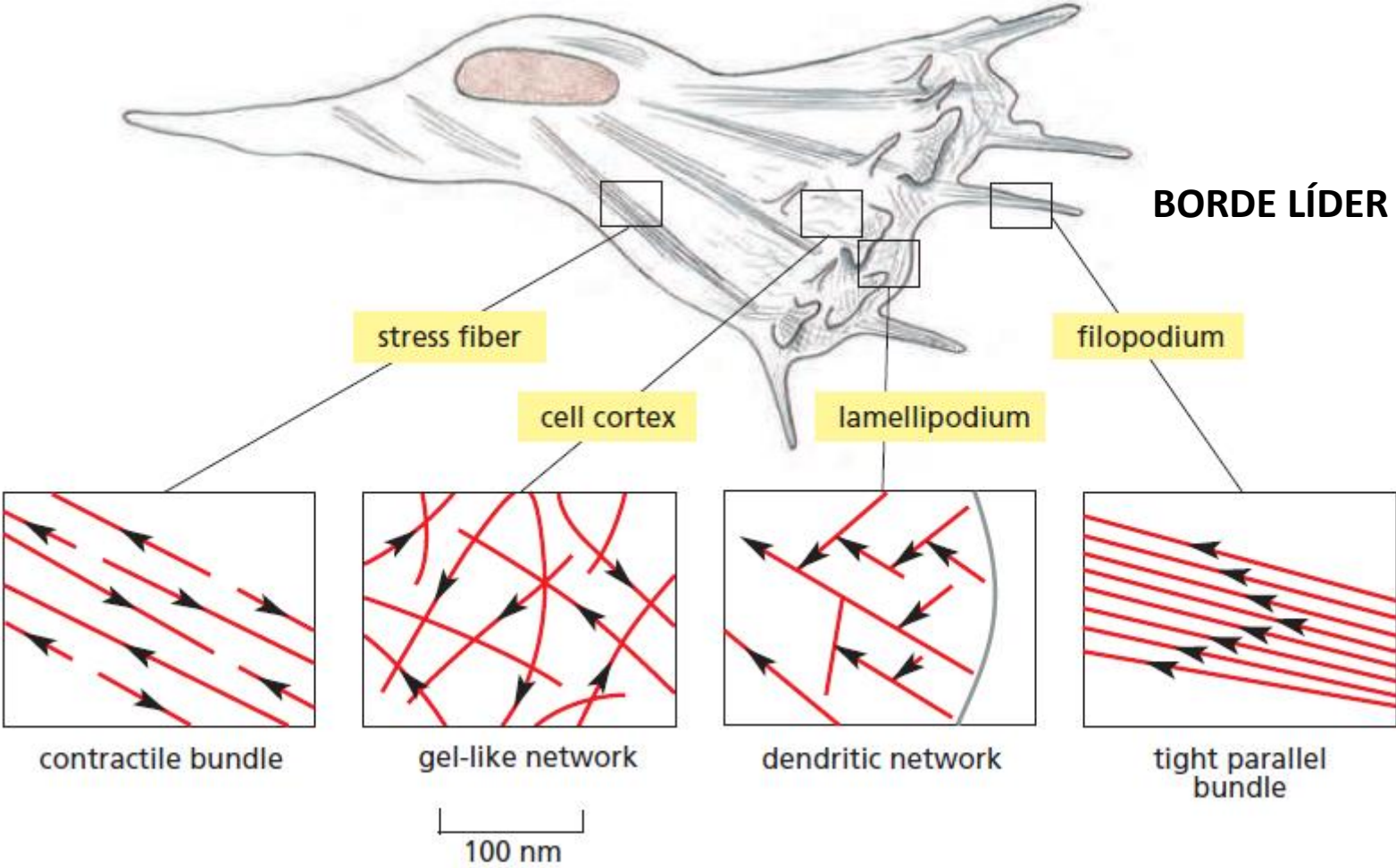
Created by Ron Yala, Ron Milligan, and
Graham Johnson for Science Magazine, 1999
Garland edition voiceover by Peter Walter
Directed by Peter Walter and Mike Morales
for Garland Publishing, 2001

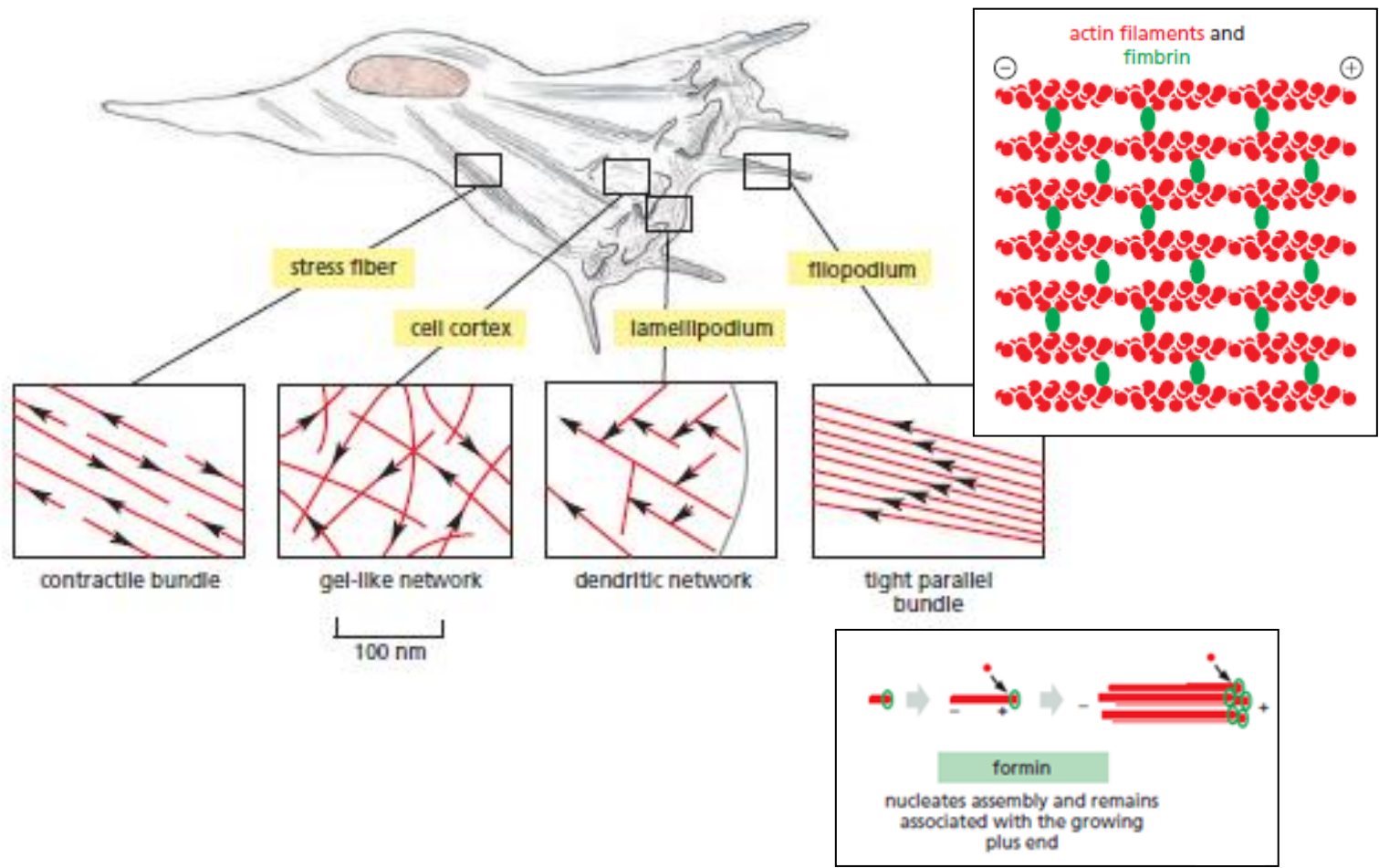
Contracción por fibras de tensión de actina y miosina llevan a la retracción del borde posterior

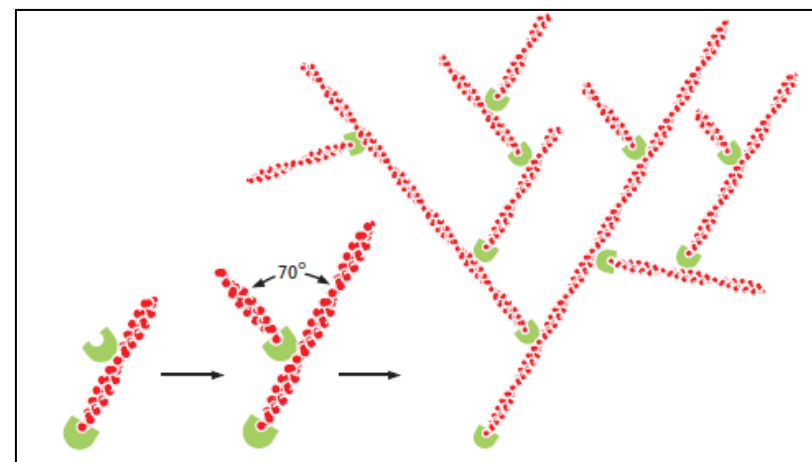
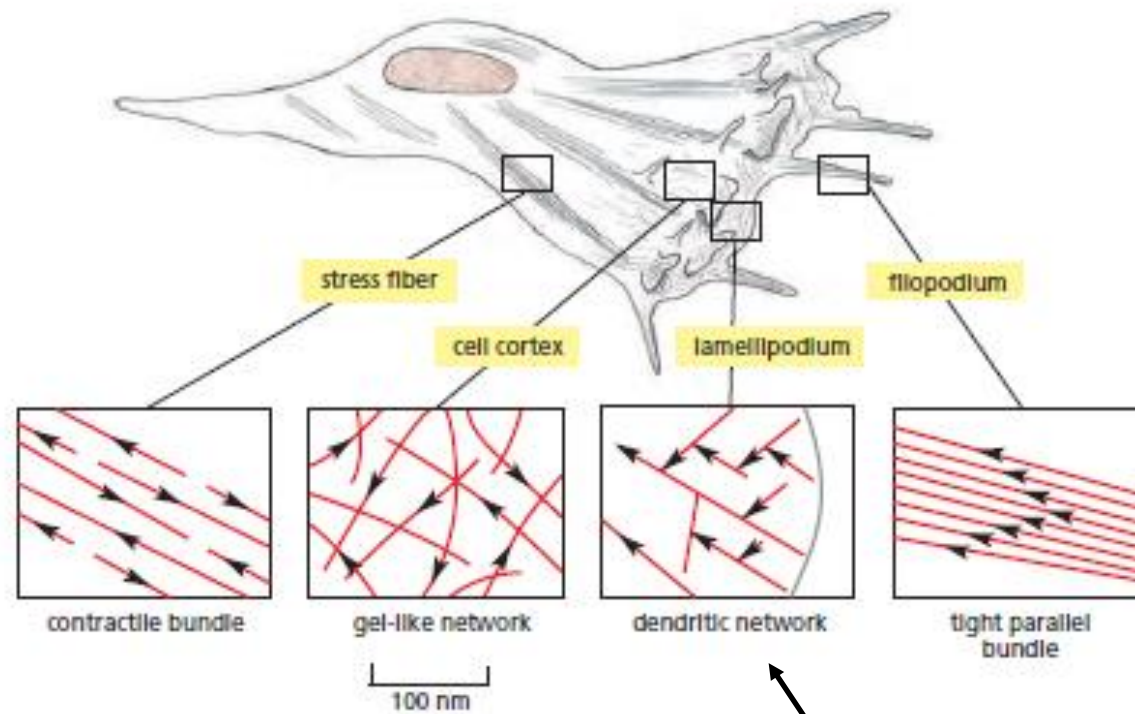


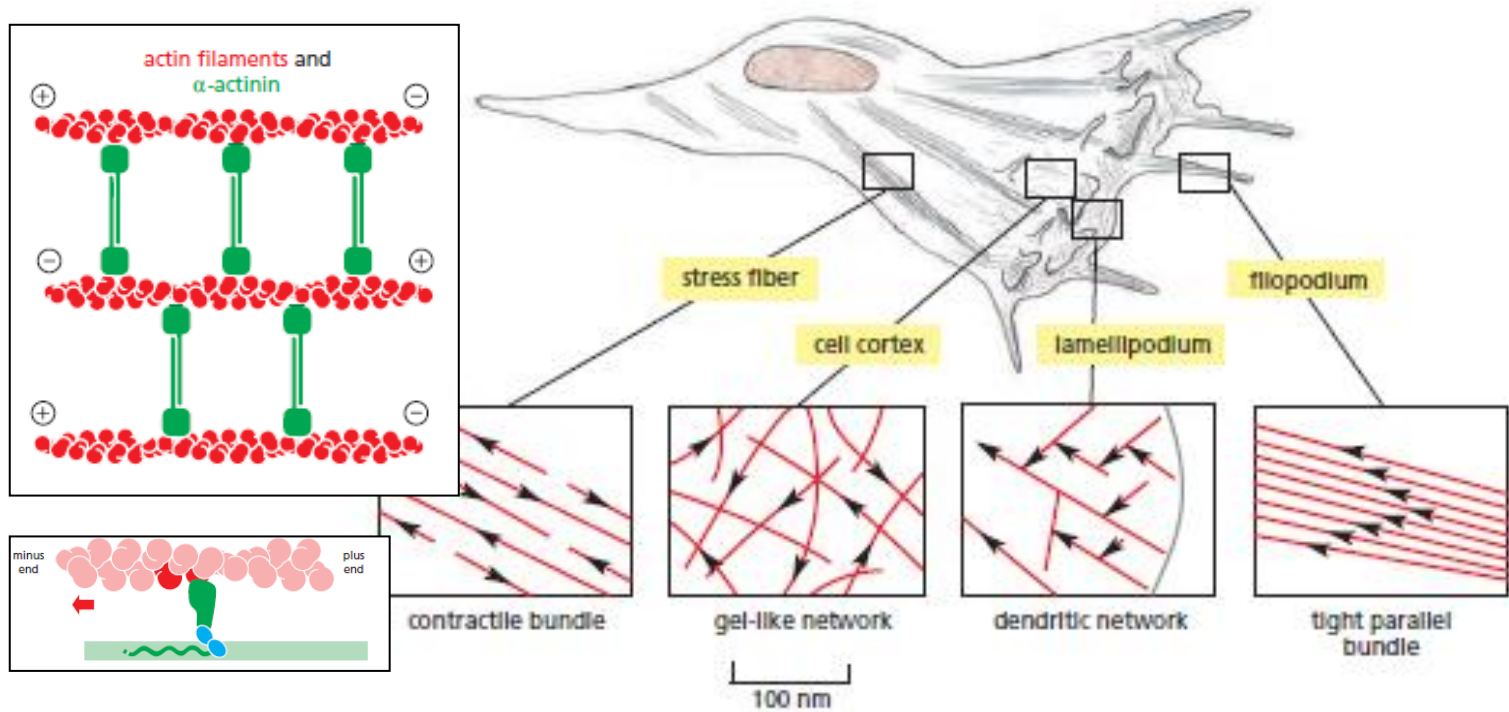
Desensamblaje de adhesiones posteriores

Actina y migración celular









¿Cómo regula la célula todas estas actividades durante la migración?

¿Cómo se mantiene la polaridad de la célula?

GTPasas como interruptores moleculares

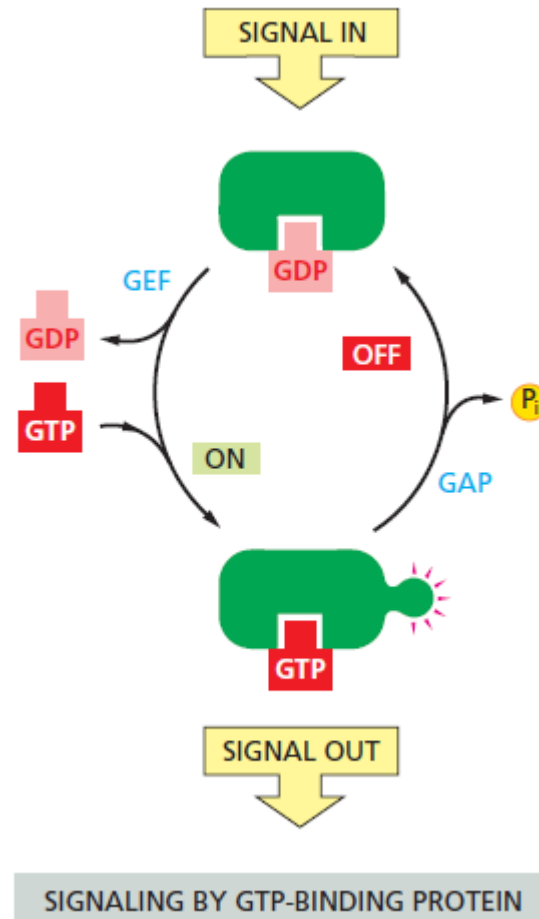


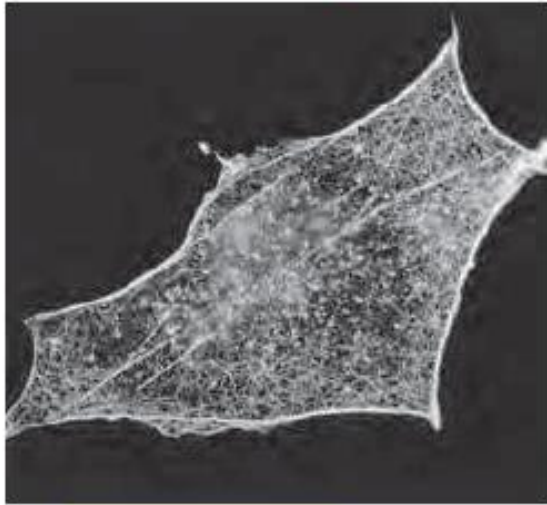
TABLE 15–5 The Ras Superfamily of Monomeric GTPases

Family	Some family members	Some functions
Ras	H-Ras, K-Ras, N-Ras	Relay signals from RTKs
	Rheb	Activates mTOR to stimulate cell growth
	Rap1	Activated by a cyclic-AMP-dependent GEF; influences cell adhesion by activating integrins
Rho*	Rho, Rac, Cdc42	Relay signals from surface receptors to the cytoskeleton and elsewhere
ARF*	ARF1–ARF6	Regulate assembly of protein coats on intracellular vesicles
Rab*	Rab1–60	Regulate intracellular vesicle traffic
Ran*	Ran	Regulates mitotic spindle assembly and nuclear transport of RNAs and proteins

*The Rho family is discussed in Chapter 16, the ARF and Rab proteins in Chapter 13, and Ran in Chapters 12 and 17. The three-dimensional structure of Ras is shown in Figure 3–67.

Ejercicio

actin staining

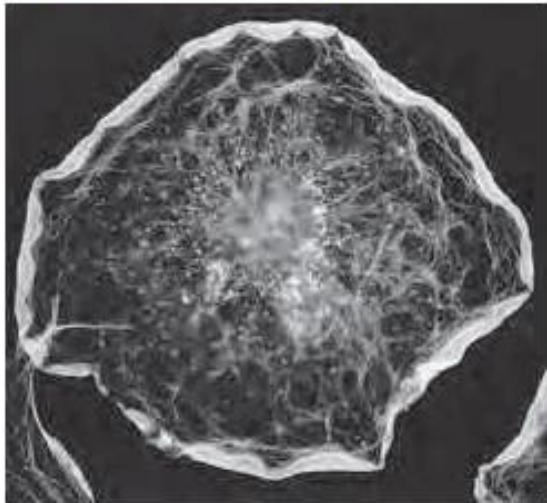


(A) QUIESCENT CELLS

actin staining



(B) Cdc42 ACTIVATION



(C) Rac ACTIVATION

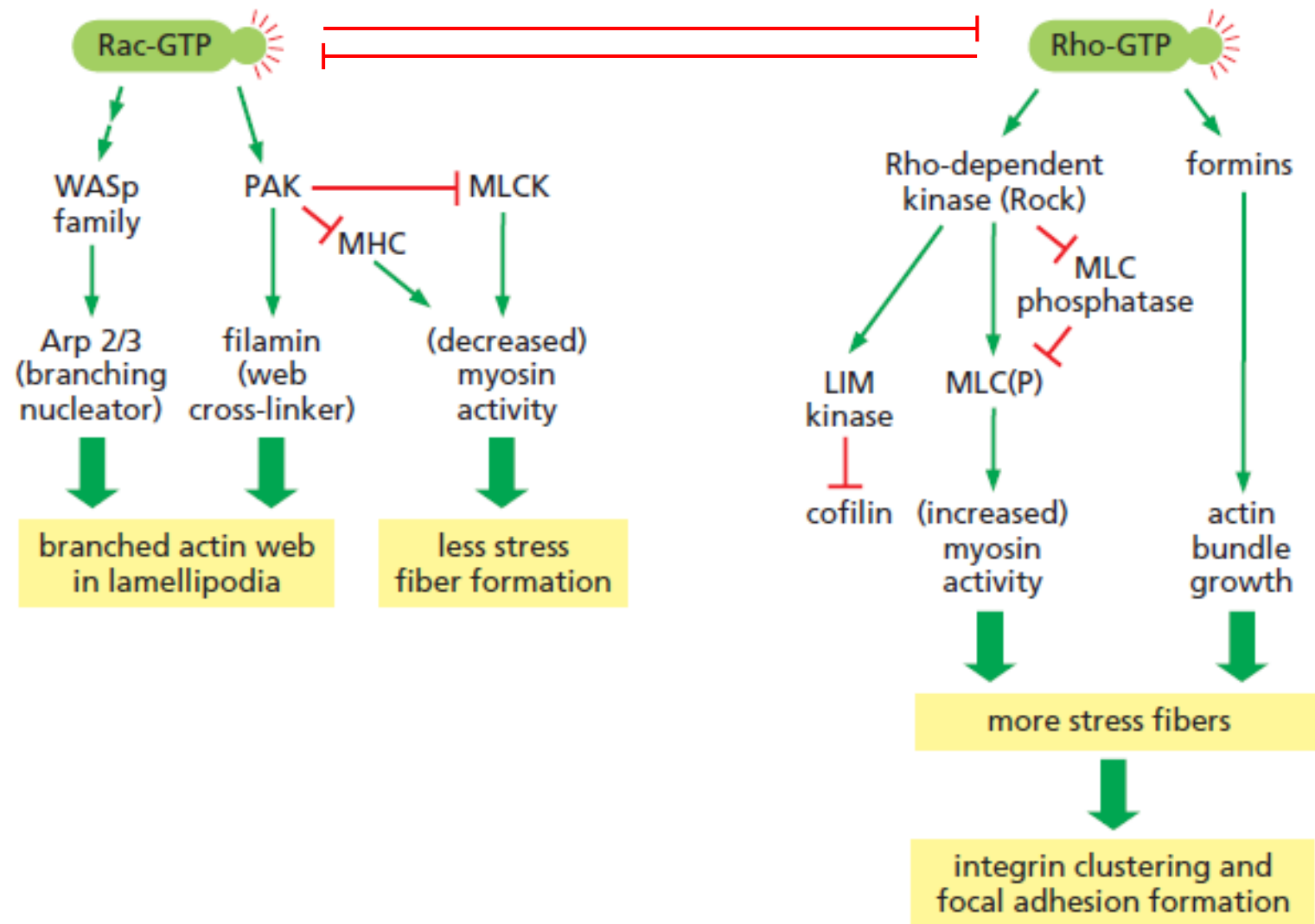


(D) Rho ACTIVATION

20 μ m

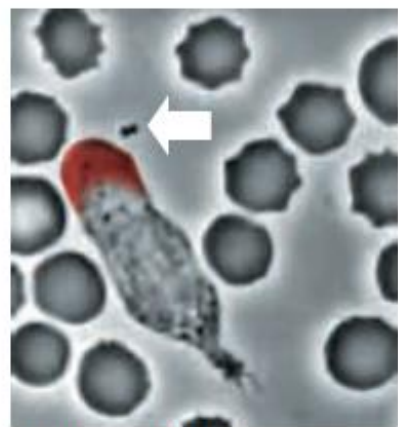
¿Qué tipo de estructuras son promovidas por cada GTPasa?

¿Qué proteínas hipotetizan son activadas por cada GTPasa?



(A)

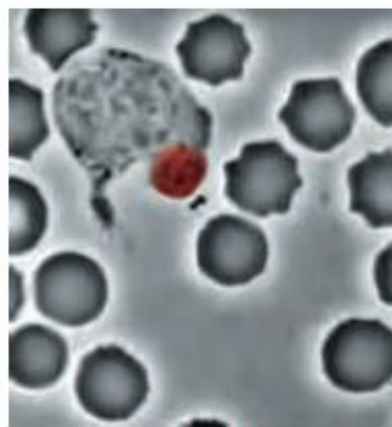
(B)



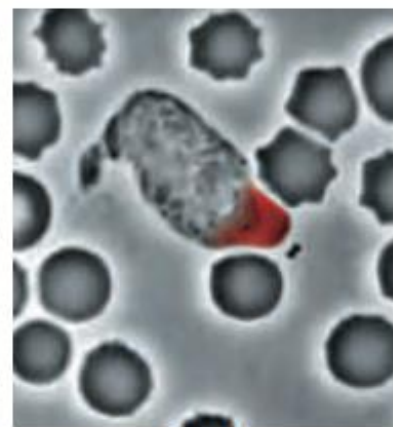
time 0 min



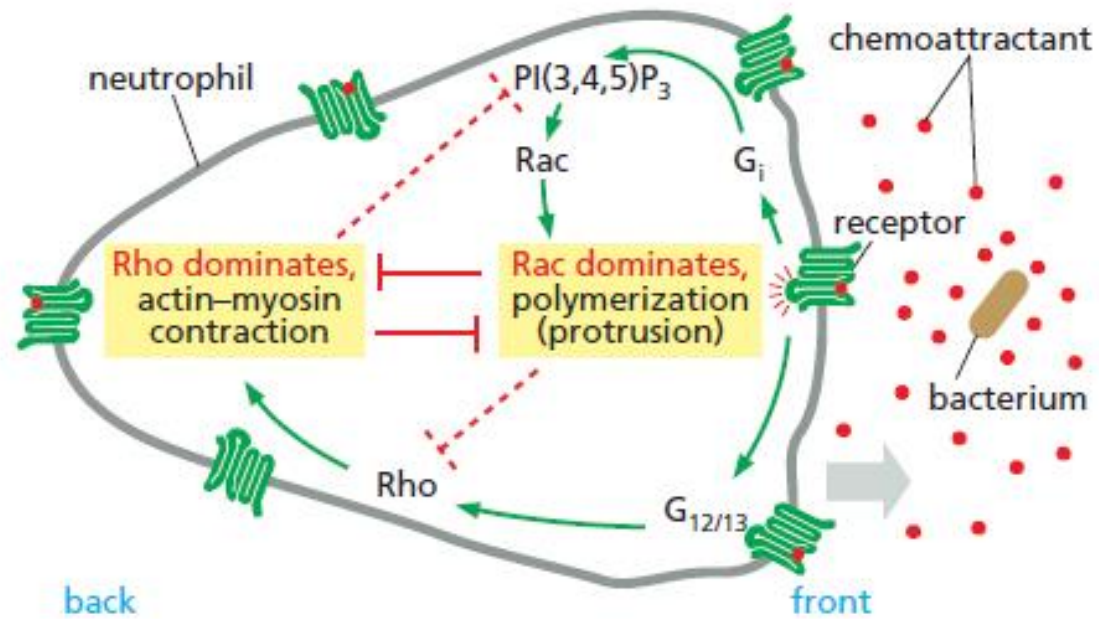
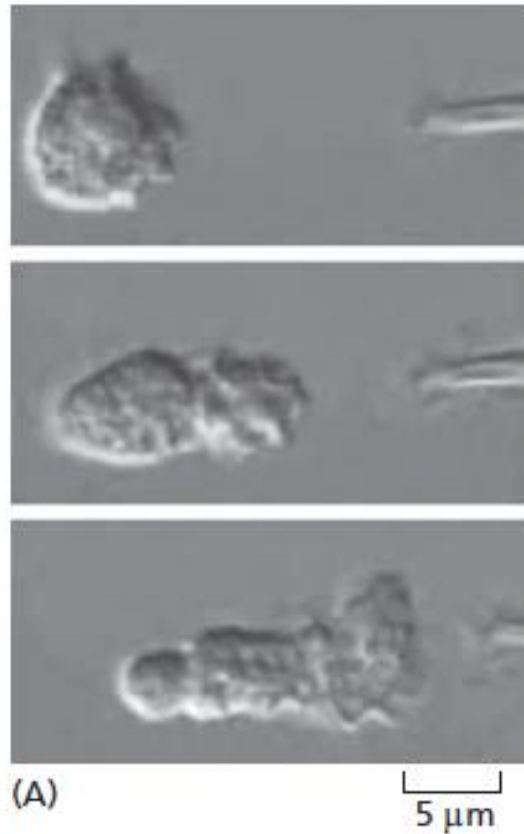
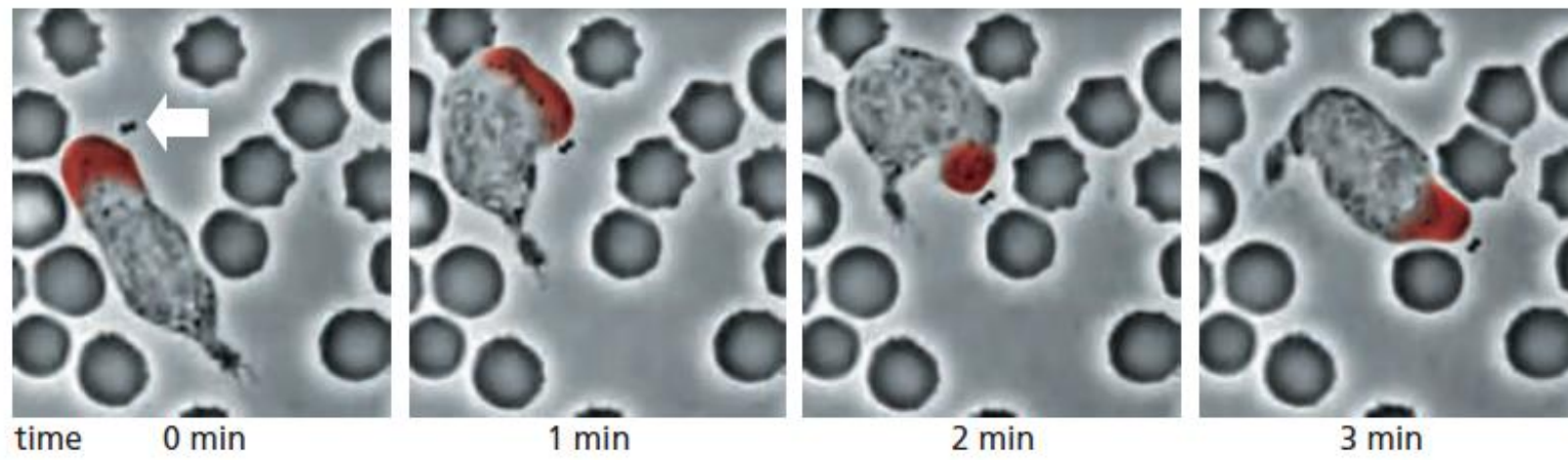
1 min



2 min

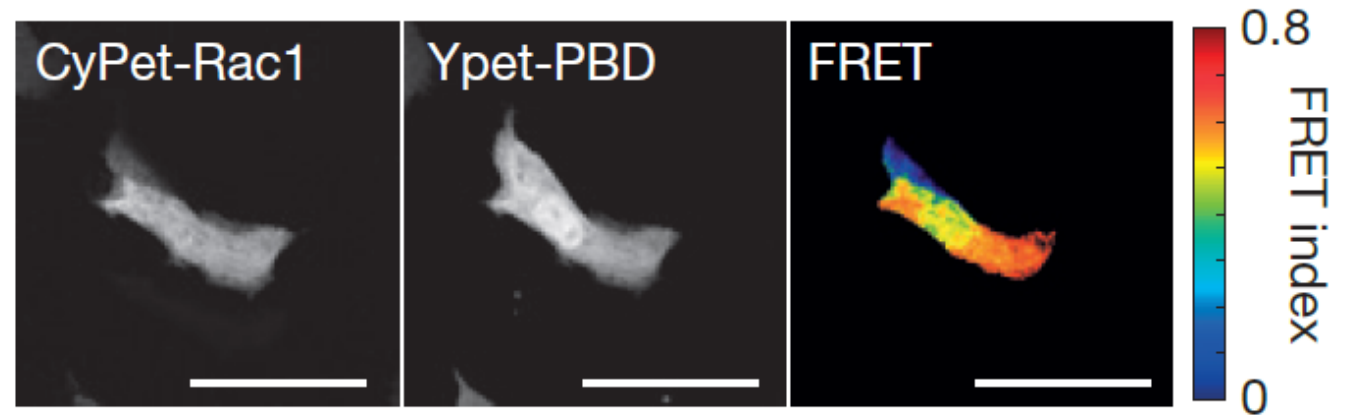
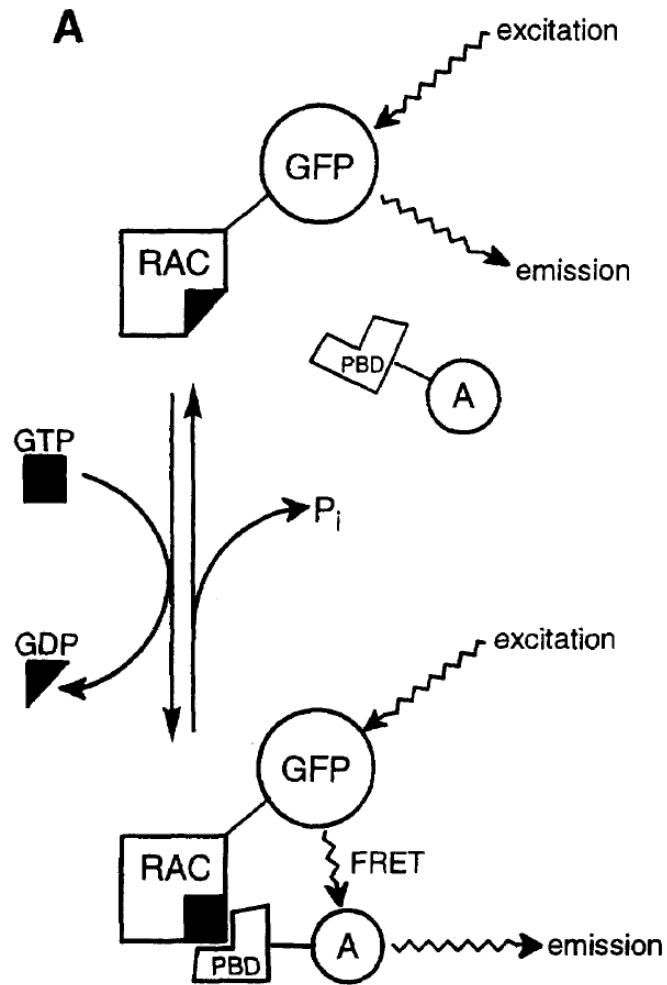


3 min



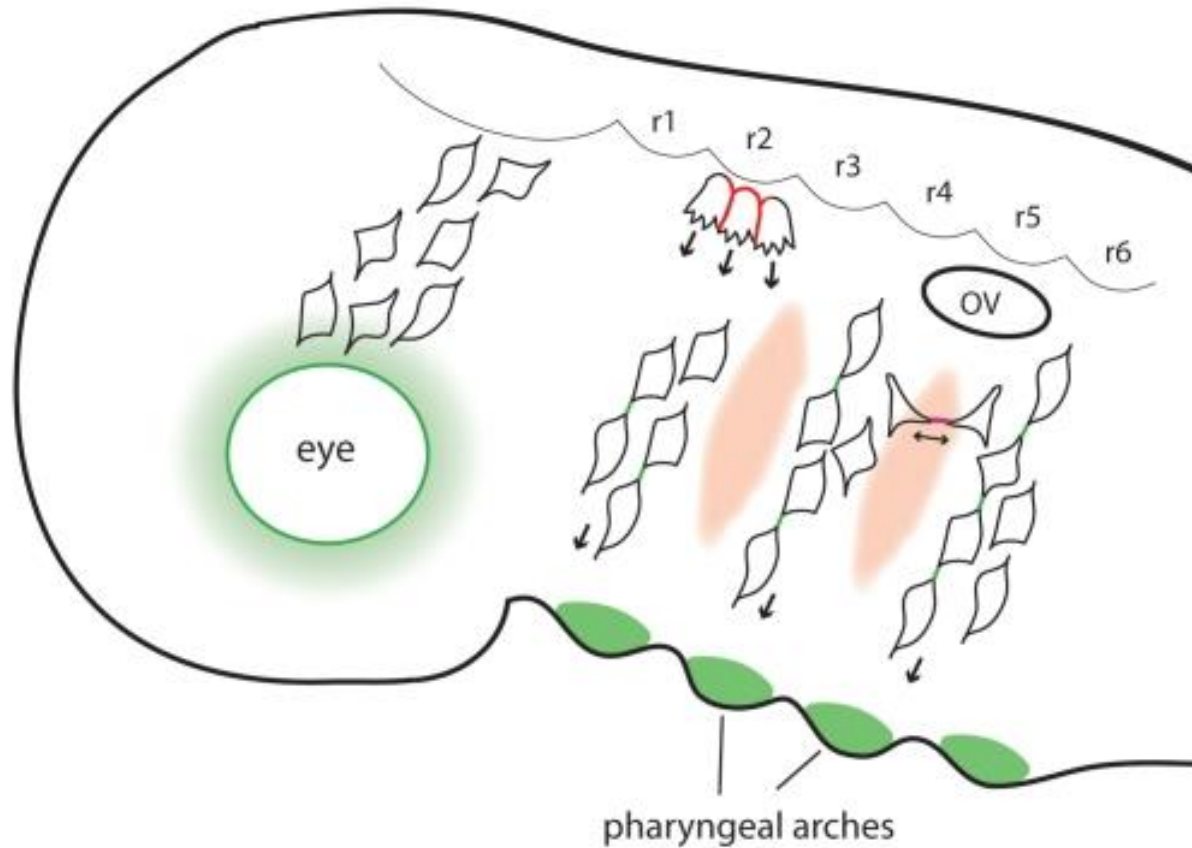
(B)

Sensores de actividad para proteínas G pequeñas



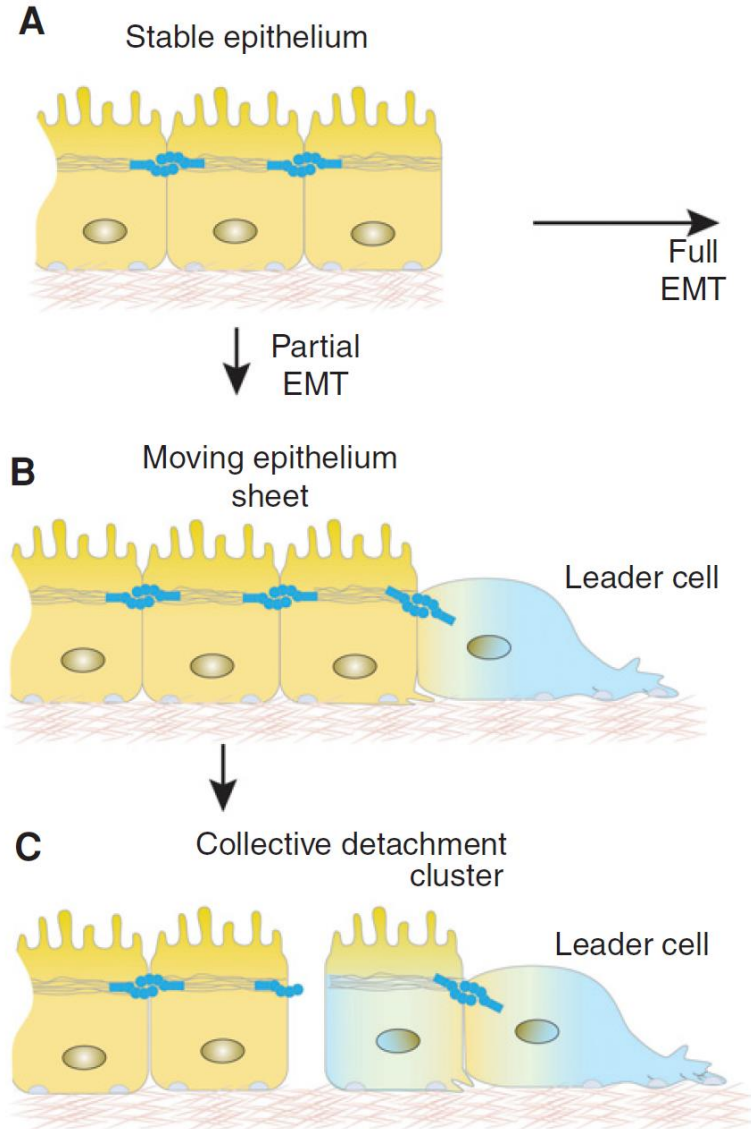
Fluorescence resonance energy transfer (FRET): < 10 nm

Combinaciones de señales atractivas y repulsivas durante el desarrollo

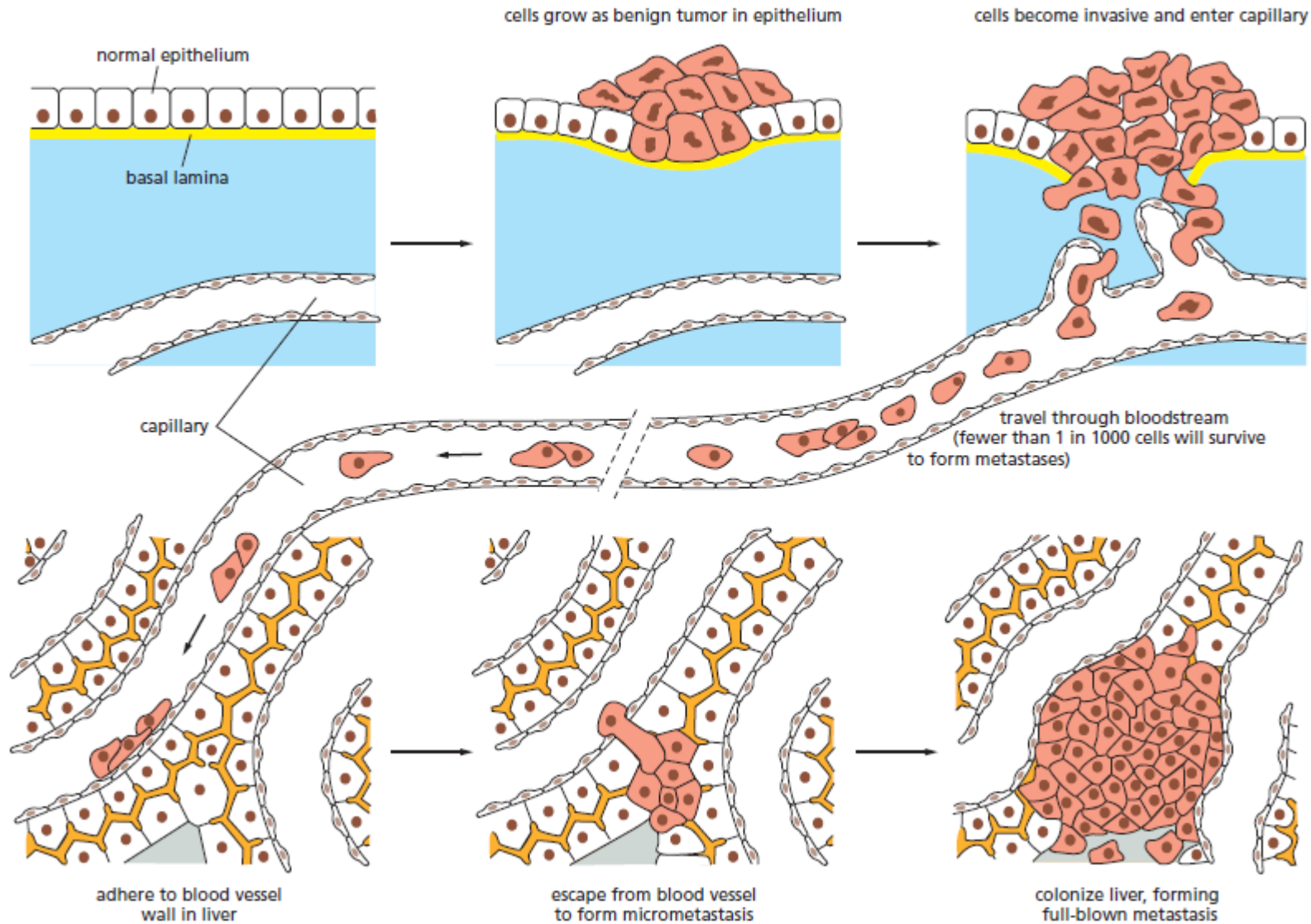


- contact inhibition causing directed migration
- repulsive contacts causing cell retraction
- attractive contacts mediating chain migration

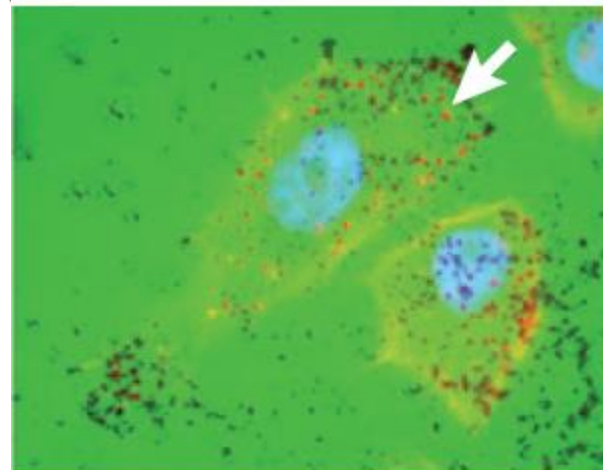
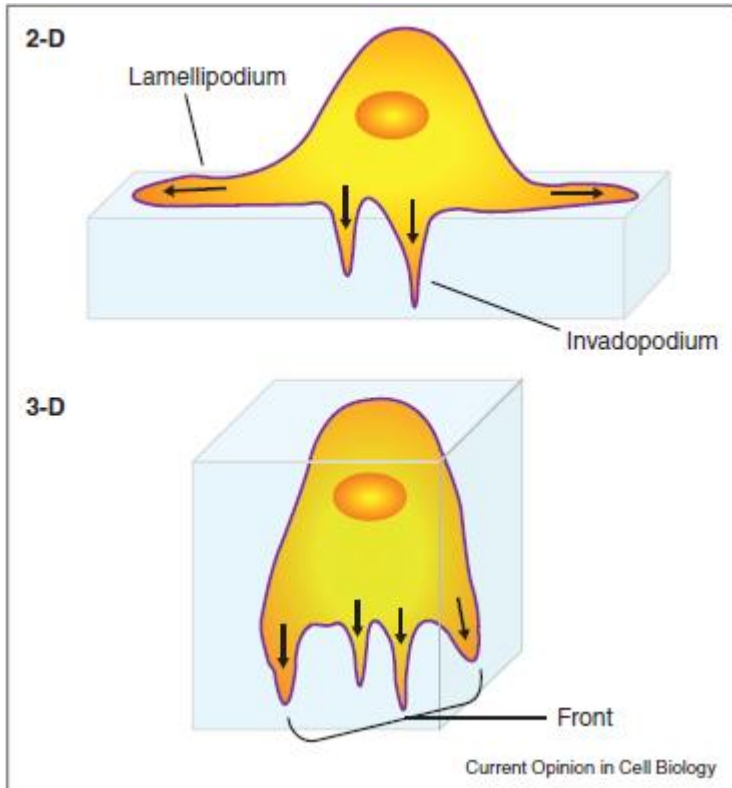
Migración celular colectiva



Invasión y Metástasis



Invadopodia



METALOPROTEASAS

Pregunta de examen

Describe el rol de las fibras de tensión de actina y miosina en la migración celular.