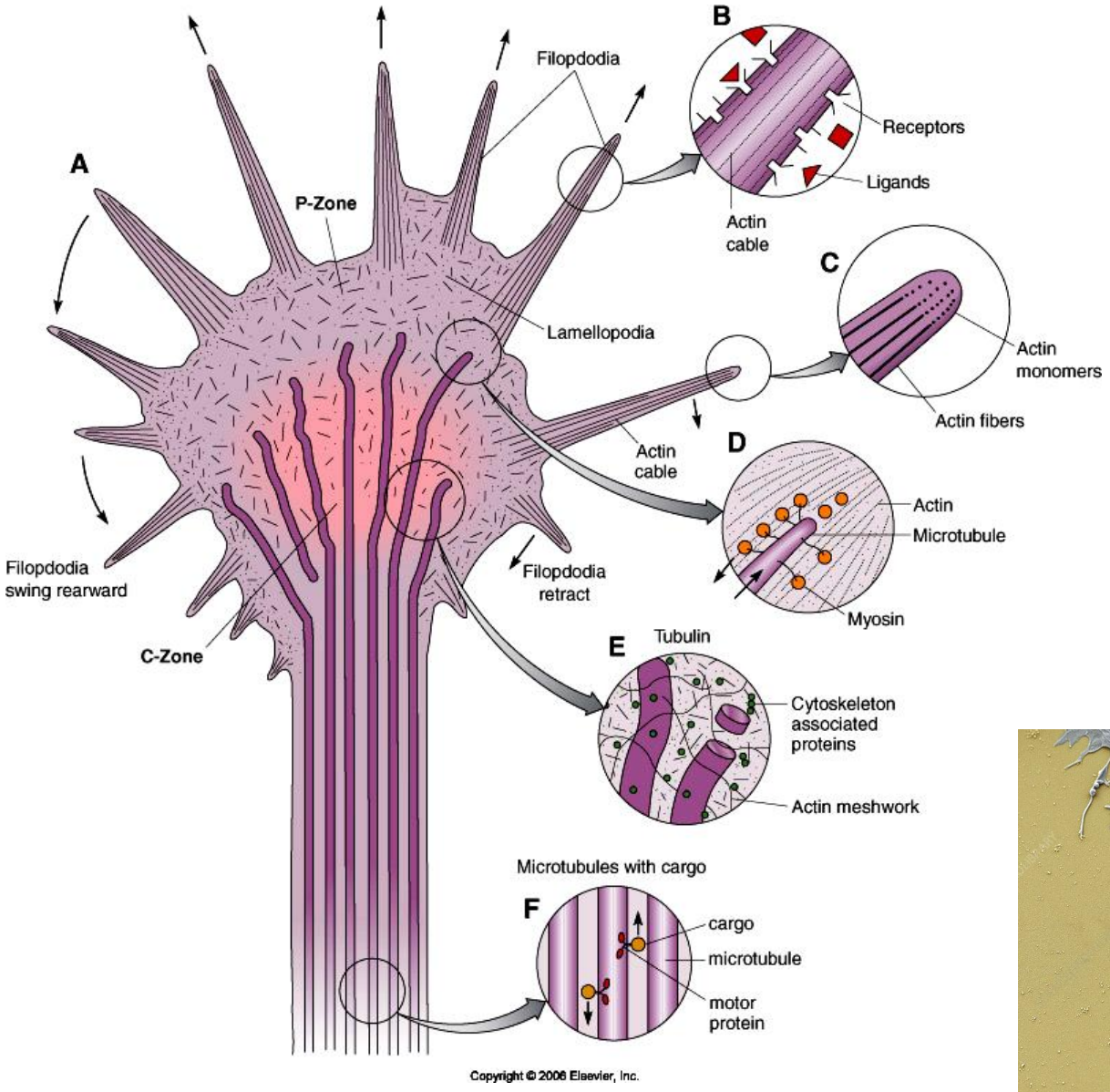
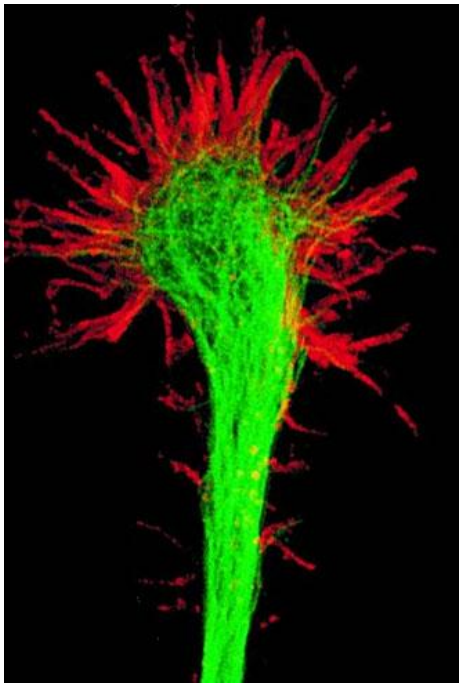
Guiado axonal

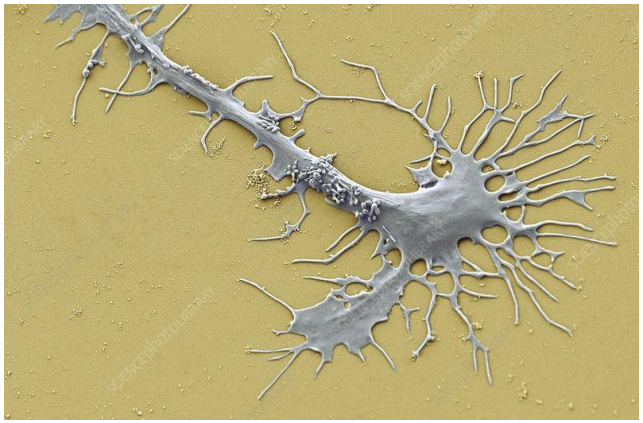
Biología del Desarrollo 2022

El cono de crecimiento

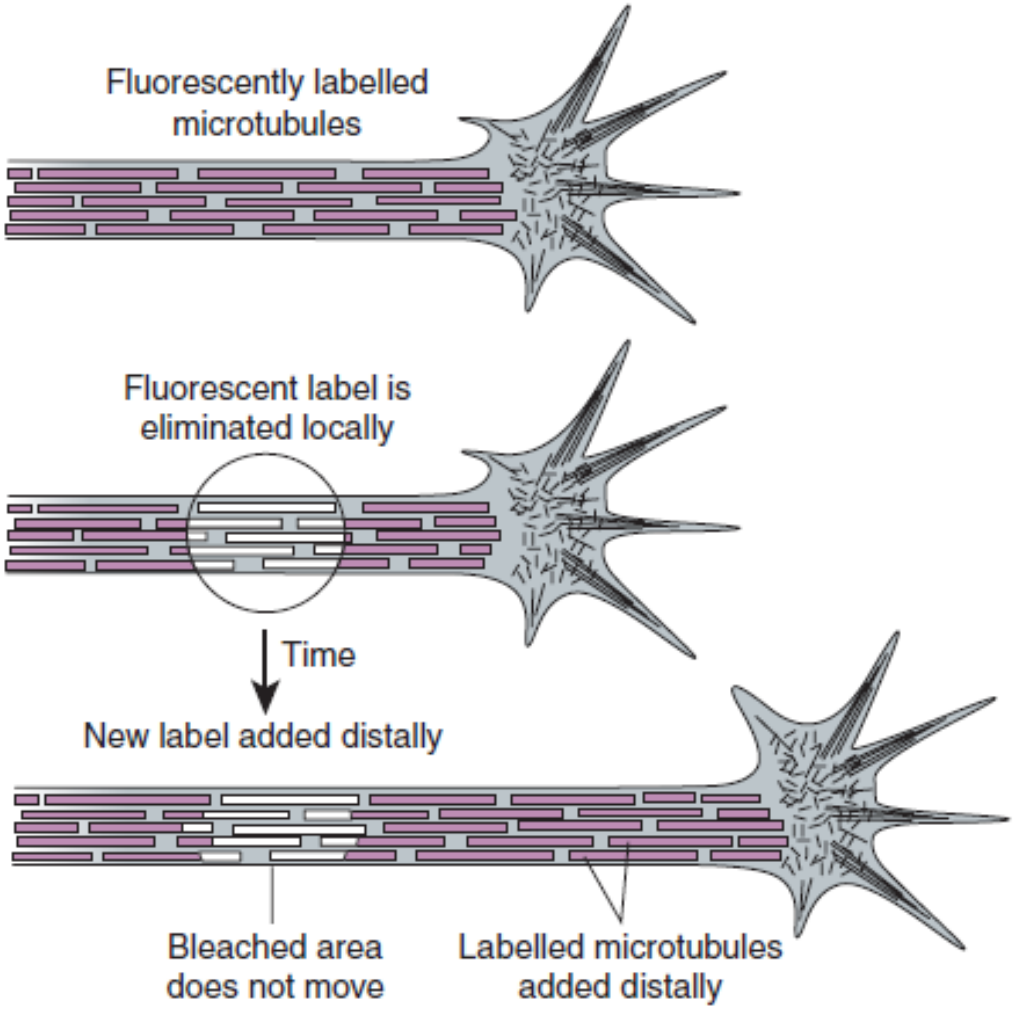


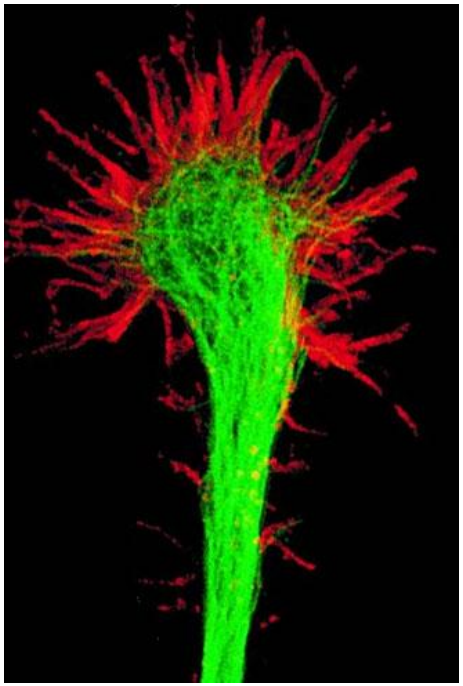


Microtúbulos
Actina

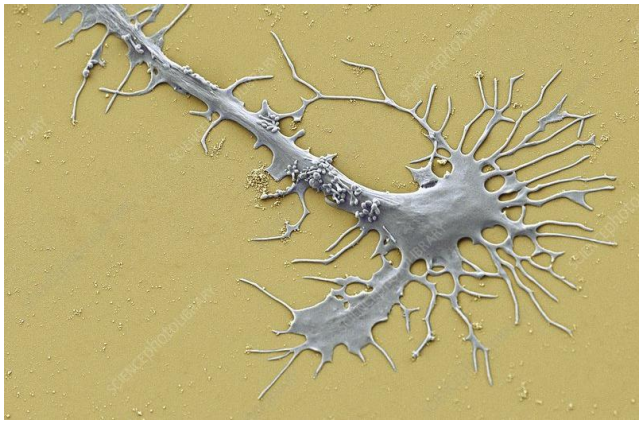


El cono de crecimiento

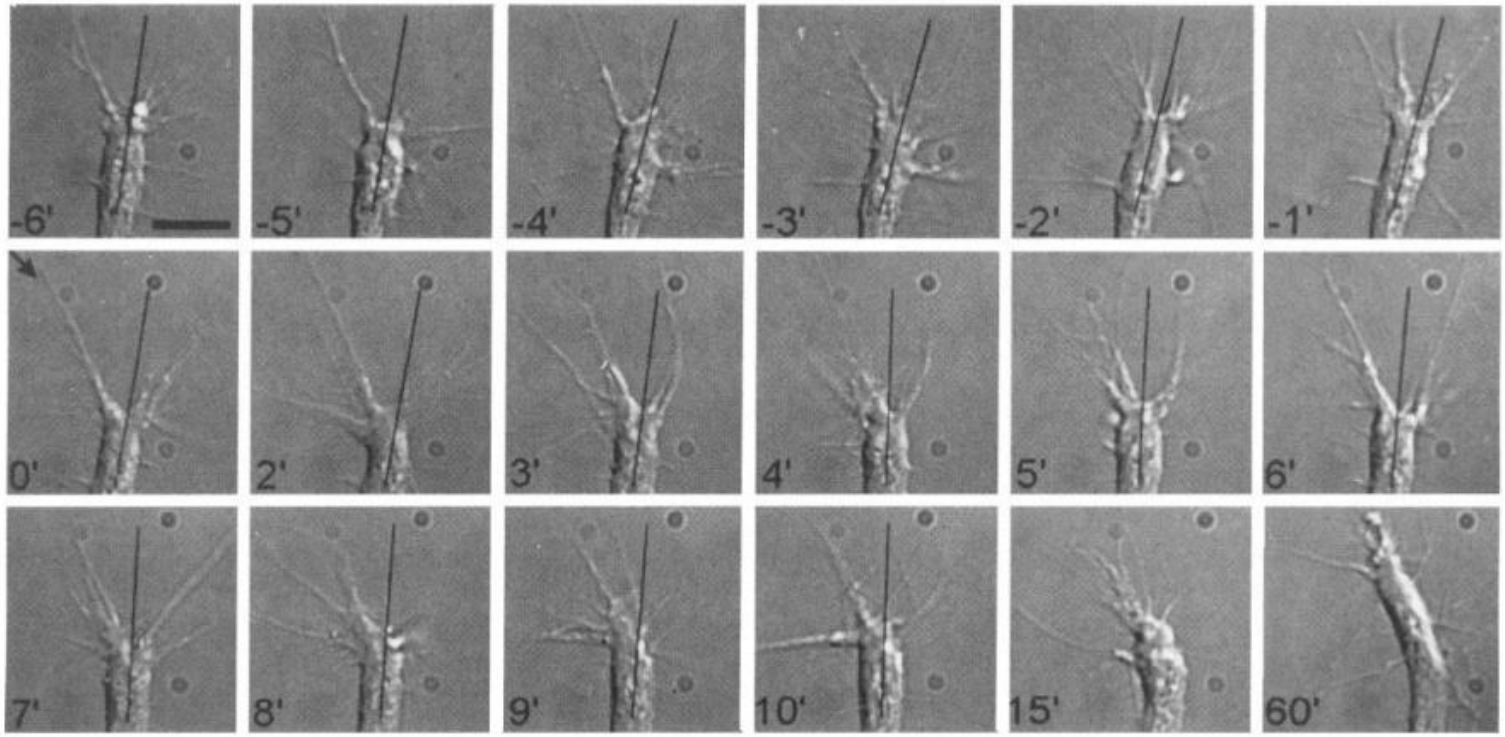




Microtúbulos
Actina

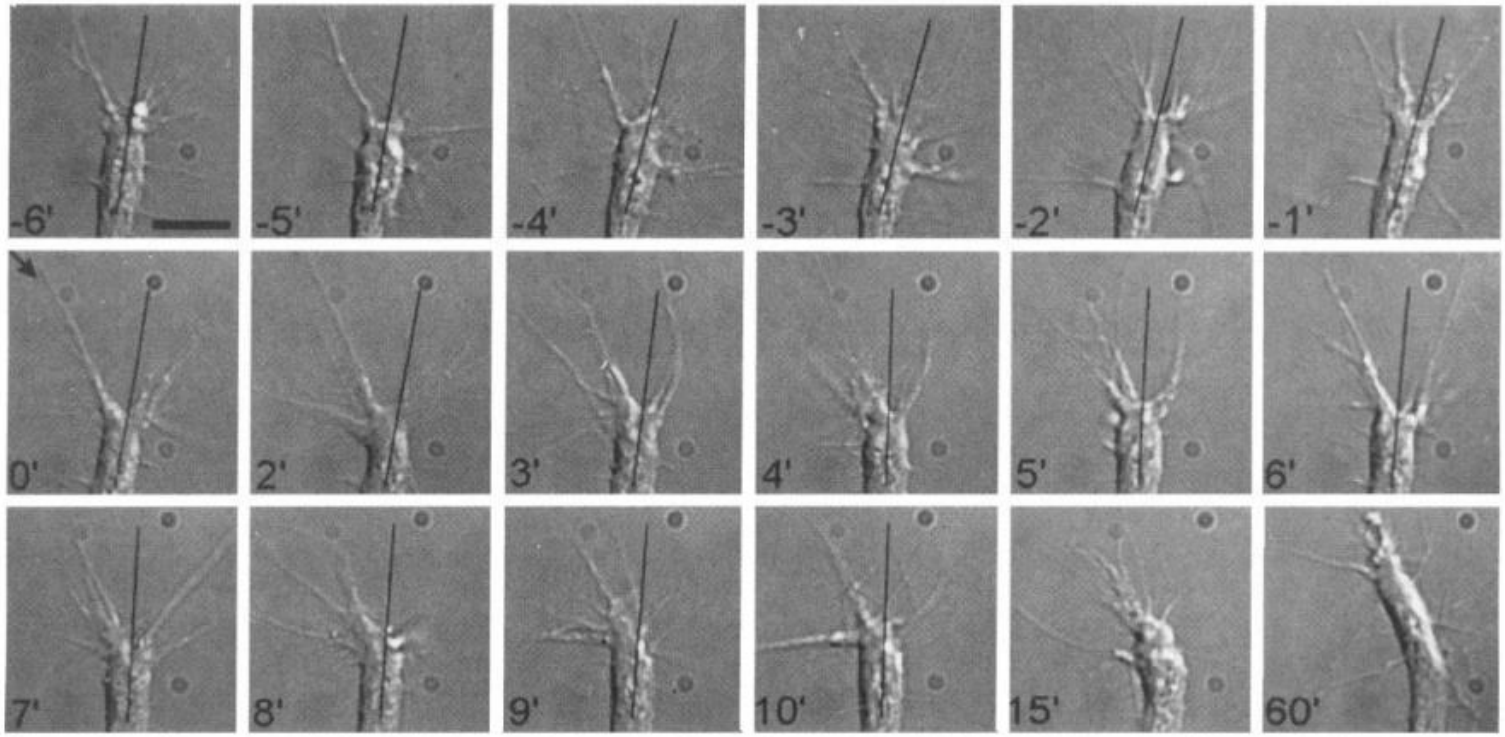


Los filopodios

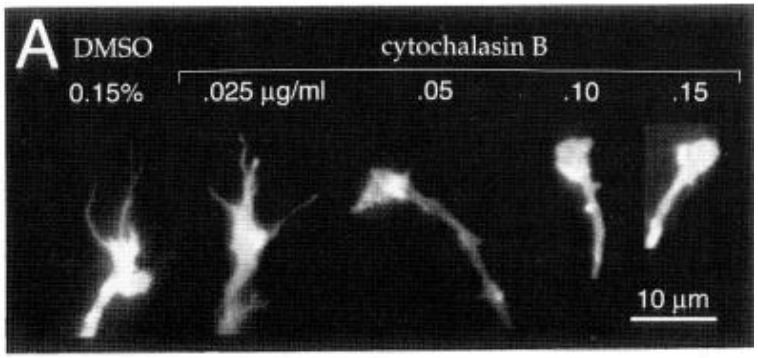


Zheng et al., 1996

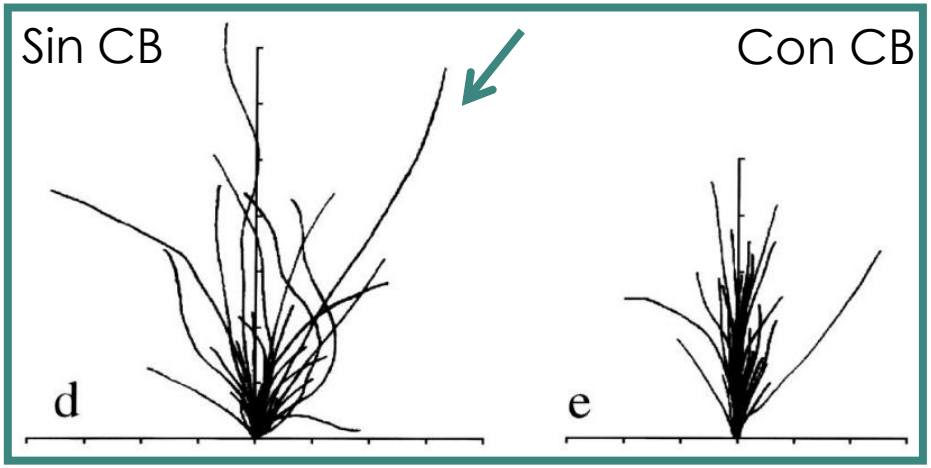
Los filopodios



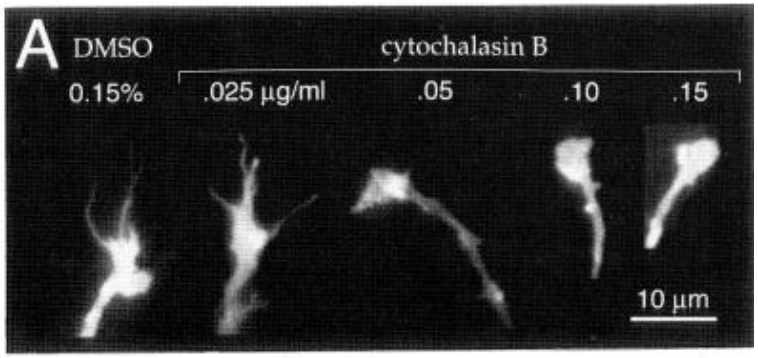
Zheng et al., 1996



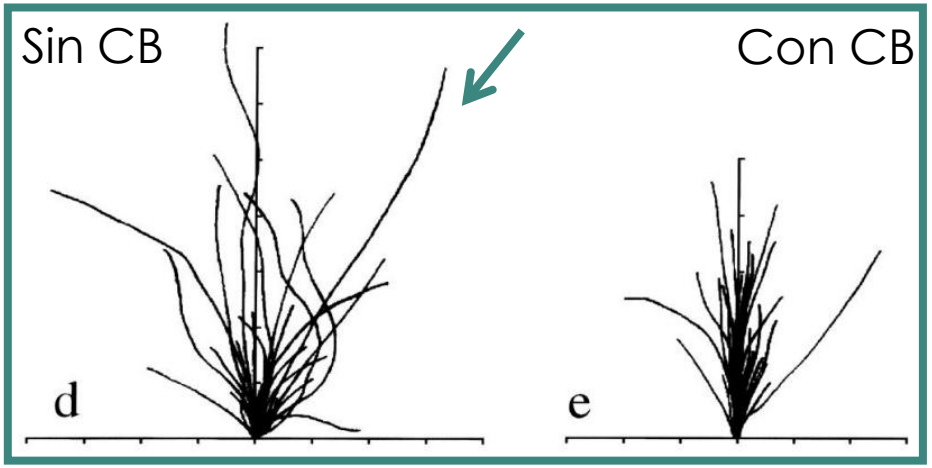
Los filopodios



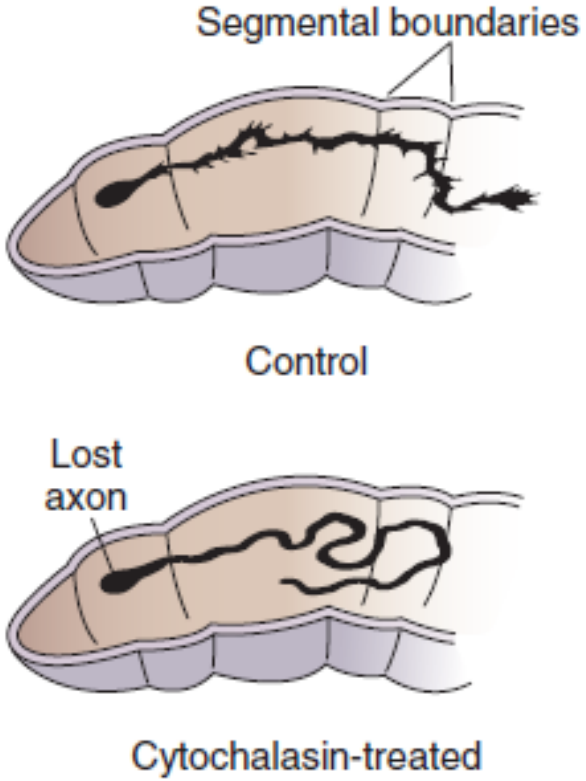
Zheng et al., 1996

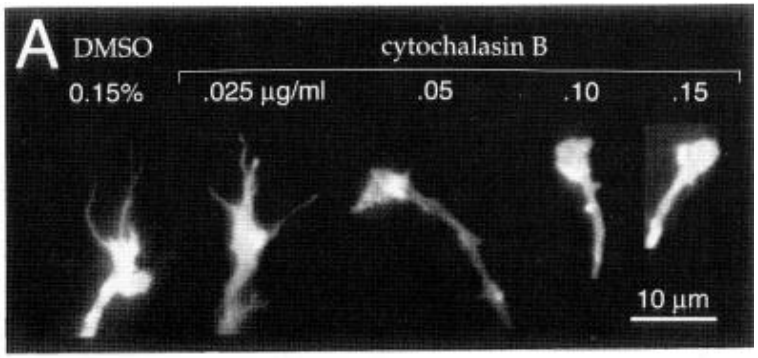


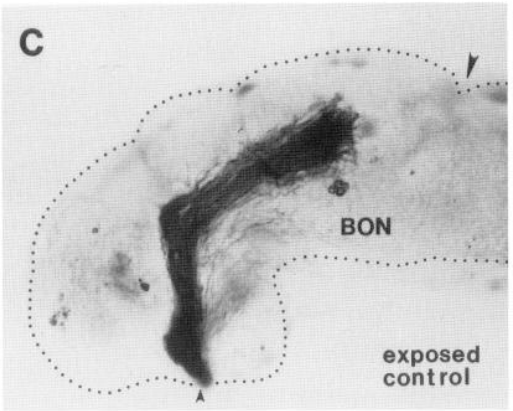
Los filopodios

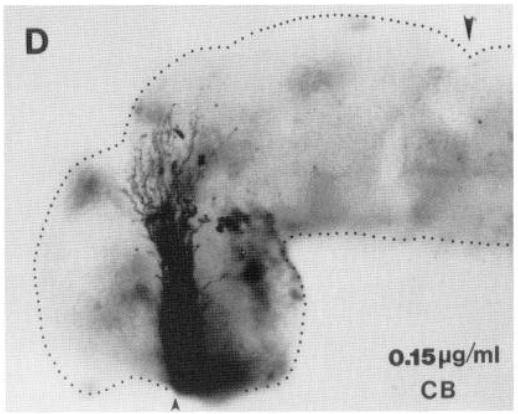


Zheng et al., 1996



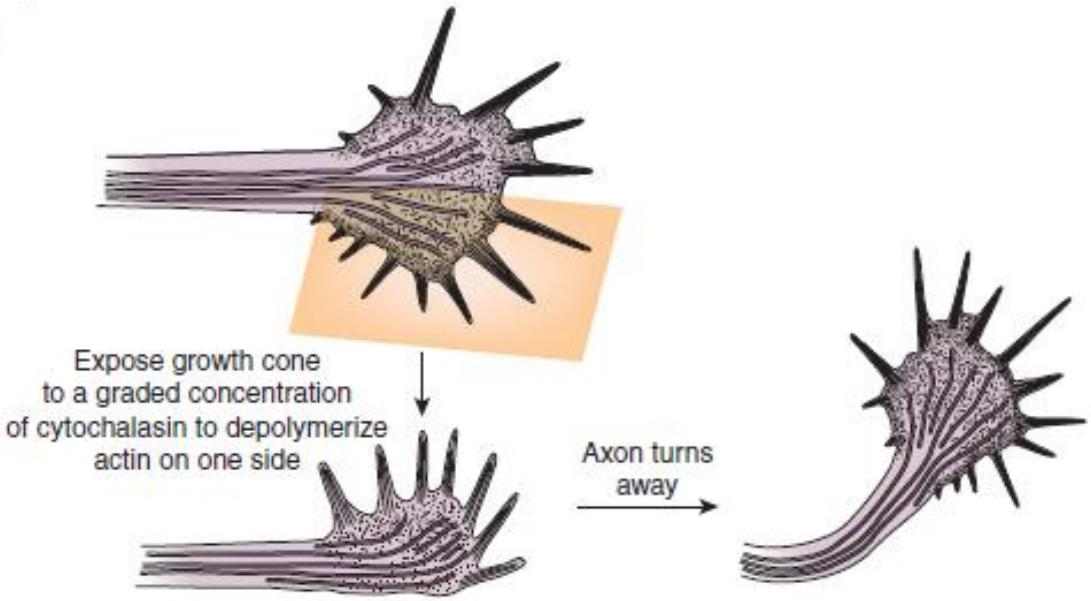


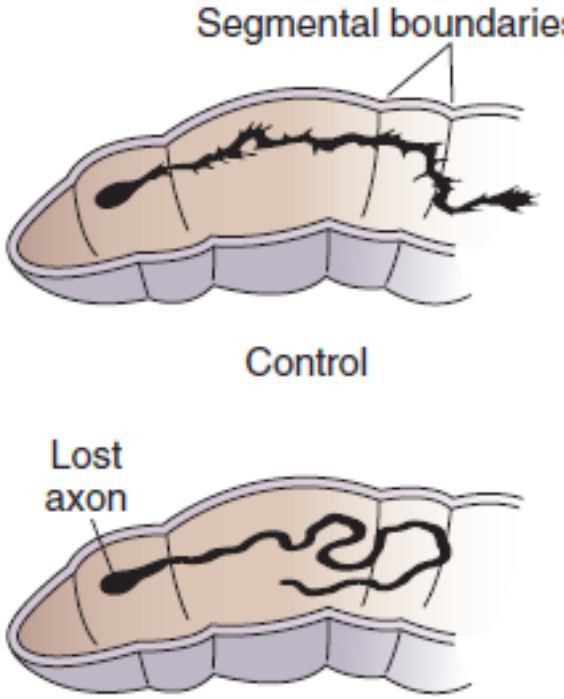


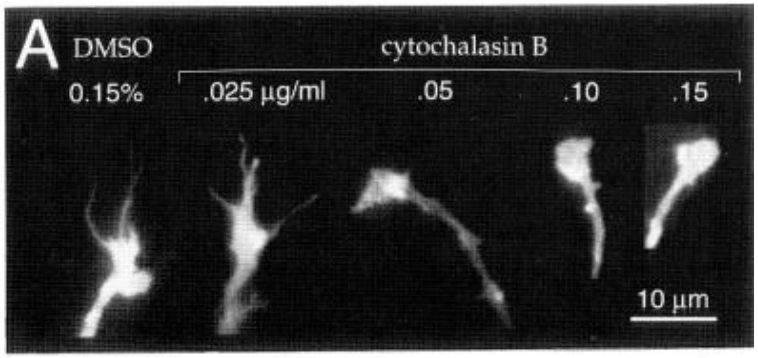


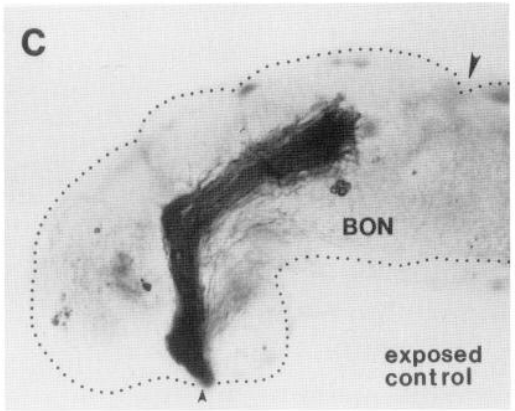
Chien et al., 1993

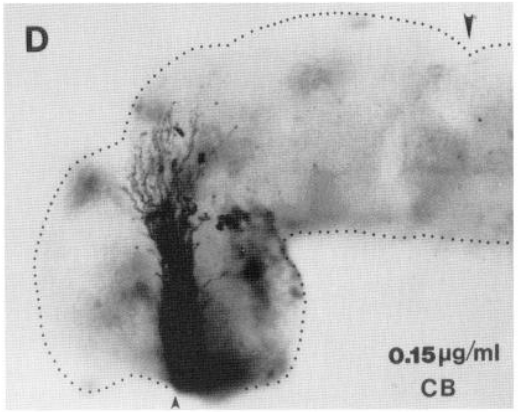
Los filopodios







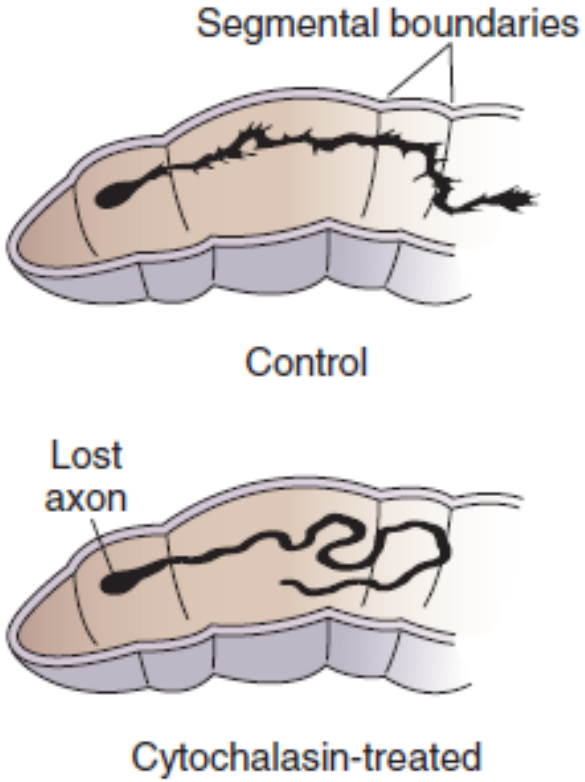


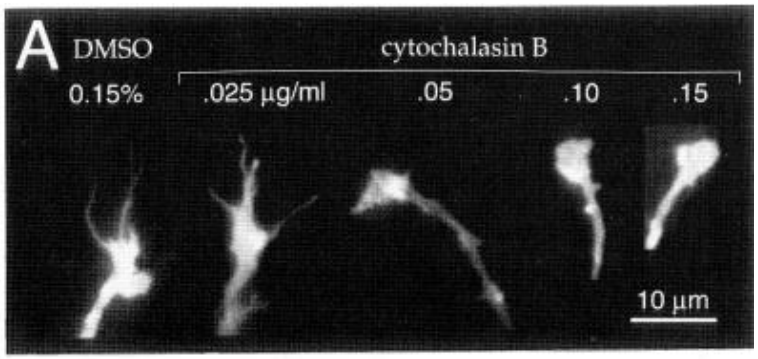


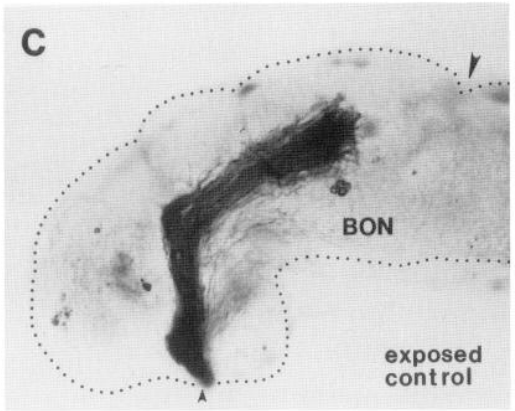
Chien et al., 1993

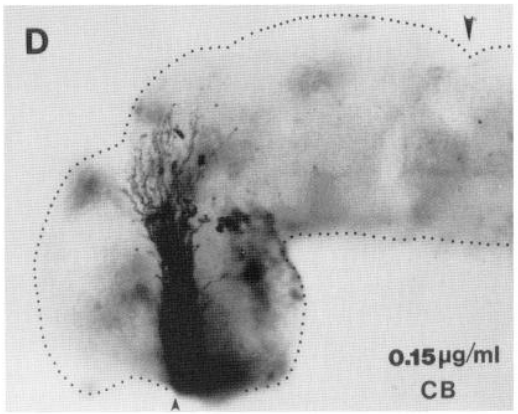
Los filopodios

Los filopodios son esenciales para la navegación del cono de crecimiento



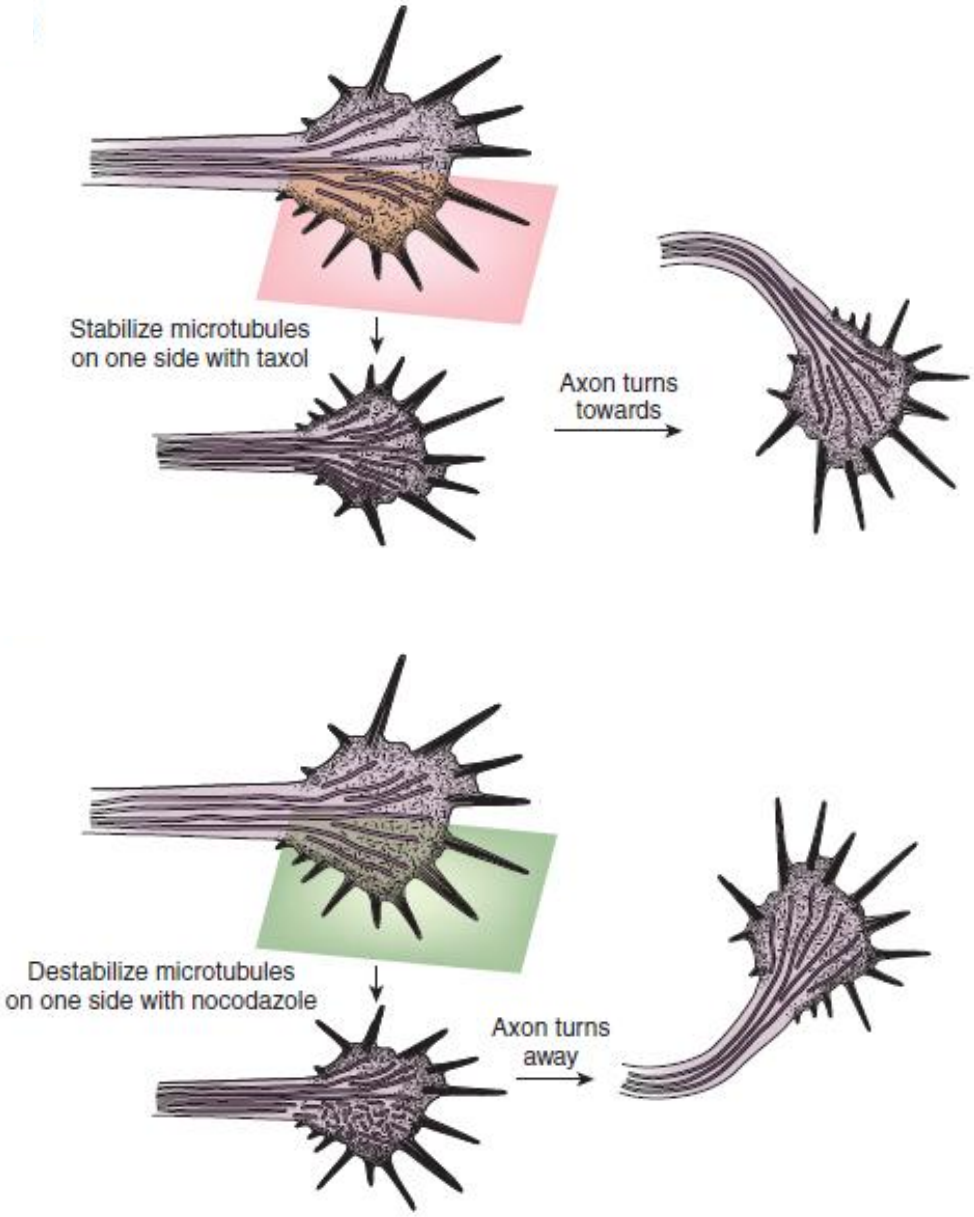




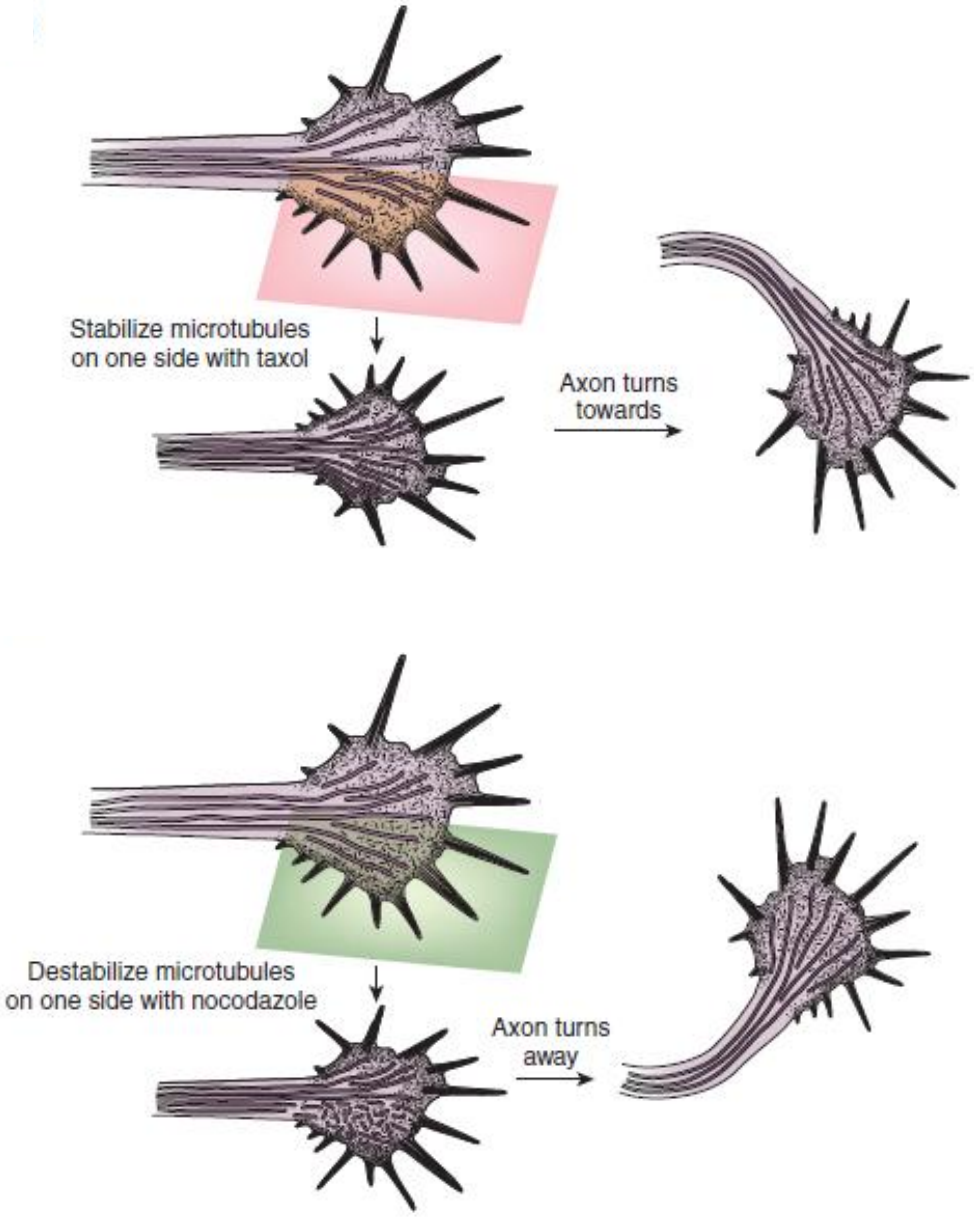


Chien et al., 1993

Los microtúbulos



Los microtúbulos



La polimerización de los MTs es esencial para la navegación del cono de crecimiento

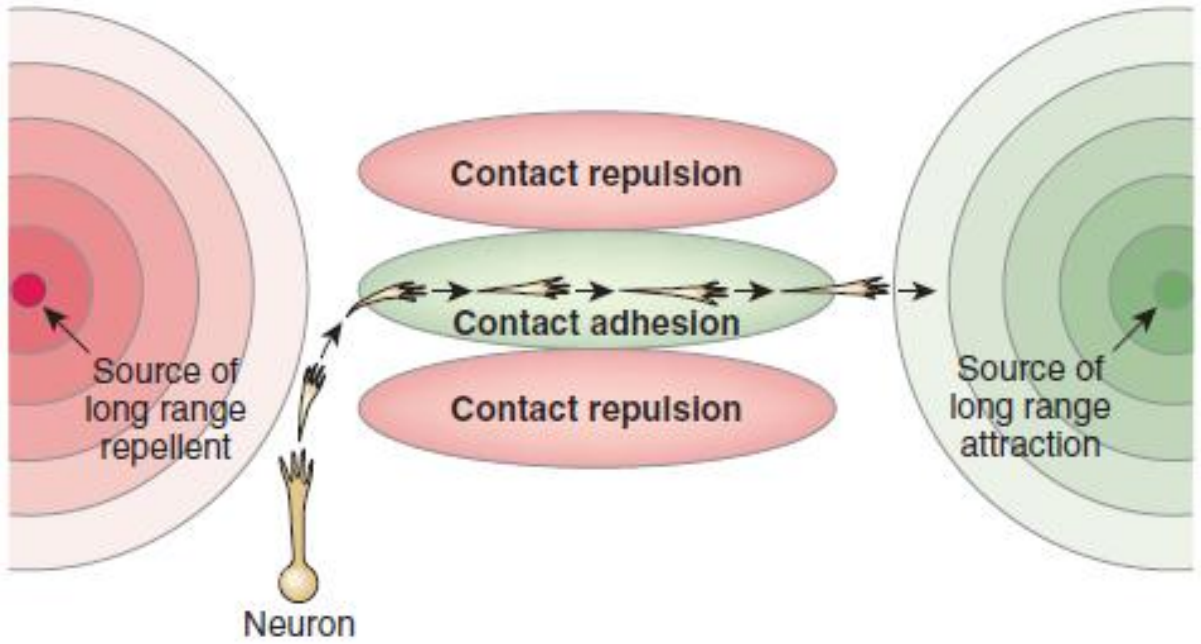
¿A quién sigue el cono?

Señales químicas

A distancia

De contacto

Estímulos mecánicos



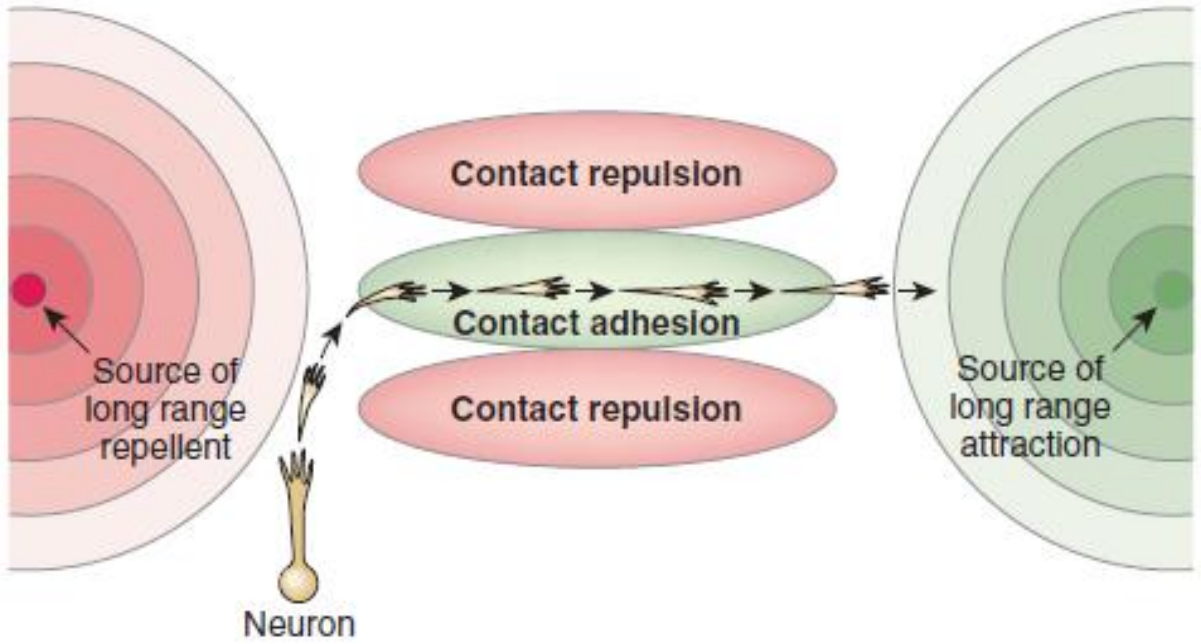
¿A quién sigue el cono?

Señales químicas

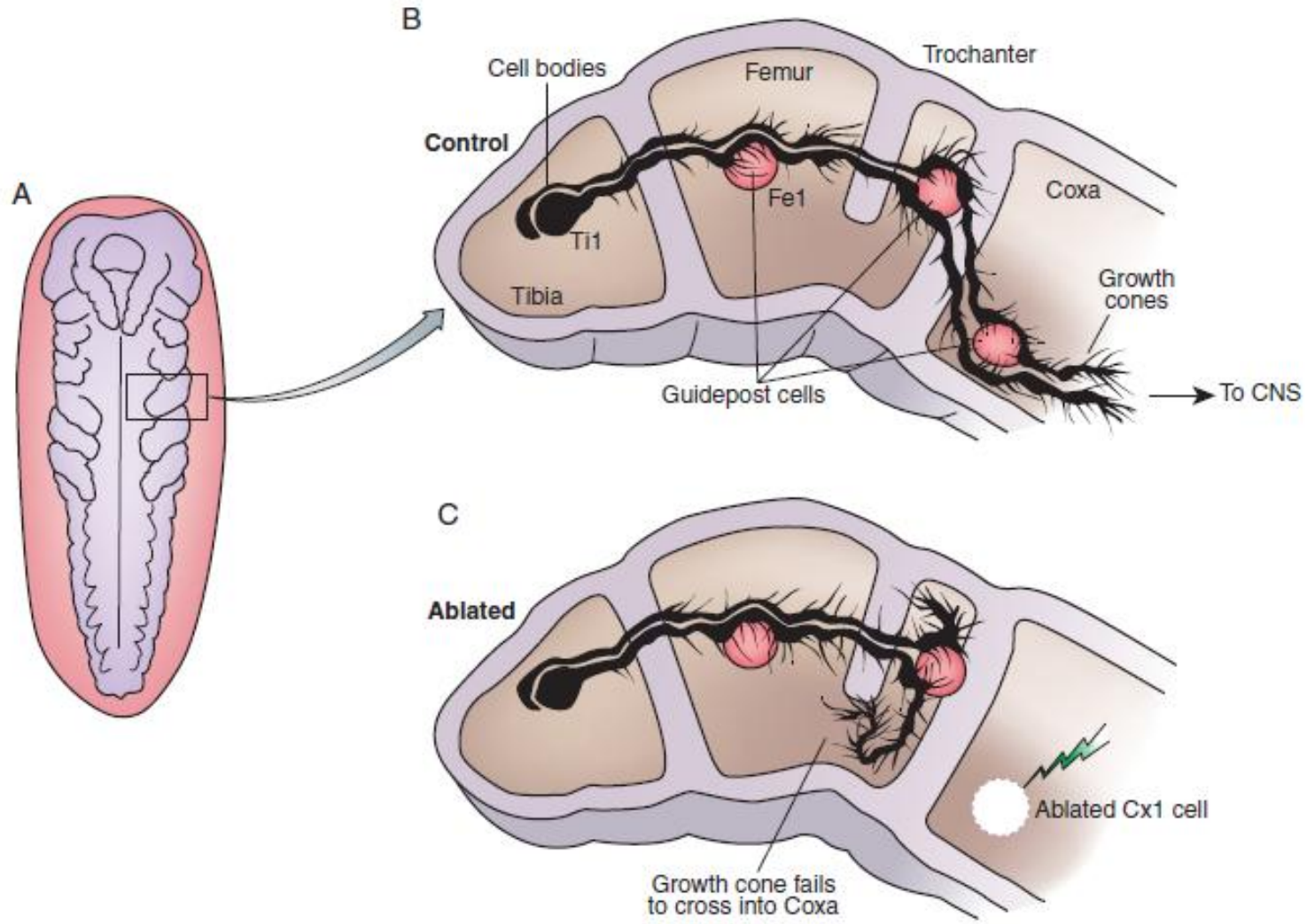
A distancia

De contacto

Estímulos mecánicos

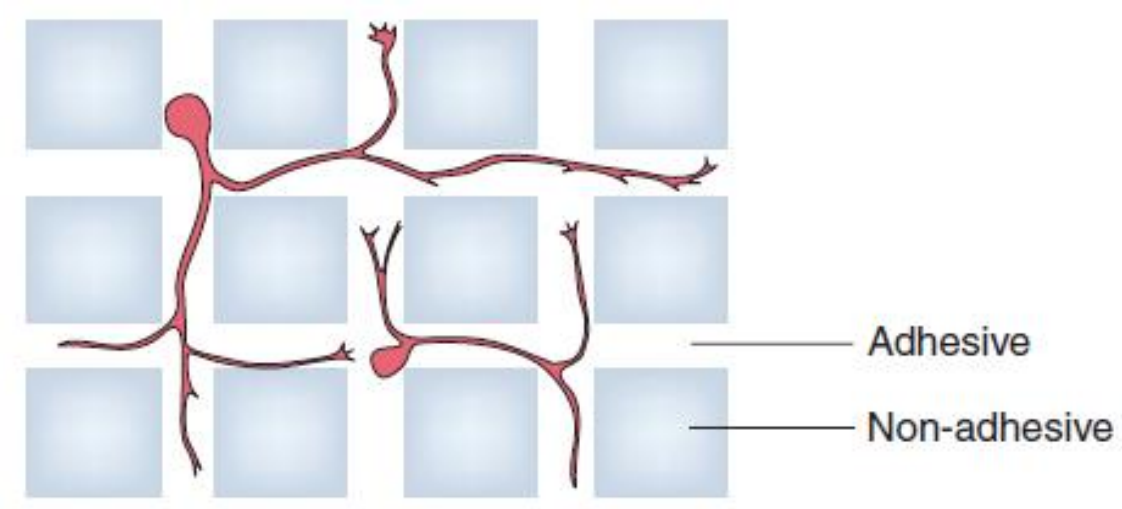


Señales locales para el guiado axonal

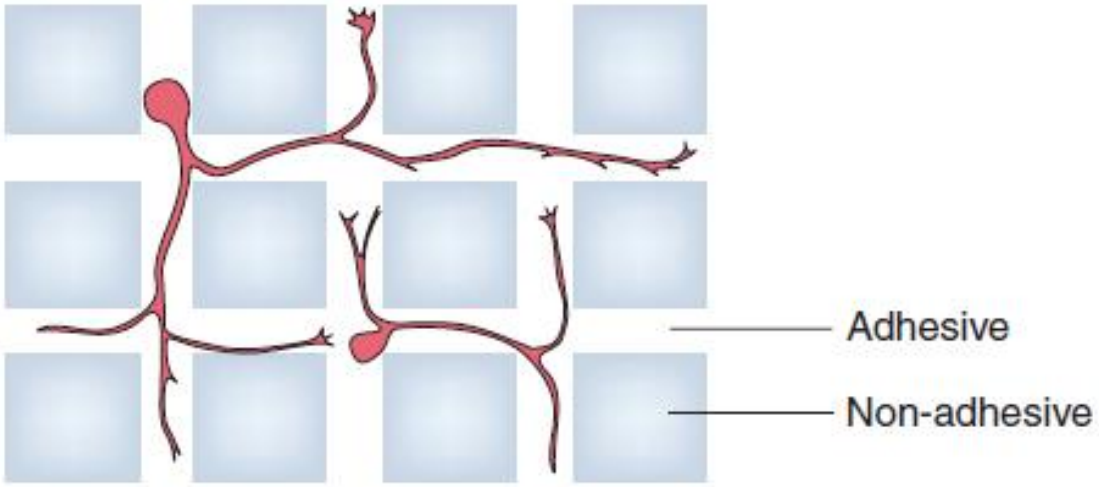


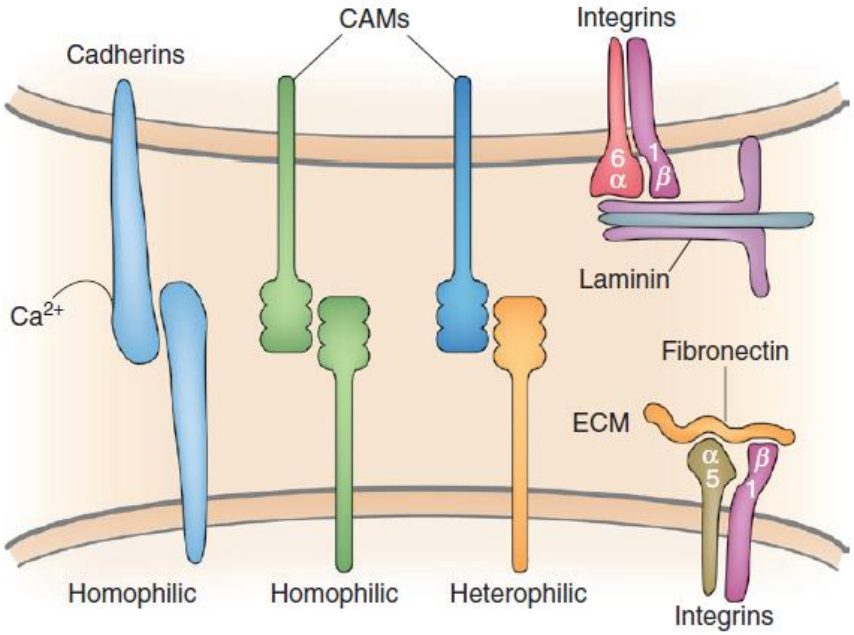
Bentley & Caudy, 1983; Caudy & Bentley, 1986

Moléculas adhesivas

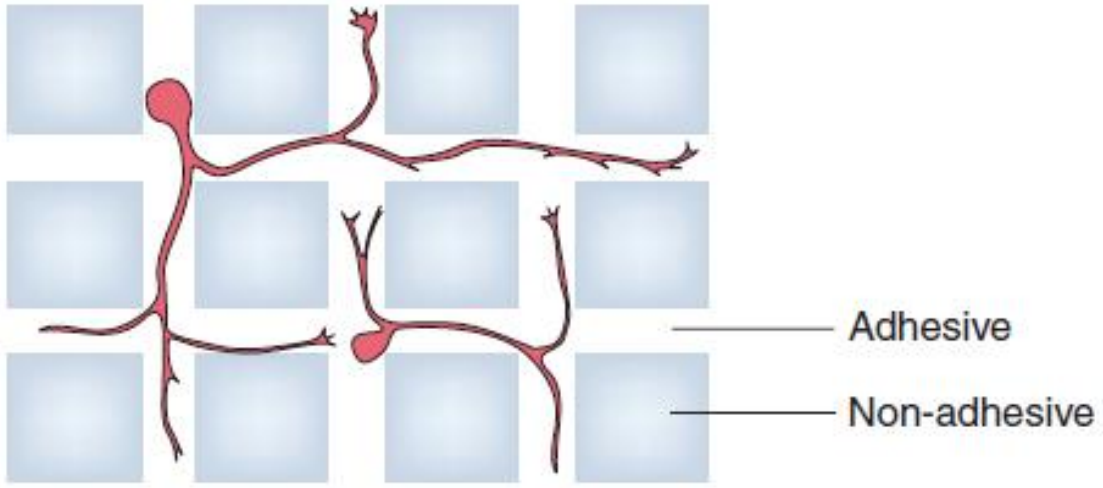


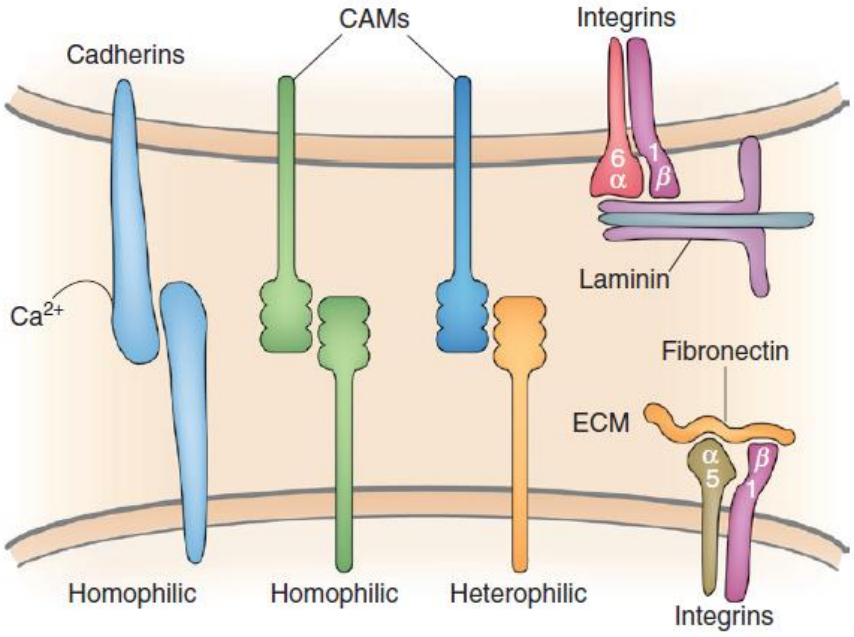
Moléculas adhesivas

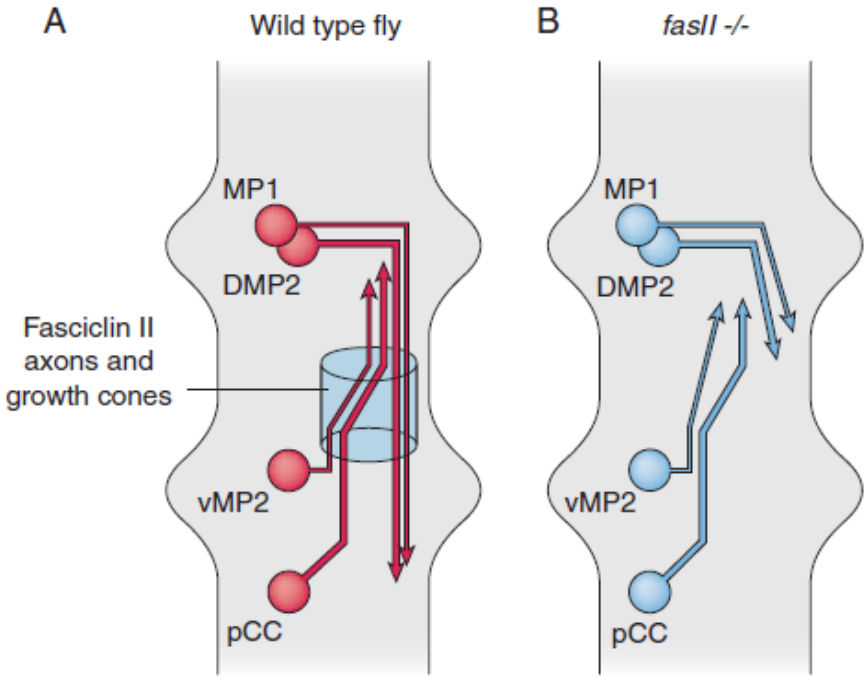




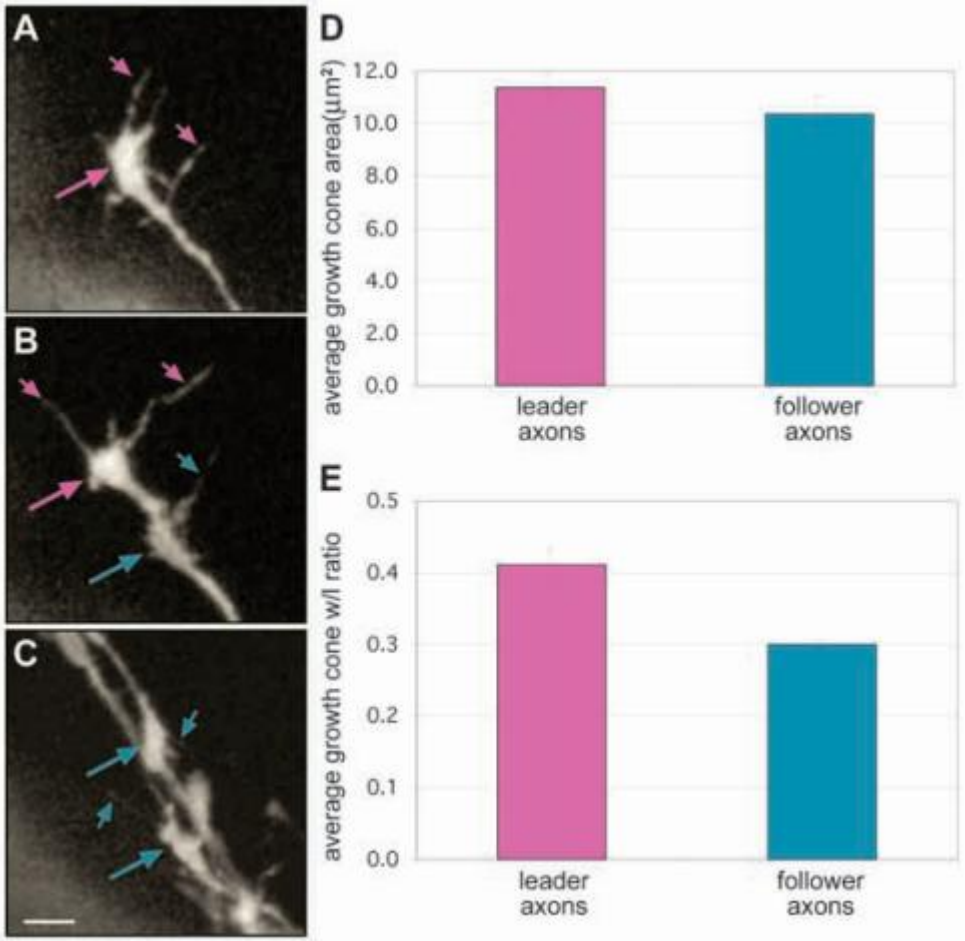
Moléculas adhesivas

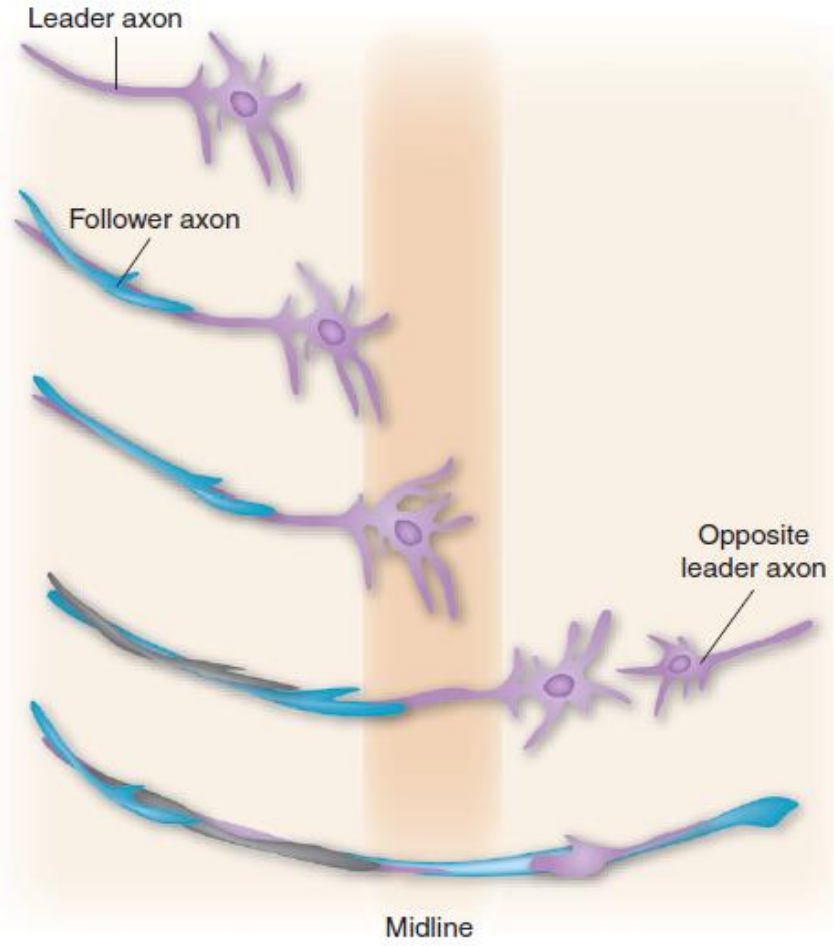






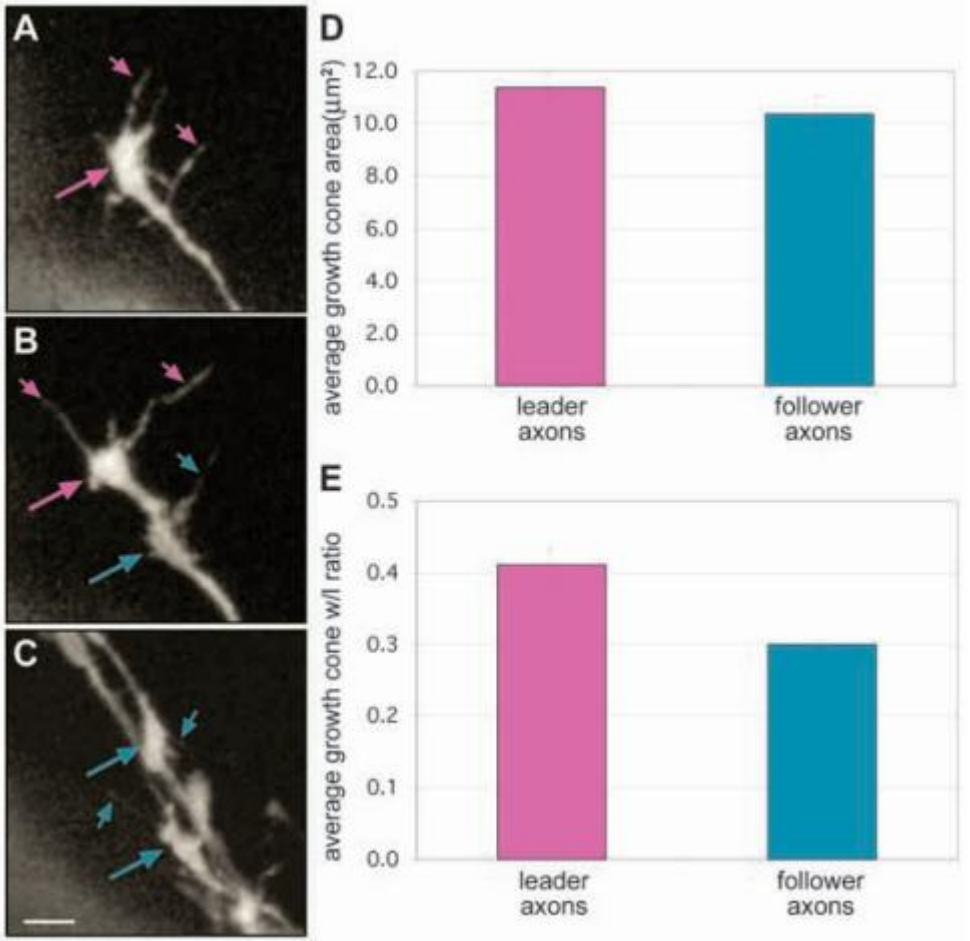
Interacción axón-axón

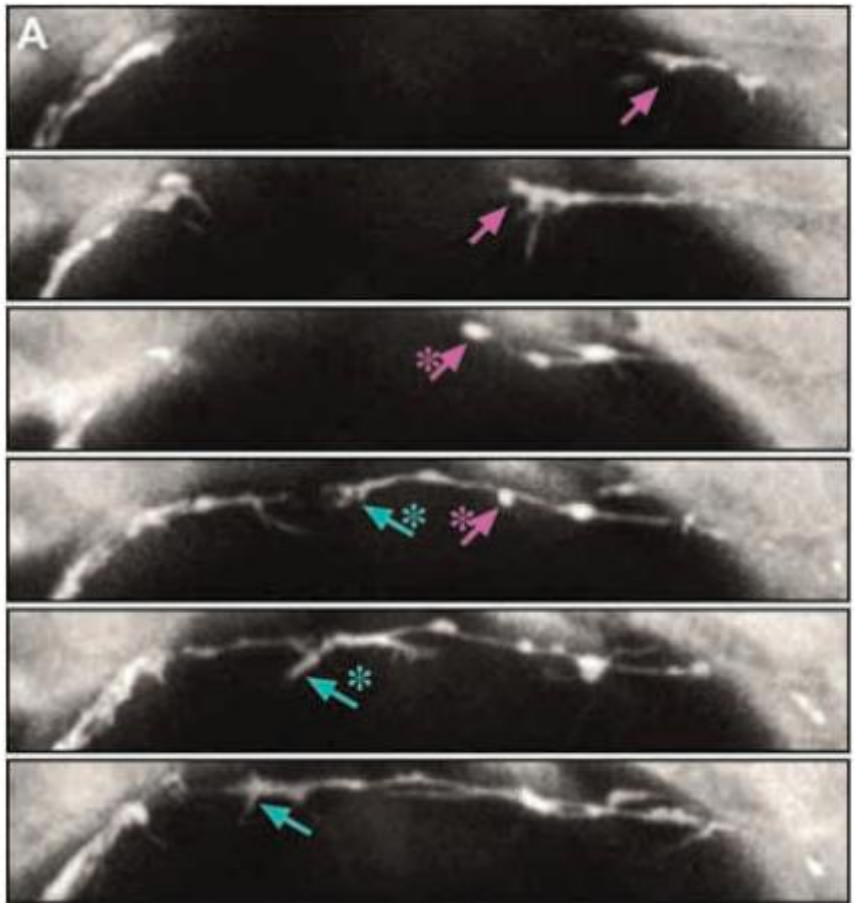




Bak & Fraser, 2003

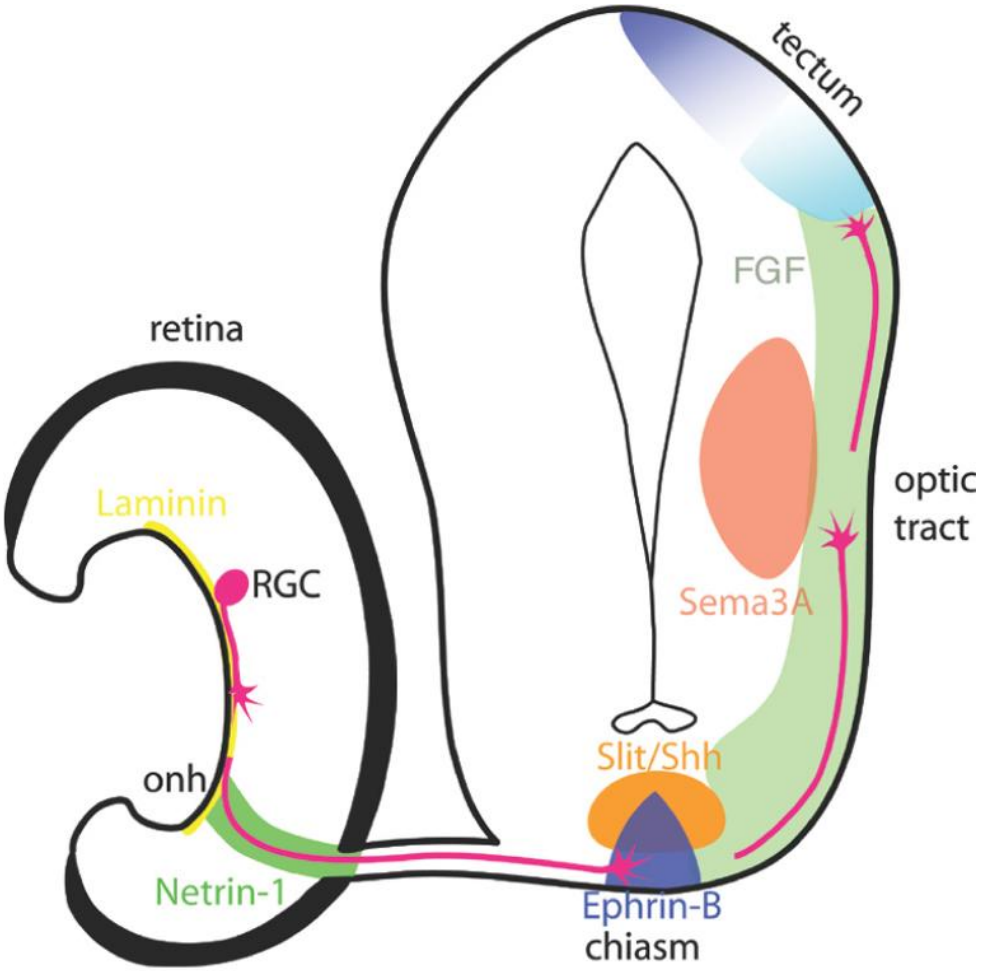
Interacción axón-axón

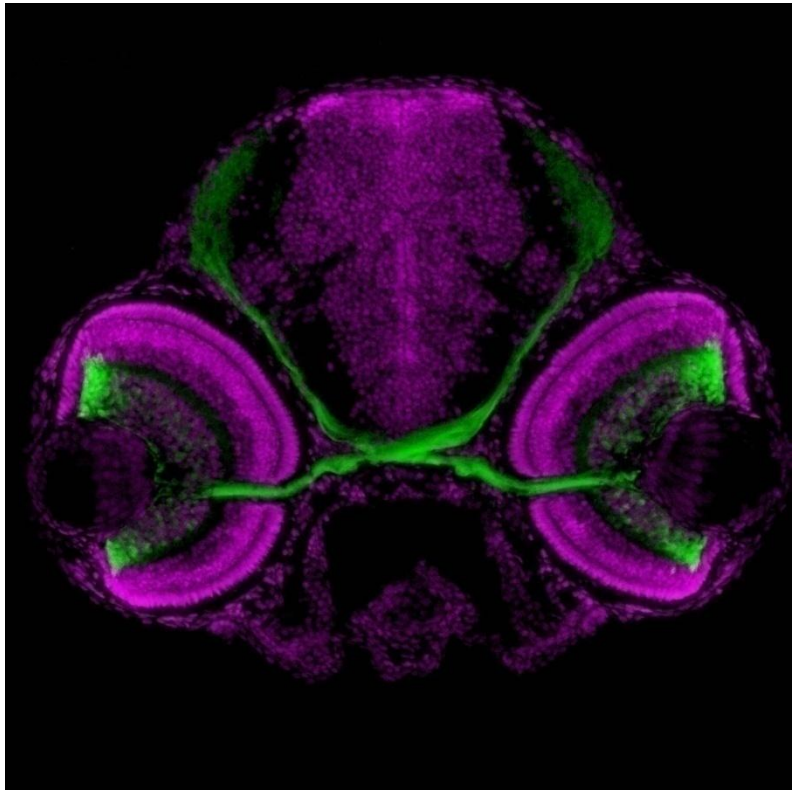




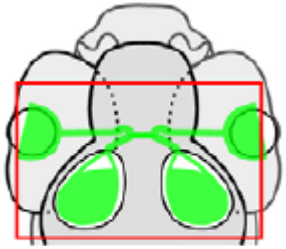
Bak & Fraser, 2003

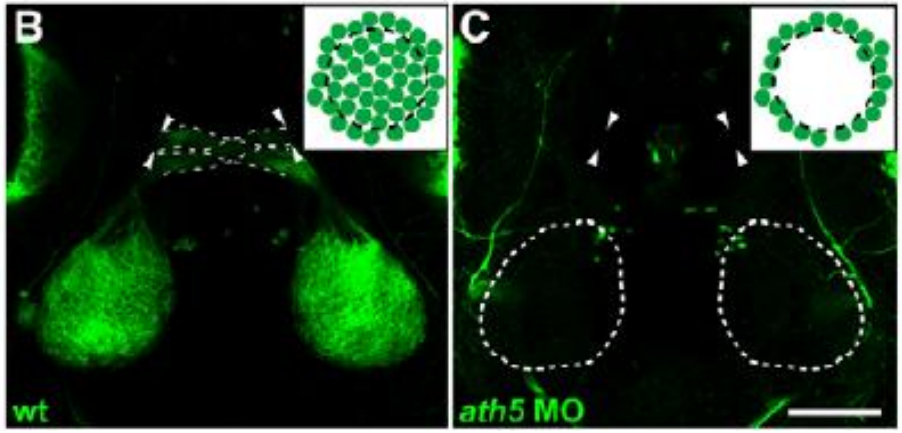
El sistema visual como modelo

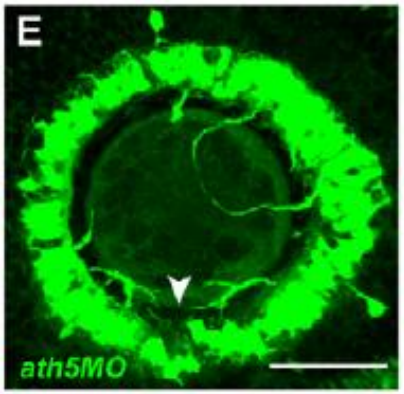




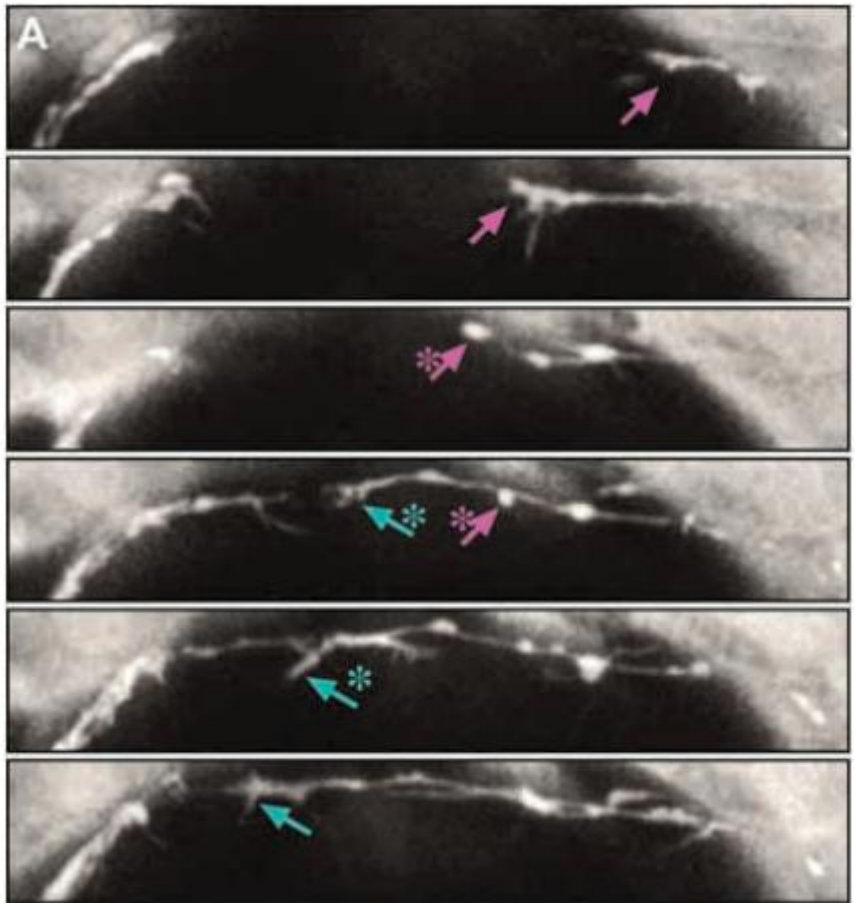
Interacción axón-axón



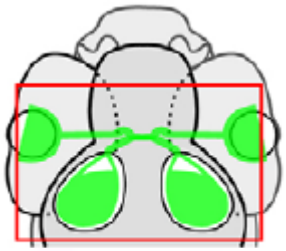


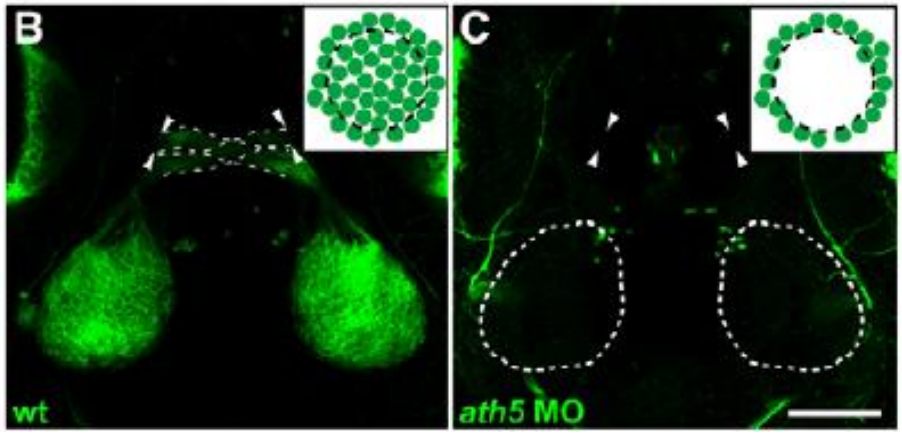


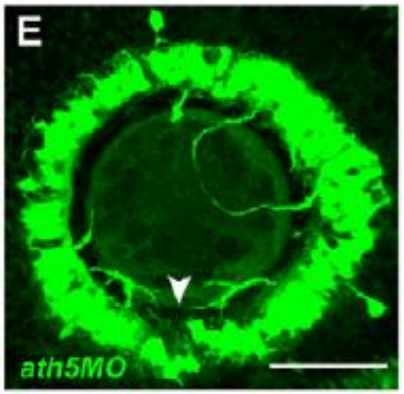
Pittman et al., 2008



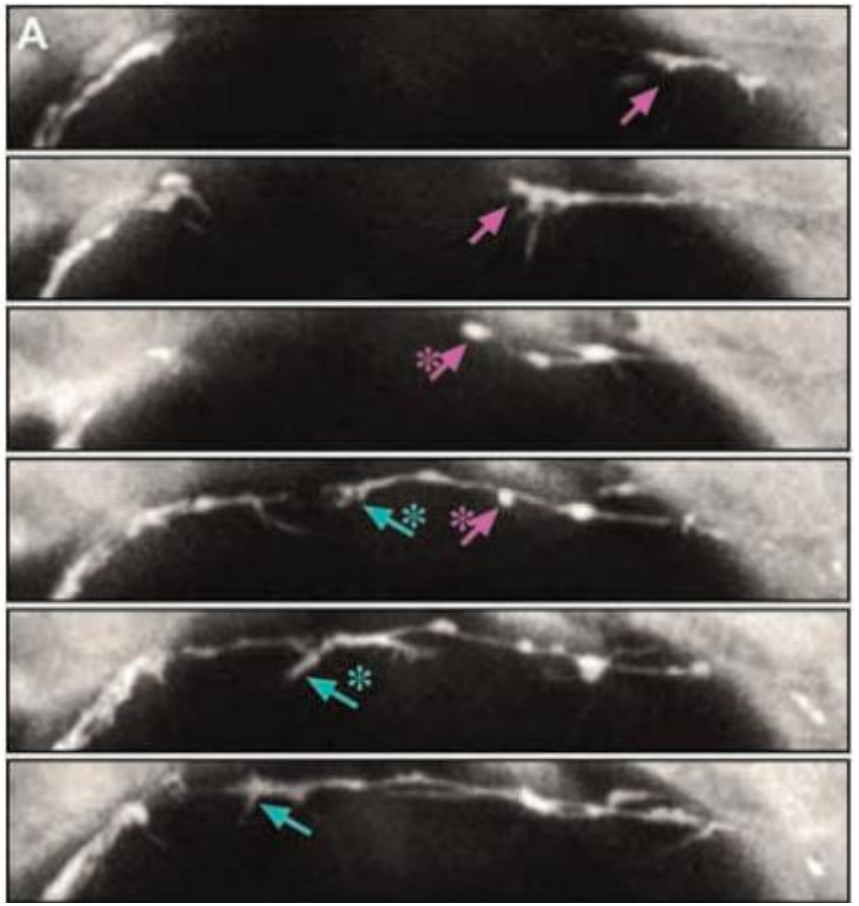
Interacción axón-axón





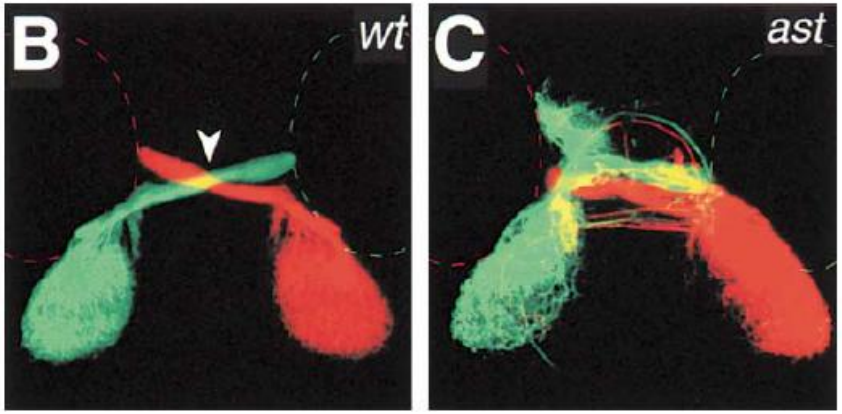


Pittman et al., 2008

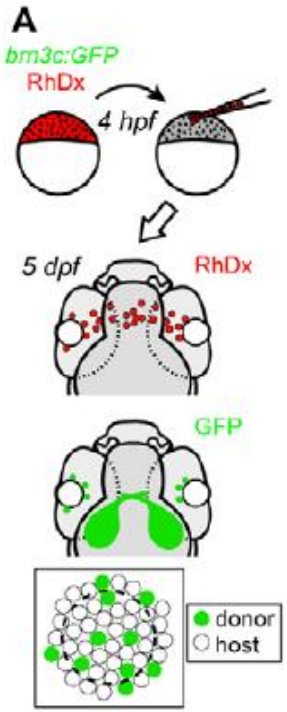


La eliminación de los axones pioneros es variable de acuerdo al tipo neuronal y la cantidad que se elimine

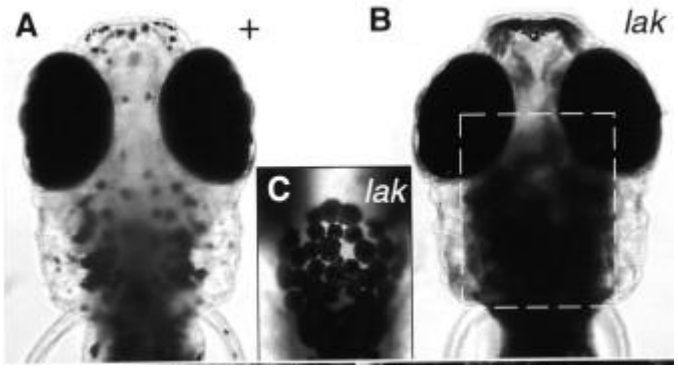
Interacción axón-axón



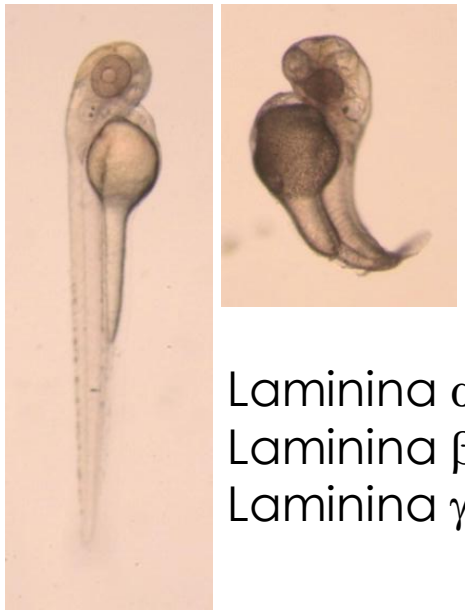
Hutson & Chien, 2002



Un pequeño paréntesis

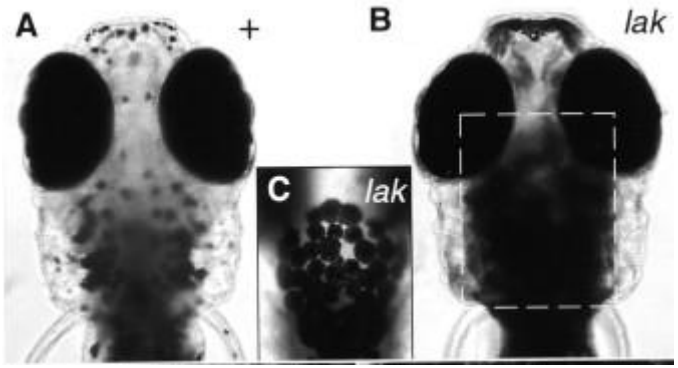


Kay et al., 2001

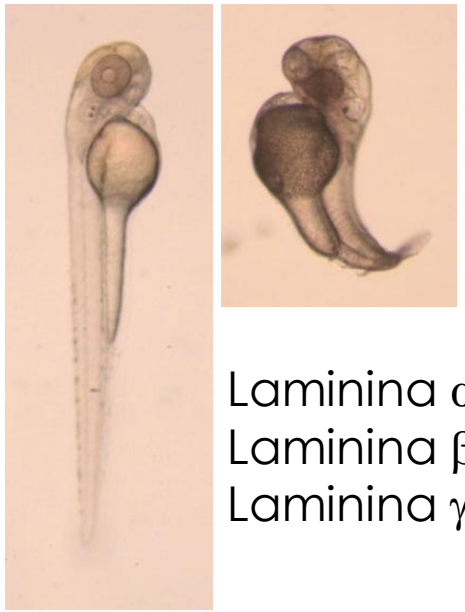


Laminina $\alpha 1$
Laminina $\beta 1$
Laminina $\gamma 1$

Un pequeño paréntesis

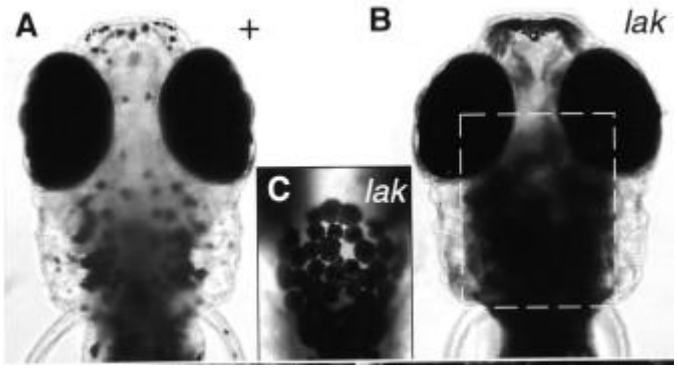


Kay et al., 2001

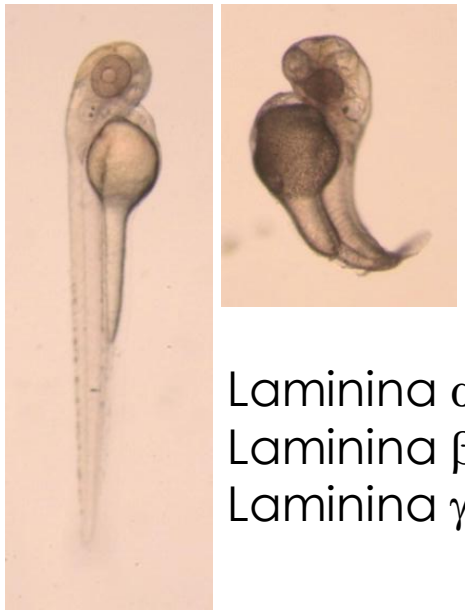


Laminina $\alpha 1$
Laminina $\beta 1$
Laminina $\gamma 1$

Un pequeño paréntesis

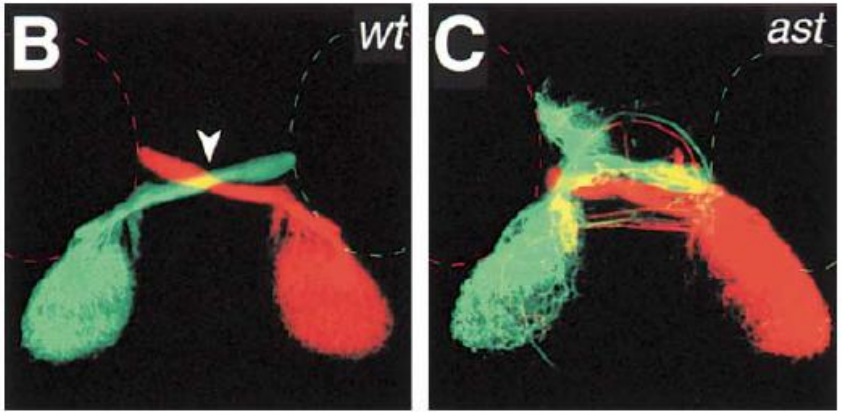


Kay et al., 2001

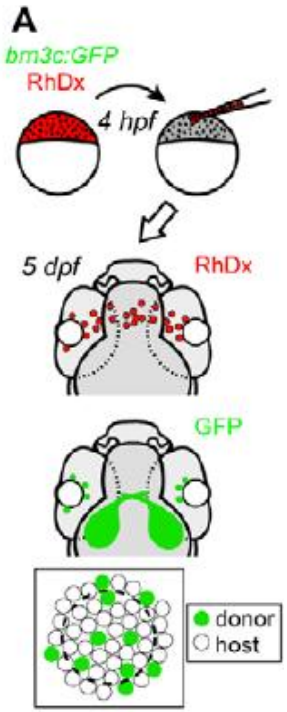


Laminina α1: bashful
Laminina β1: grumpy
Laminina γ1: sleepy

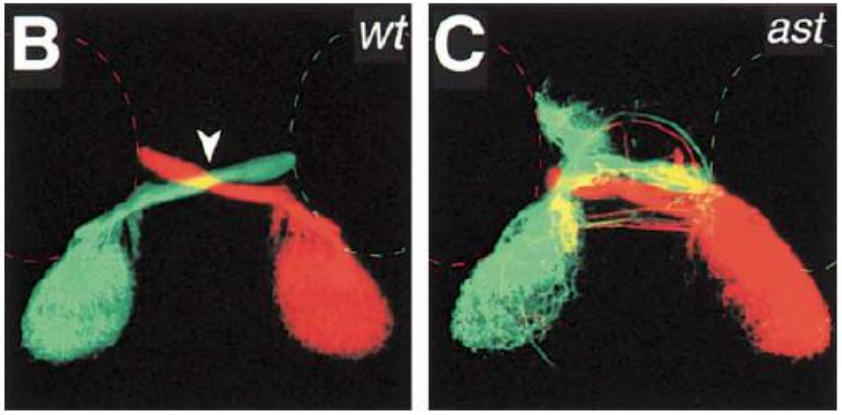
Interacción axón-axón



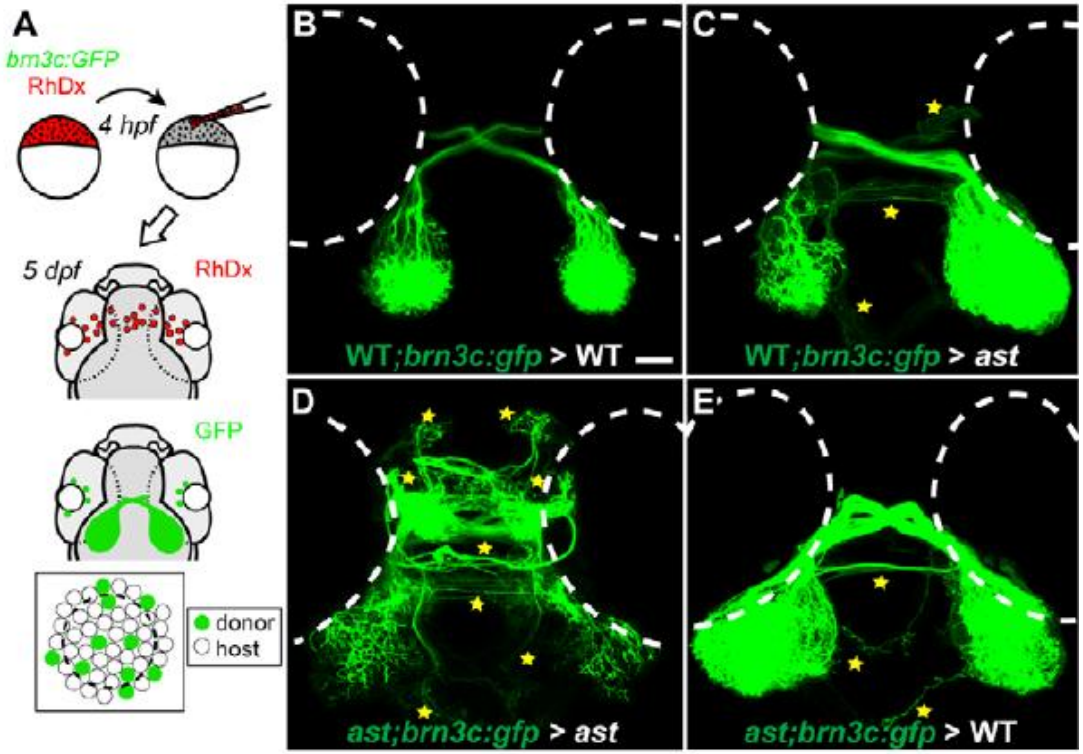
Hutson & Chien, 2002



Interacción axón-axón

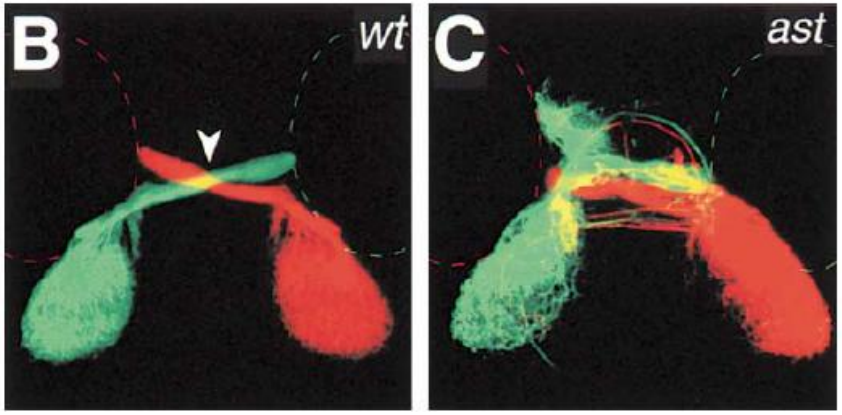


Hutson & Chien, 2002



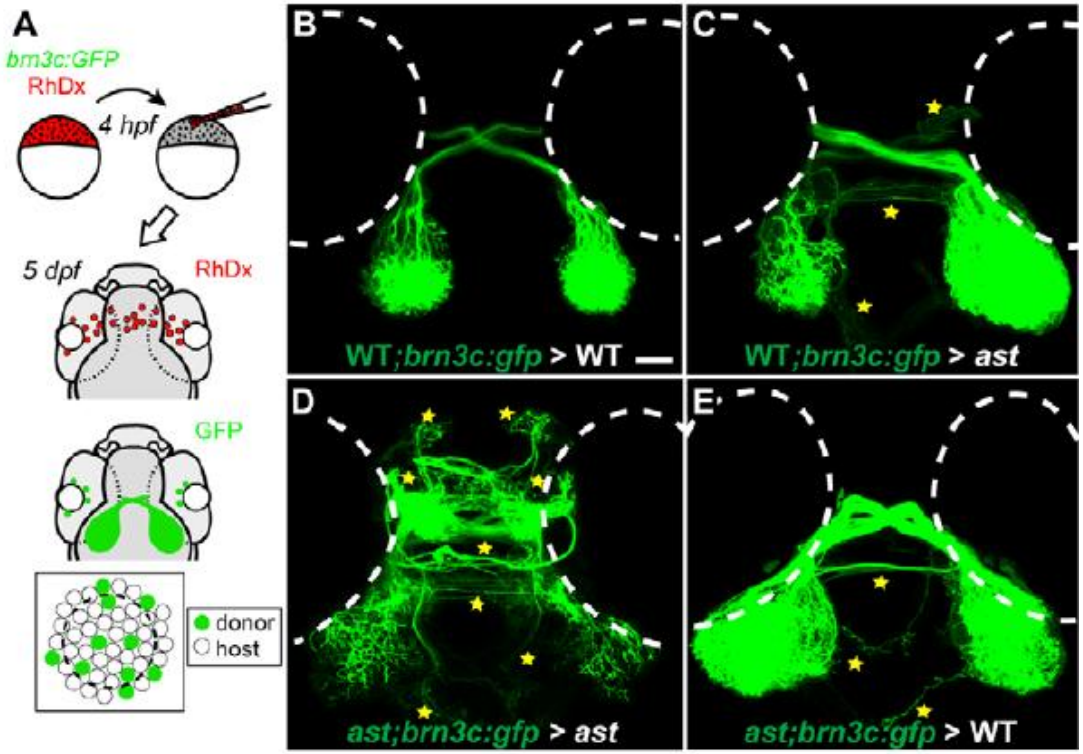
Pittman et al., 2008

Interacción axón-axón



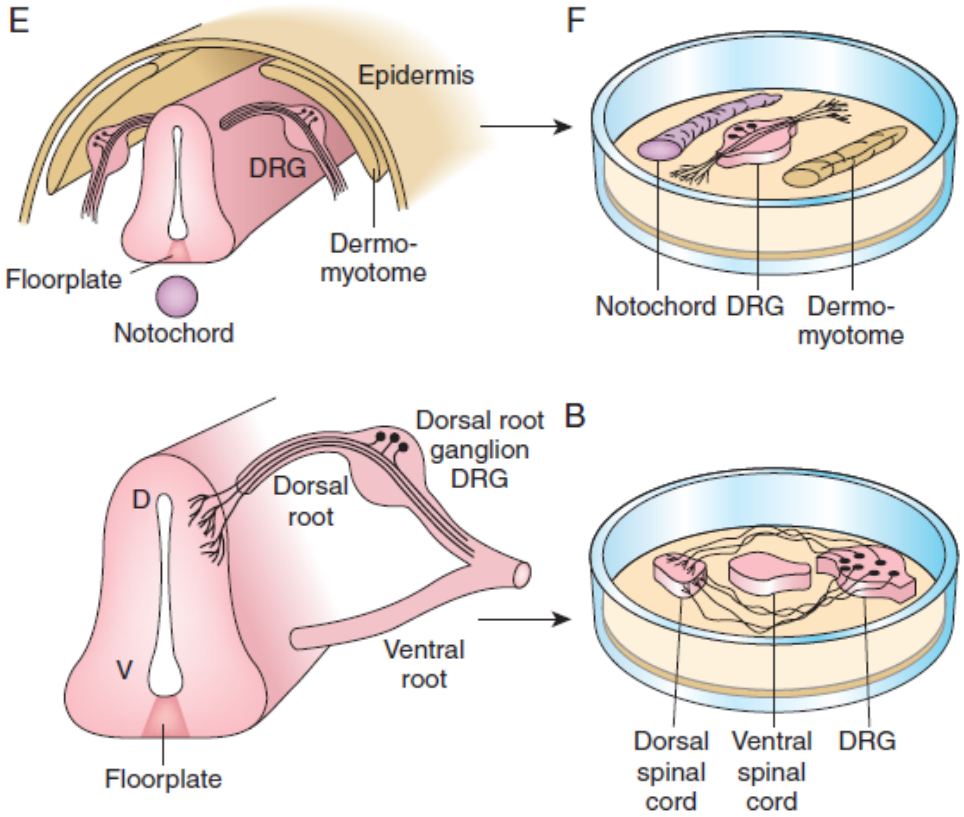
Hutson & Chien, 2002

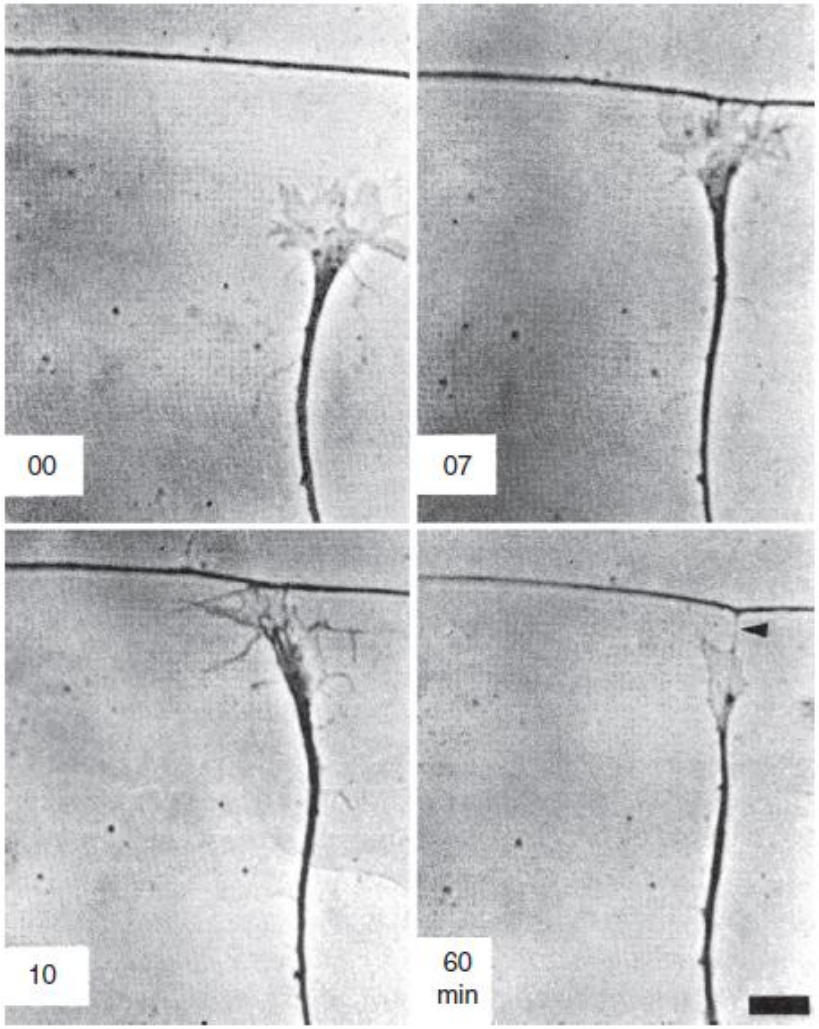
Los axones salvajes pueden equivocarse si siguen a un axón errado, y viceversa



Pittman et al., 2008

Señales repulsivas





Kapfhammer & Raper, 1987

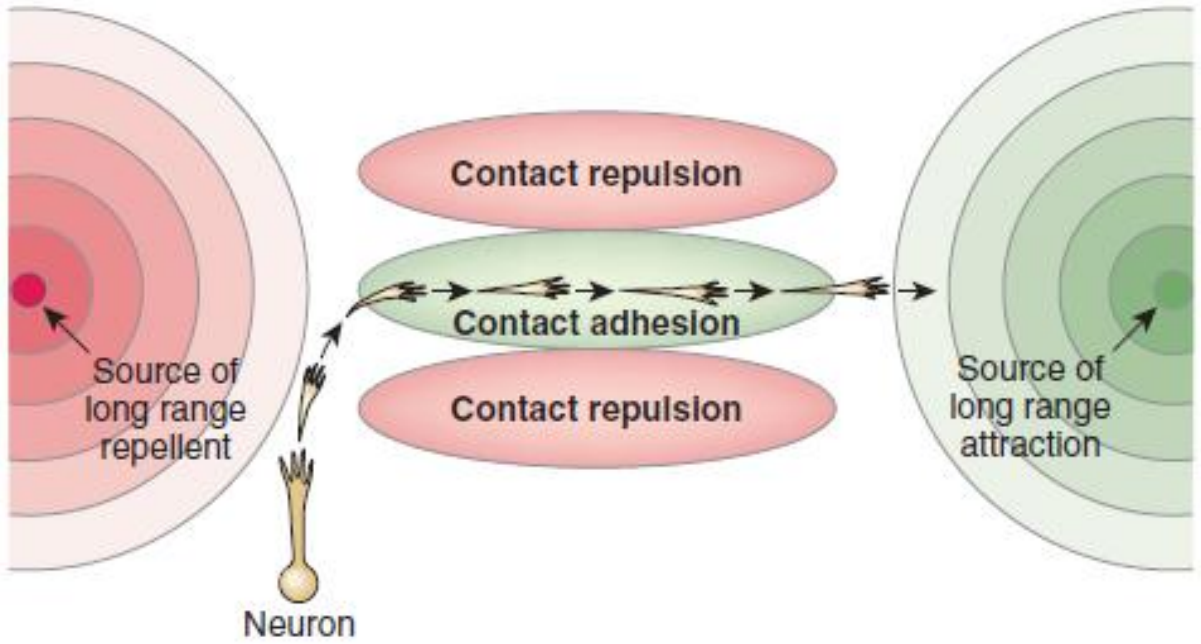
¿A quién sigue el cono?

Señales químicas

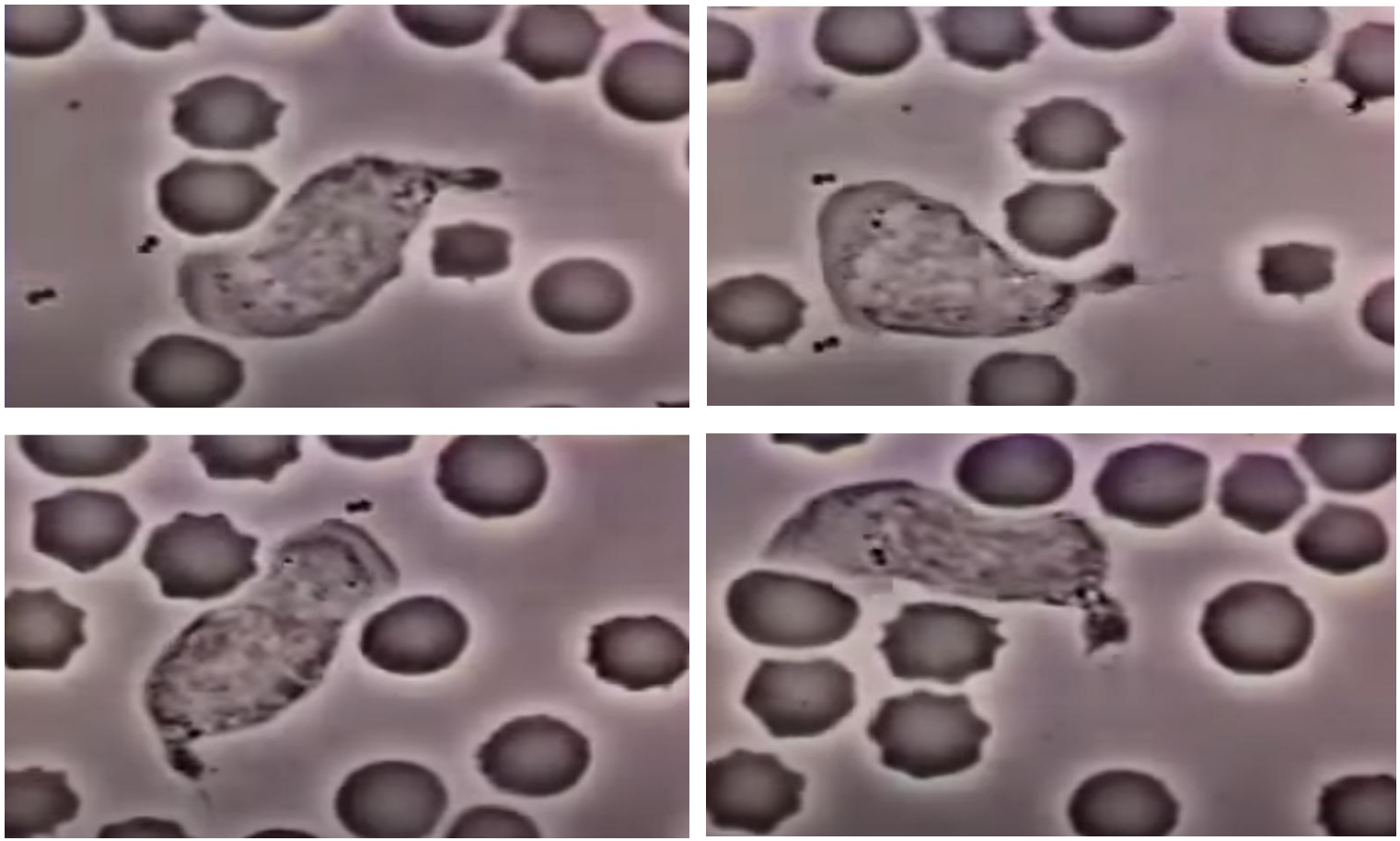
A distancia

De contacto

Estímulos mecánicos

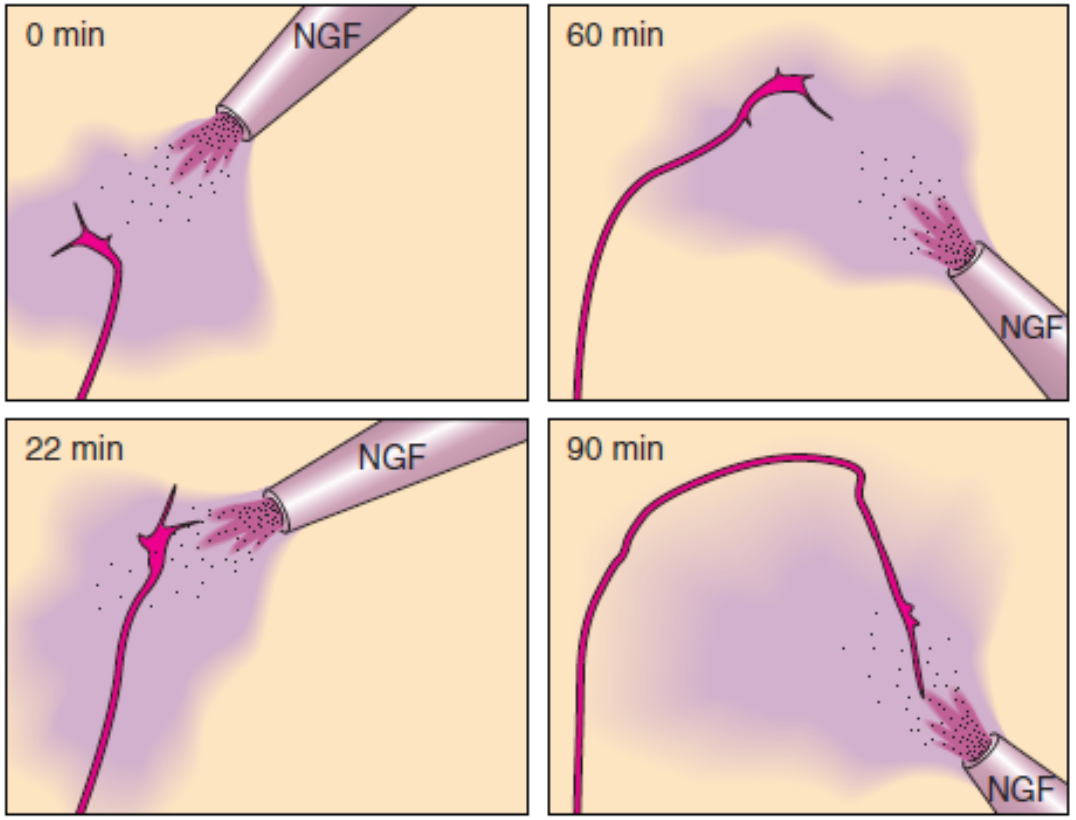


Señales a distancia

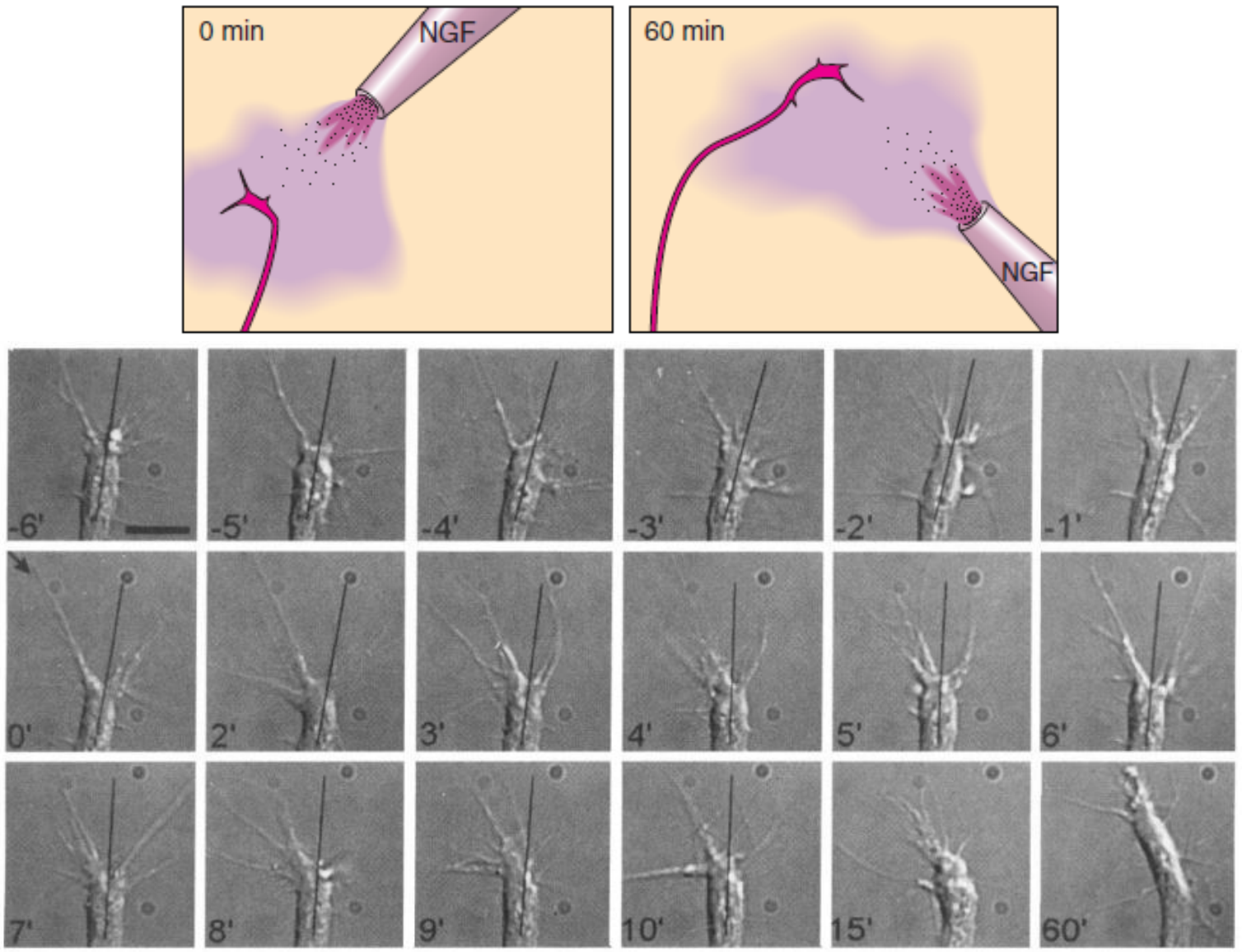


https://www.youtube.com/watch?v=I_xh-bkiv_c

Señales a distancia

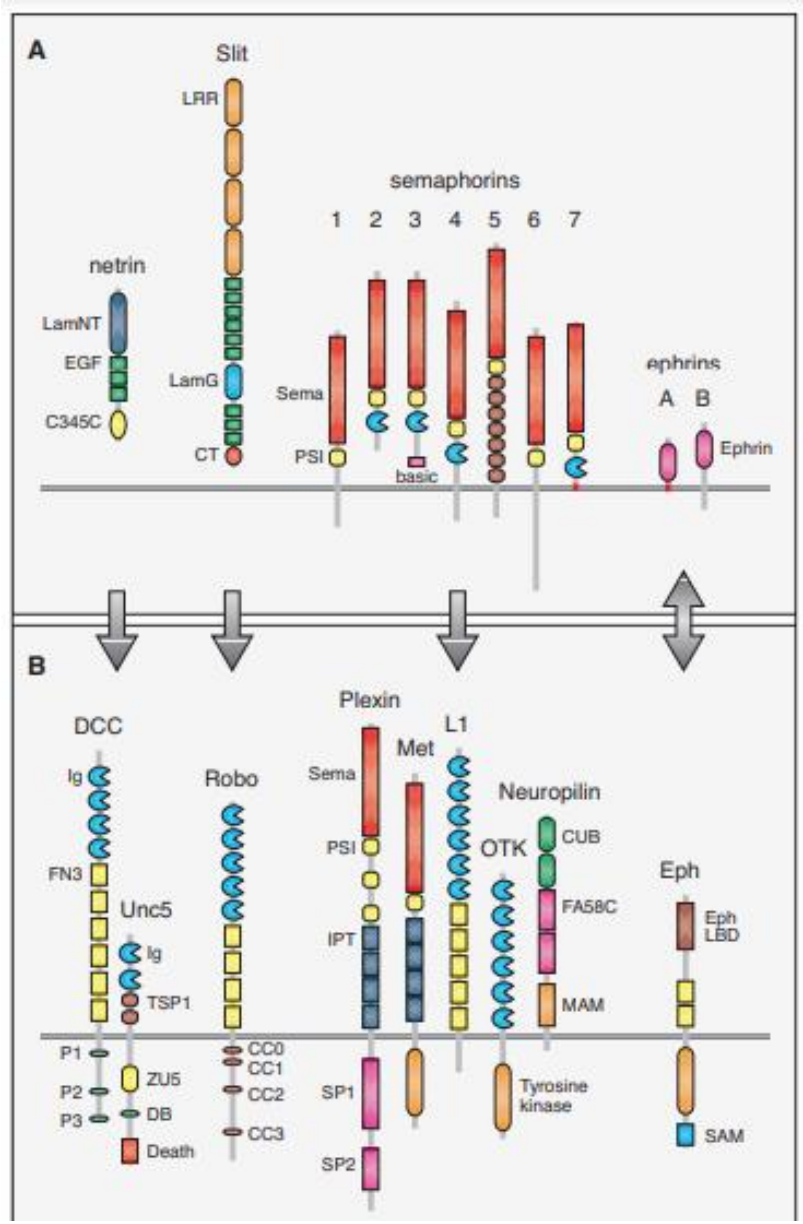


Señales a distancia



Zheng et al., 1996

Señales a distancia

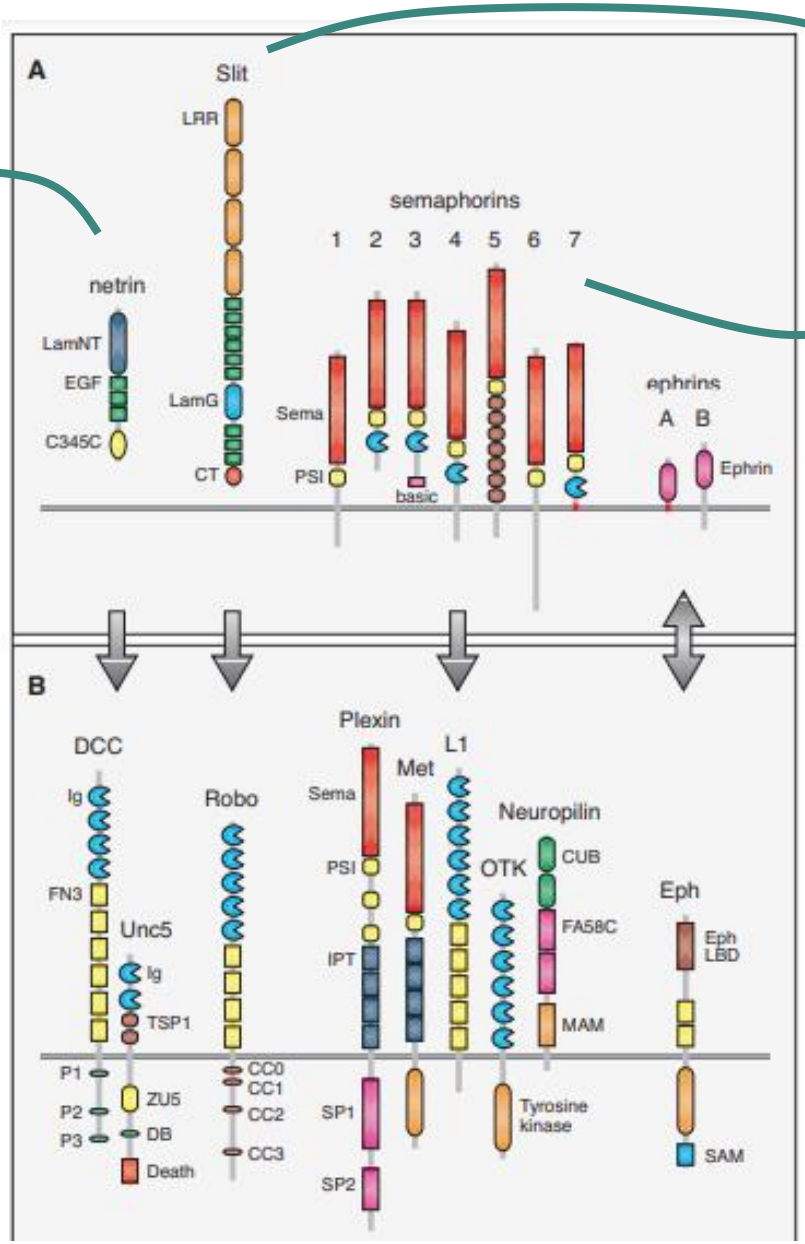


Dickson, 2002

Señales a distancia

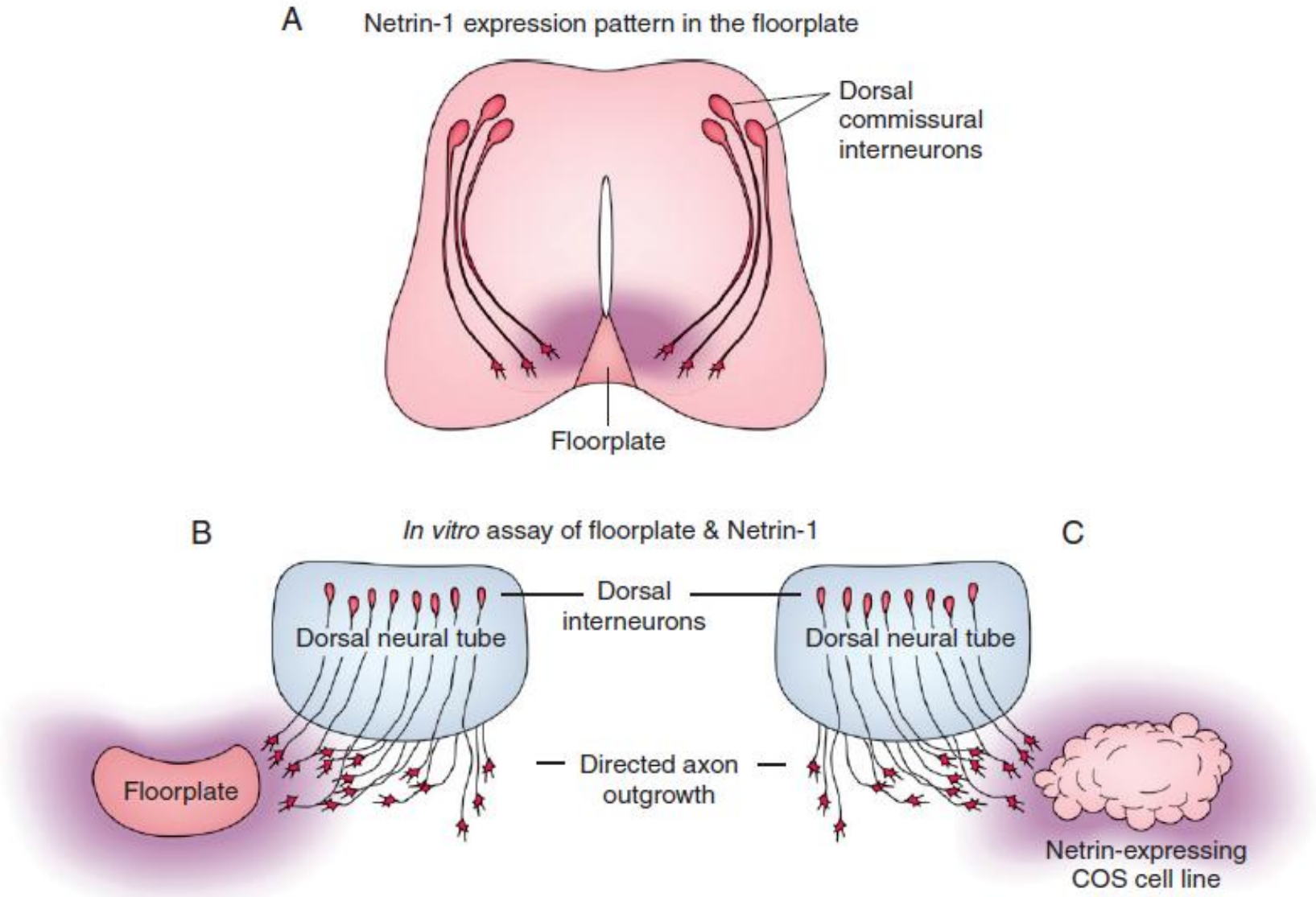
Atractiva

Repulsivas

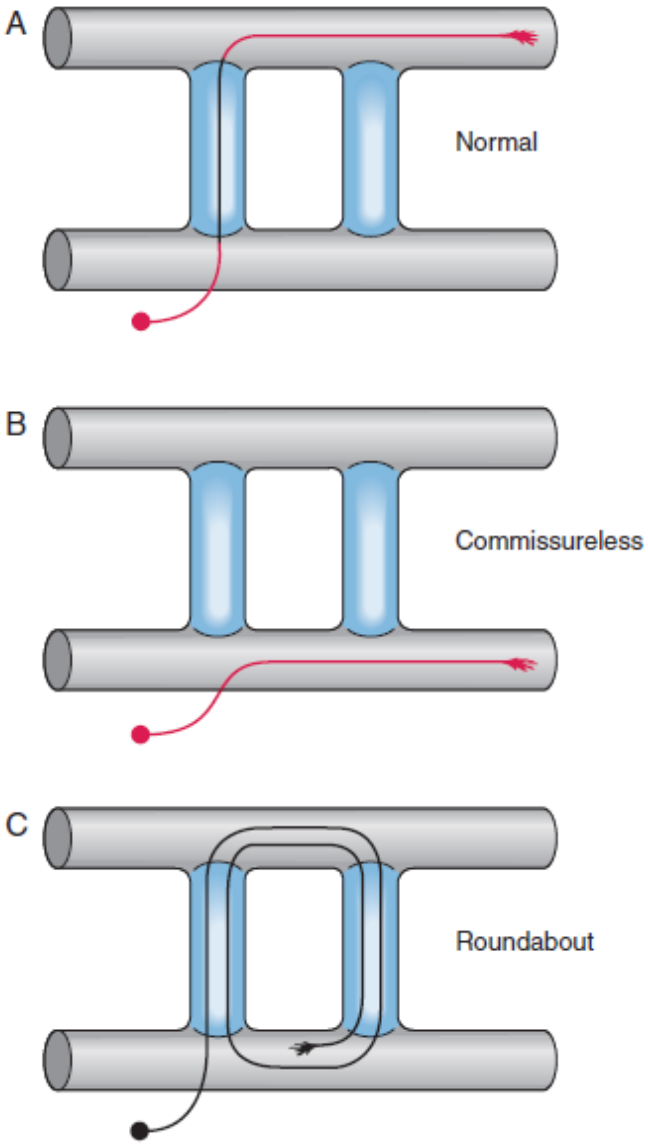


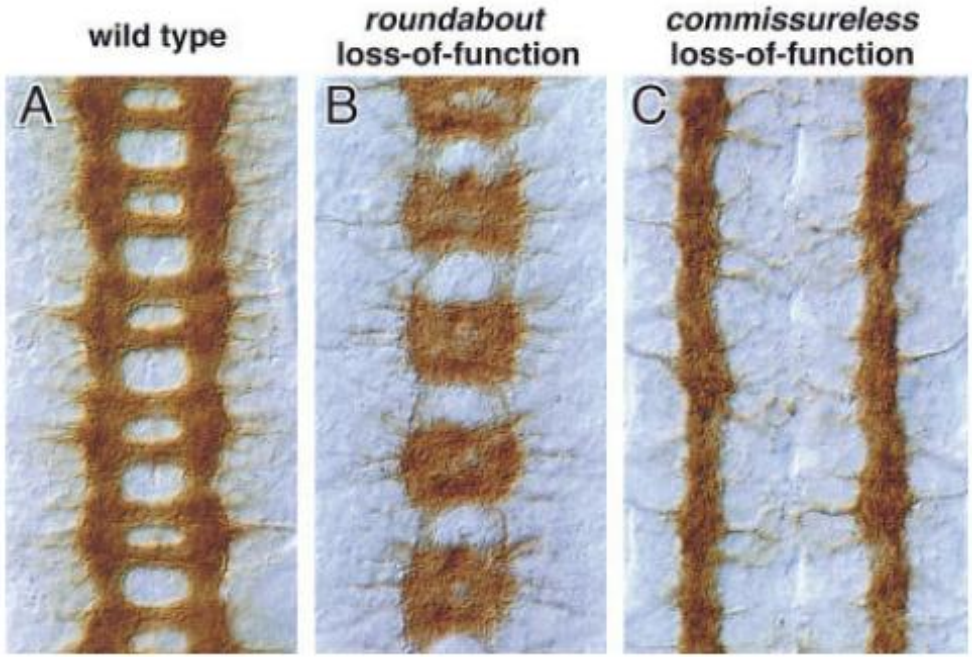
Dickson, 2002

Cruce de la línea media



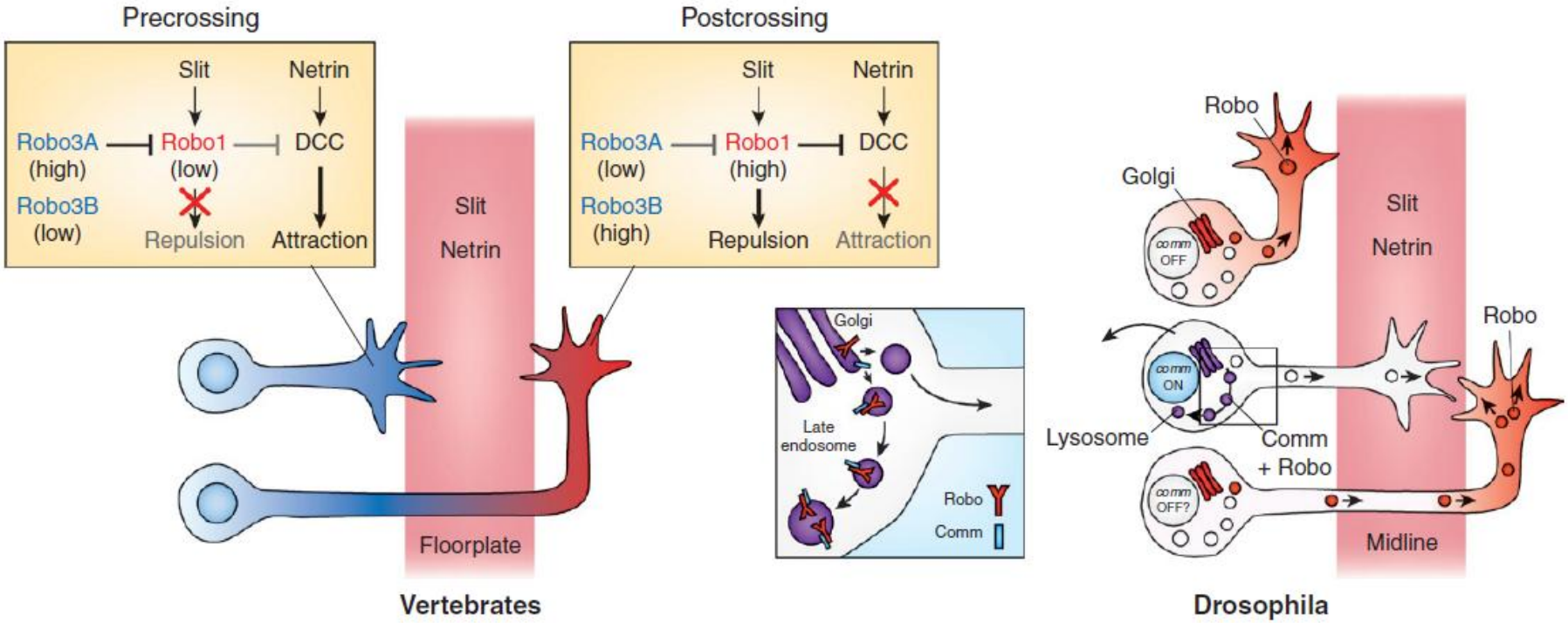
Cruce de la línea media



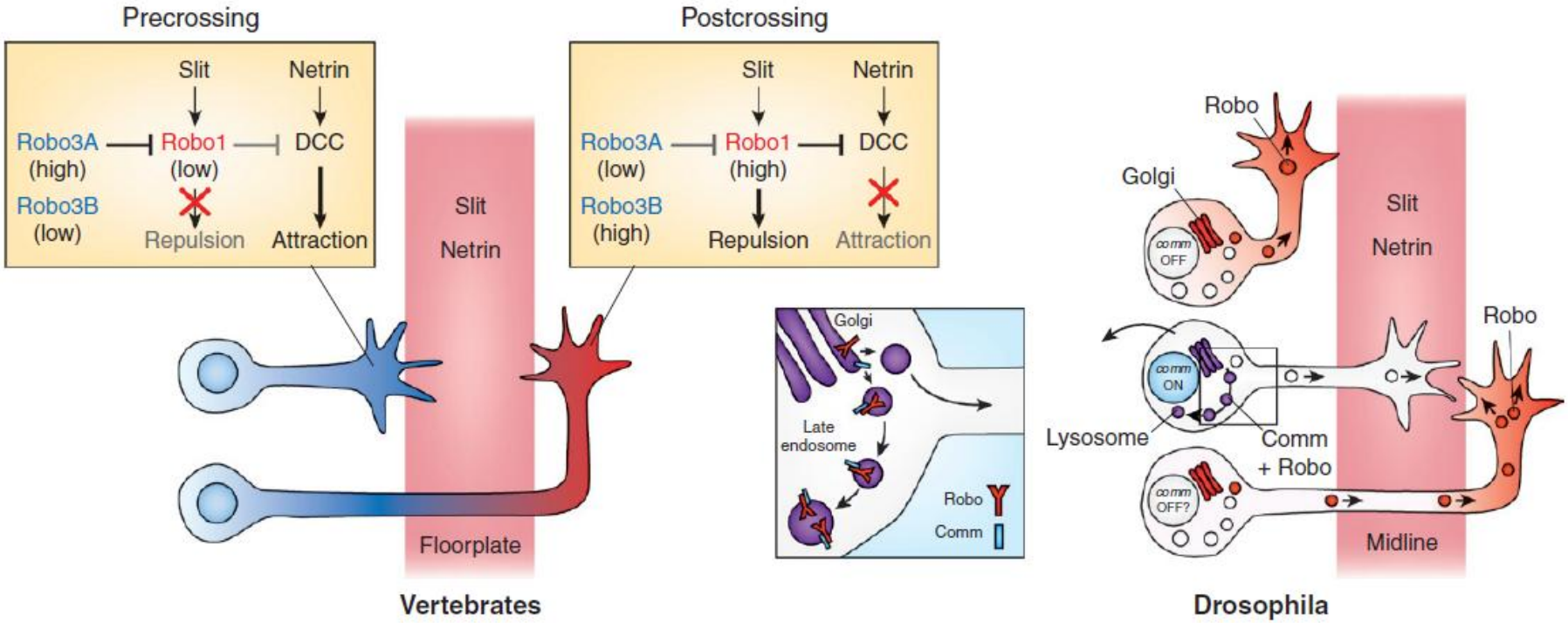


Kidd et al., 1998

Cruce de la línea media

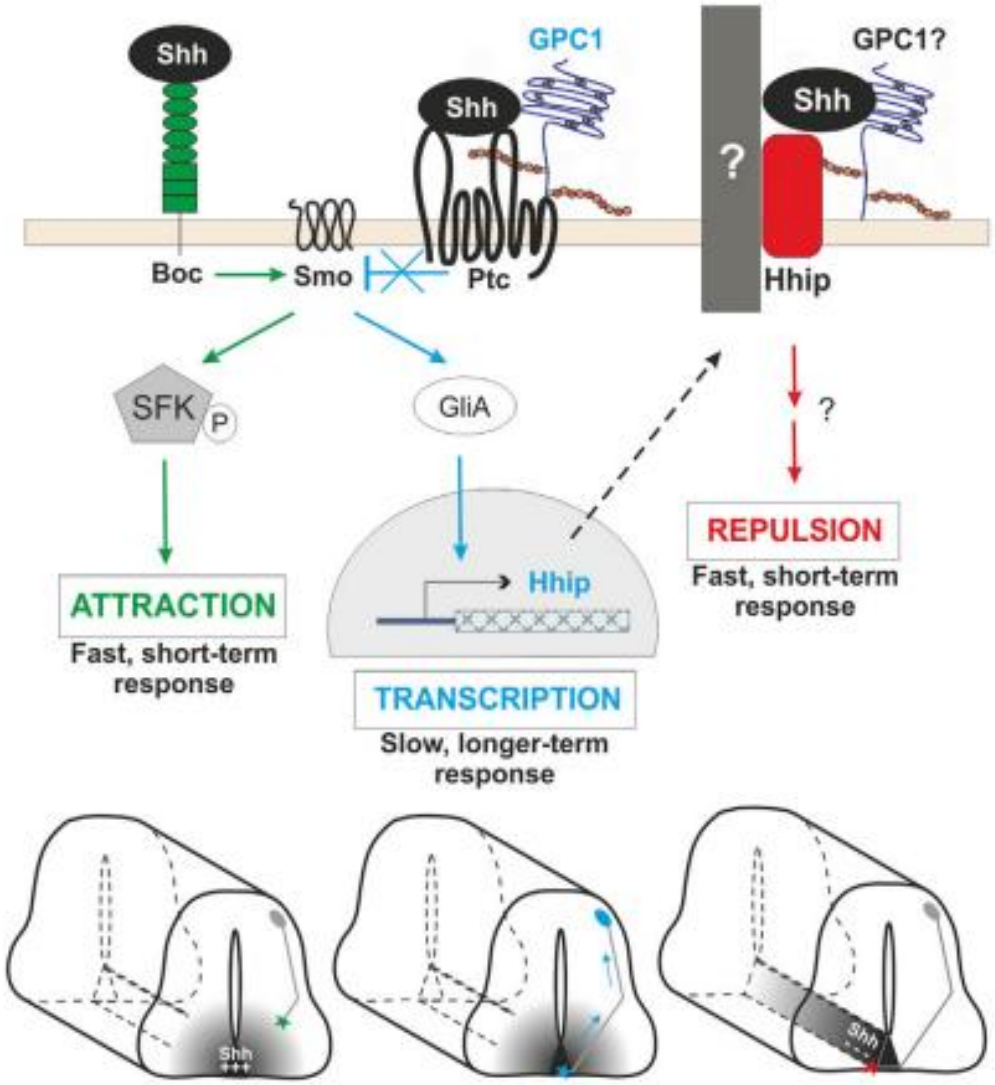


Cruce de la línea media



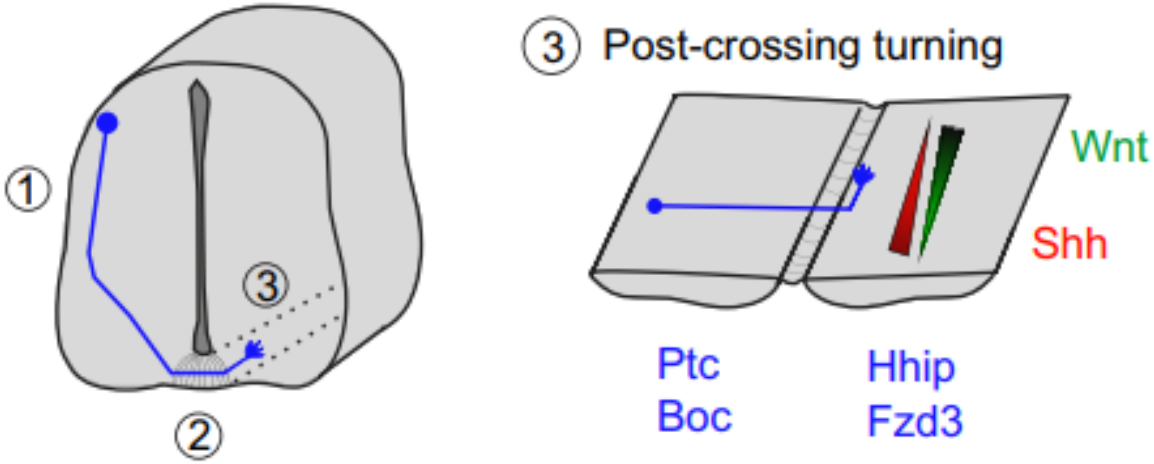
Los axones deben cambiar su respuesta a distintas moléculas a lo largo de su trayecto

Cruce de la línea media

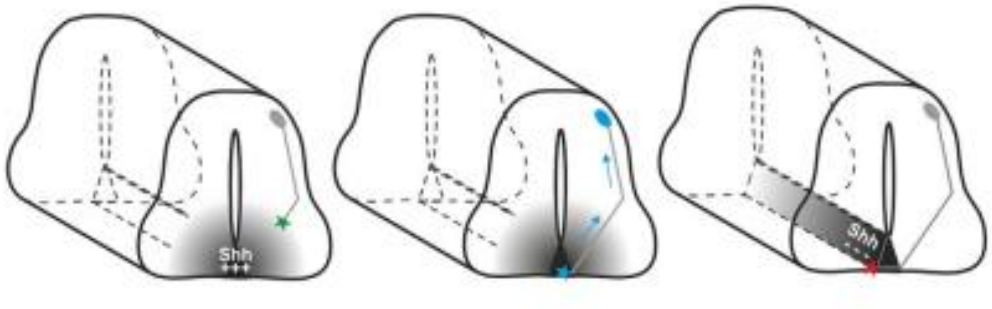


Wilson & Stoeckli, 2018

Cruce de la línea media

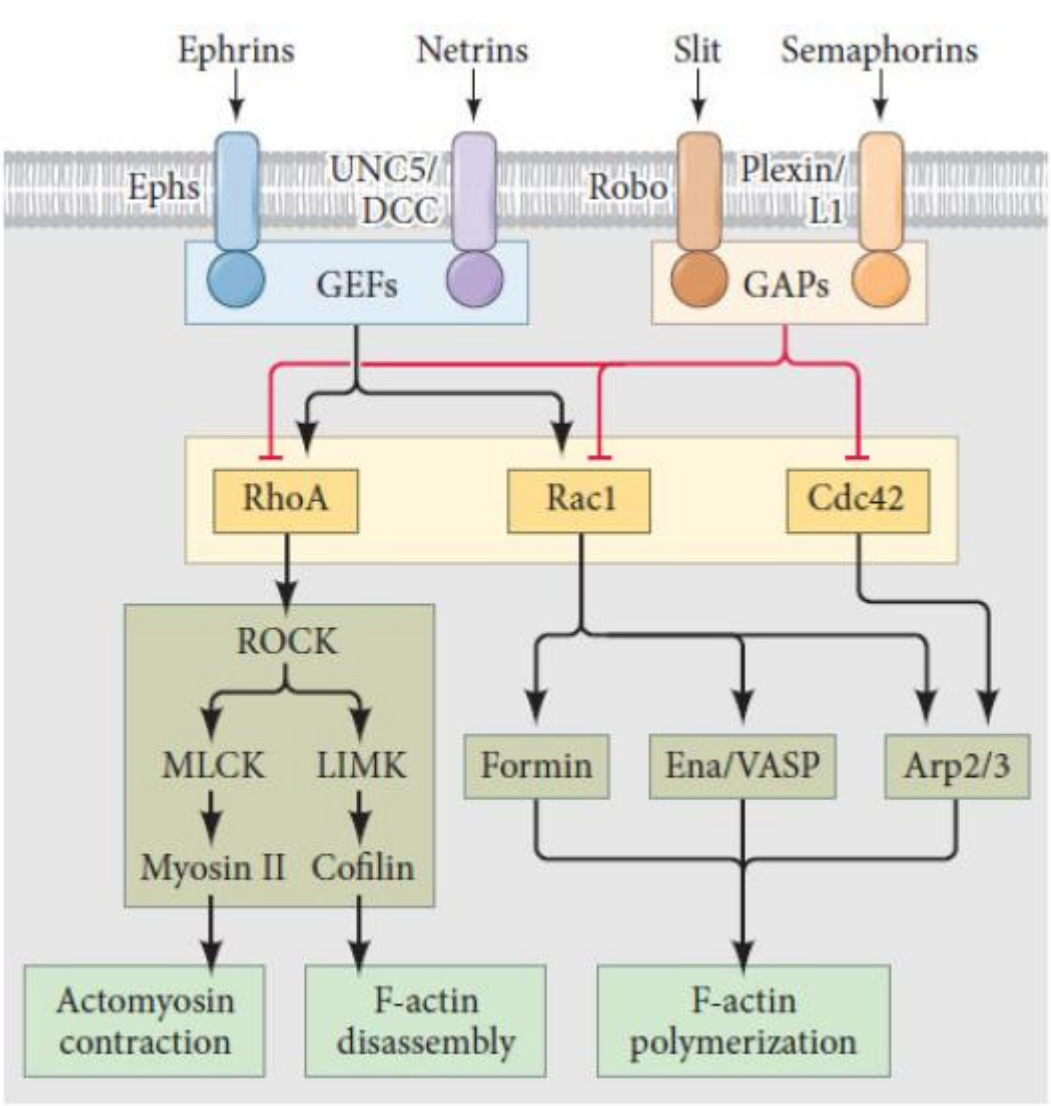


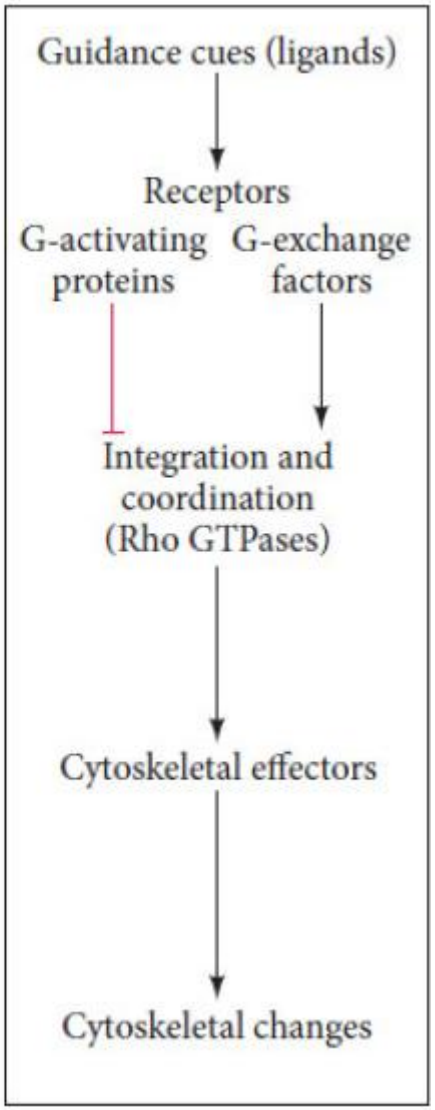
Stoeckli, 2018



Wilson & Stoeckli, 2018

Transducción de las señales





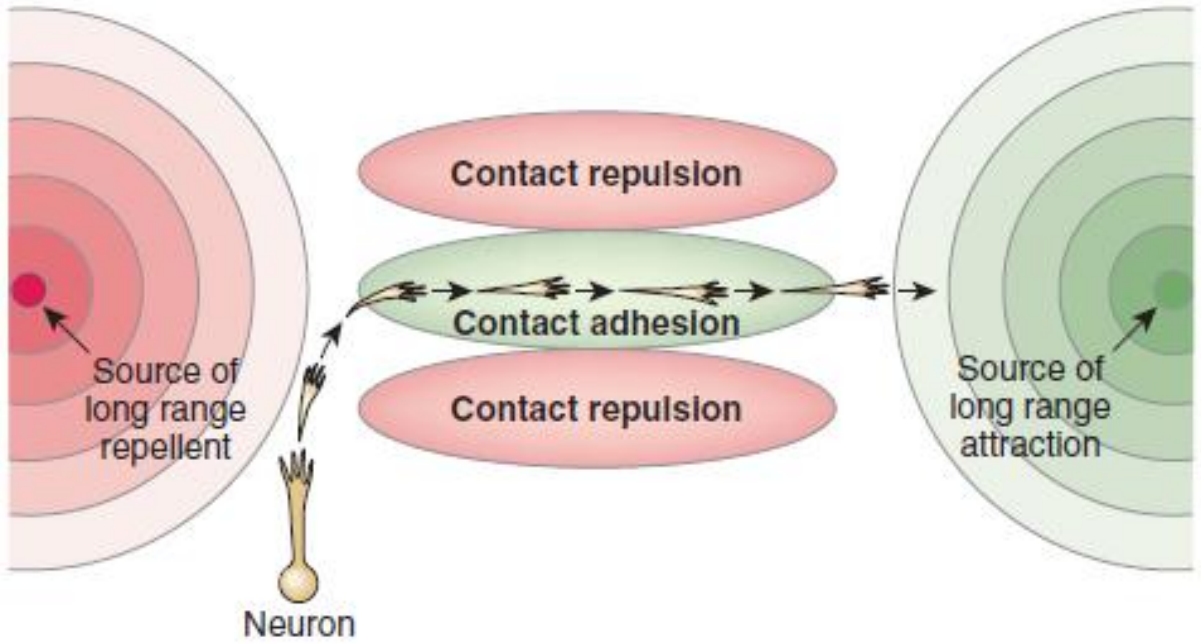
¿A quién sigue el cono?

Señales químicas

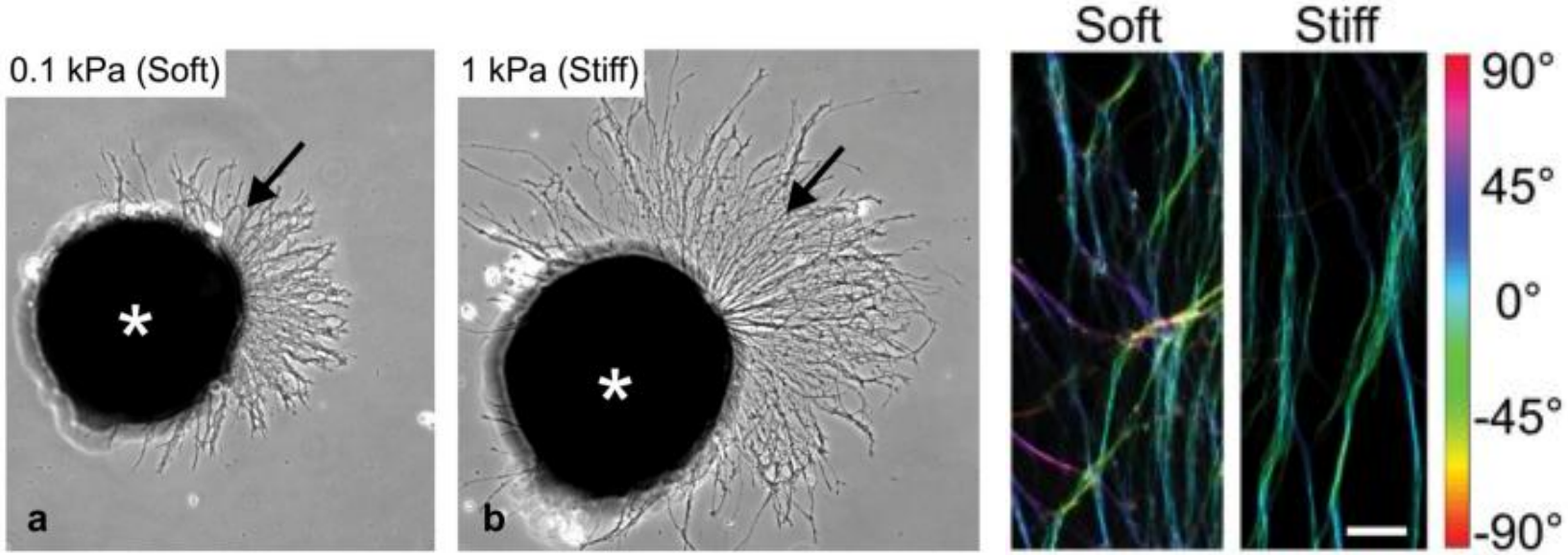
A distancia

De contacto

Estímulos mecánicos

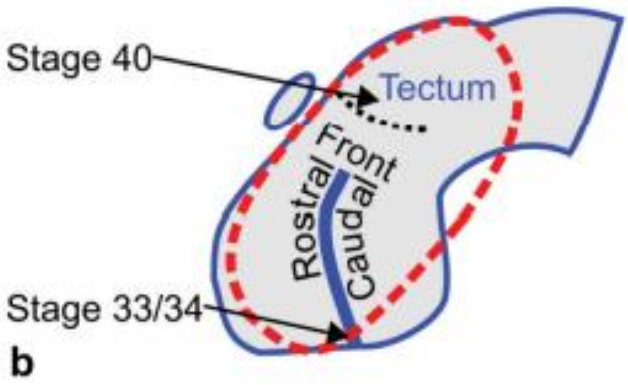


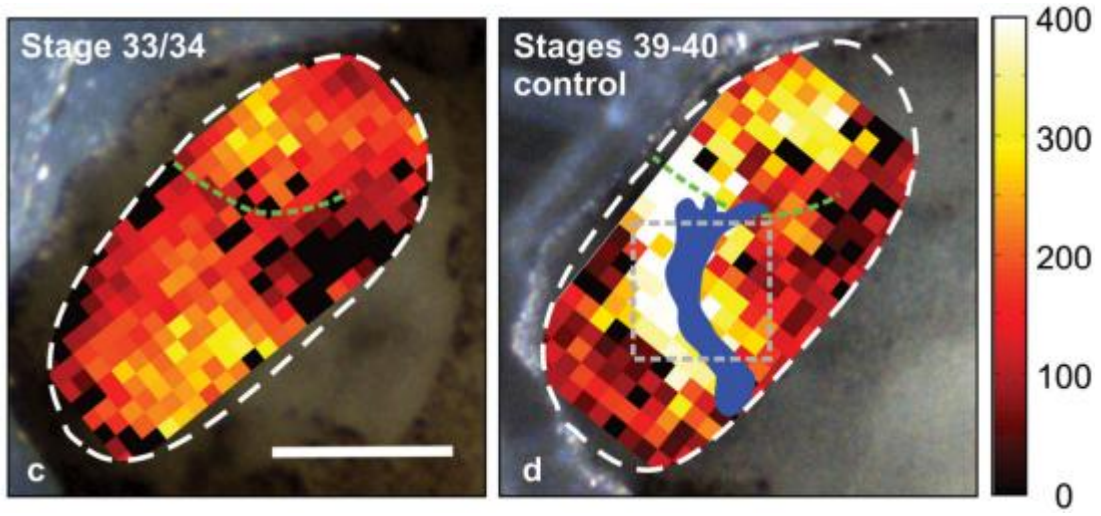
Señales mecánicas



Koser et al., 2016

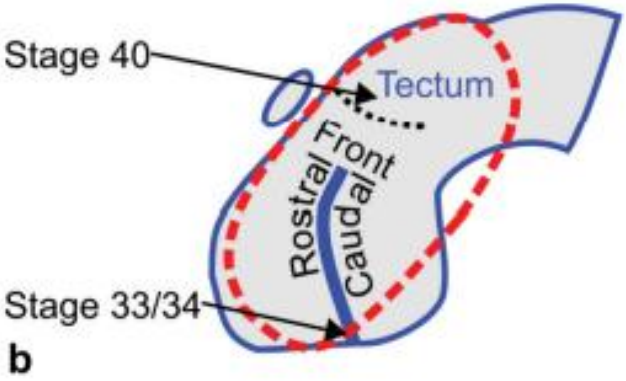
Señales mecánicas

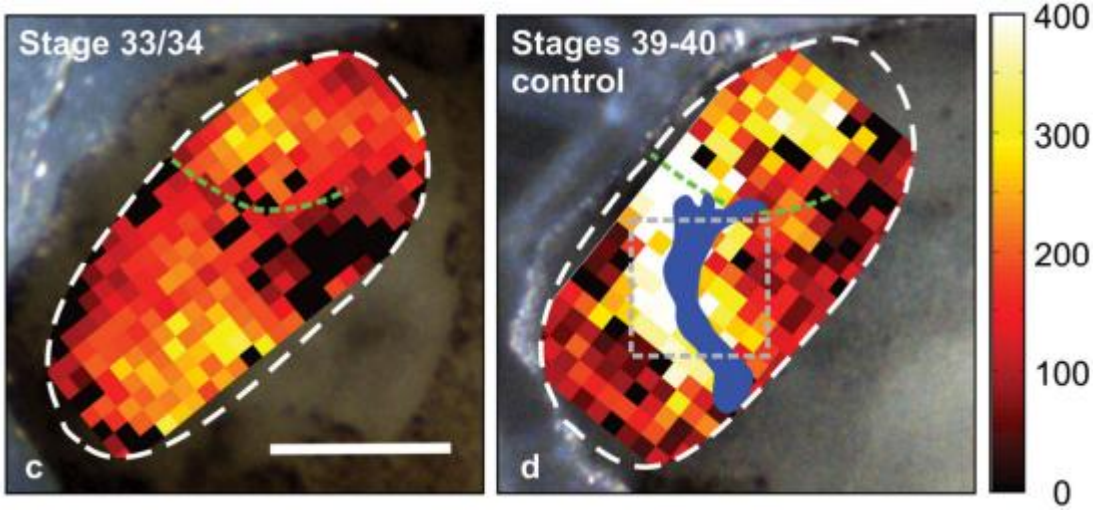


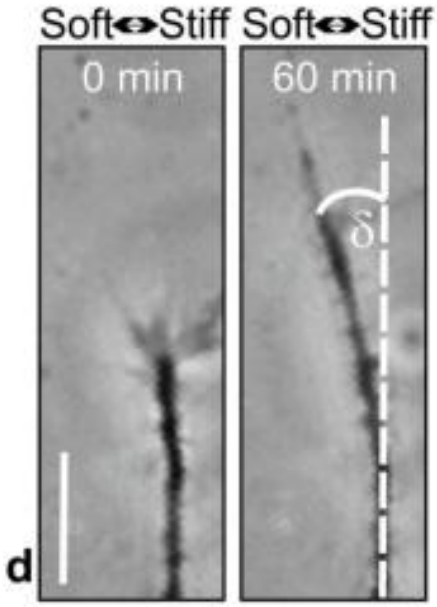


Koser et al., 2016

Señales mecánicas

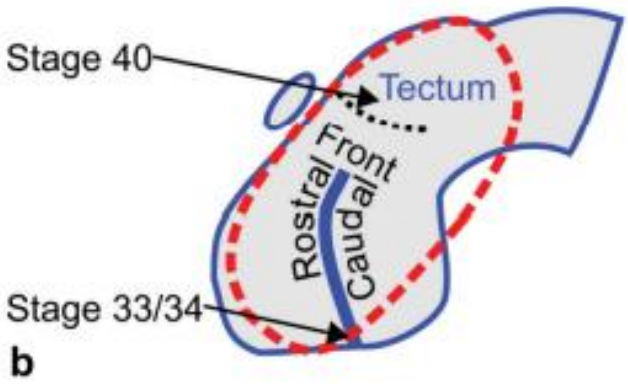


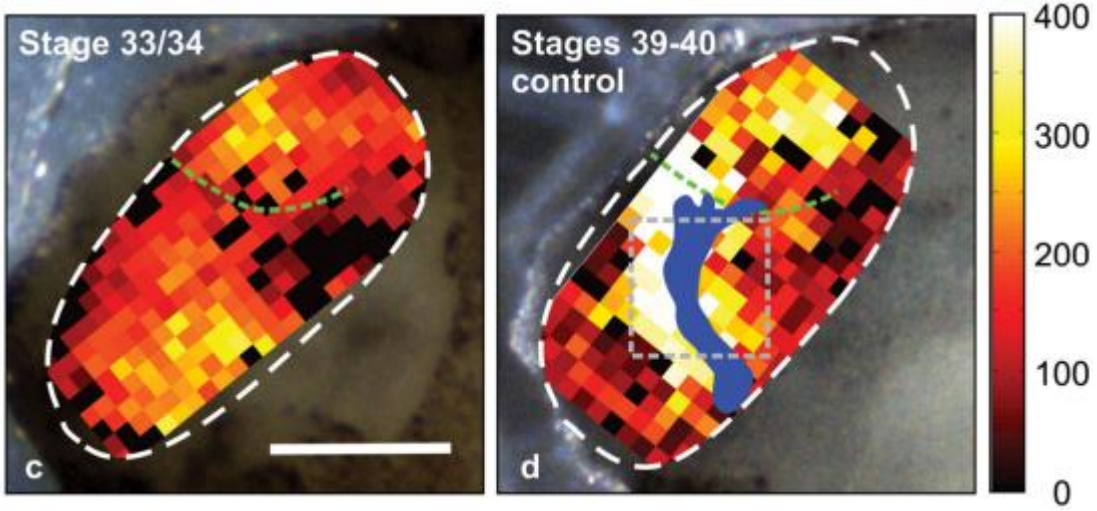


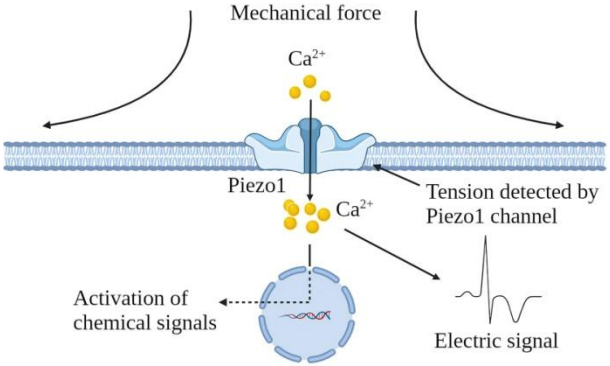


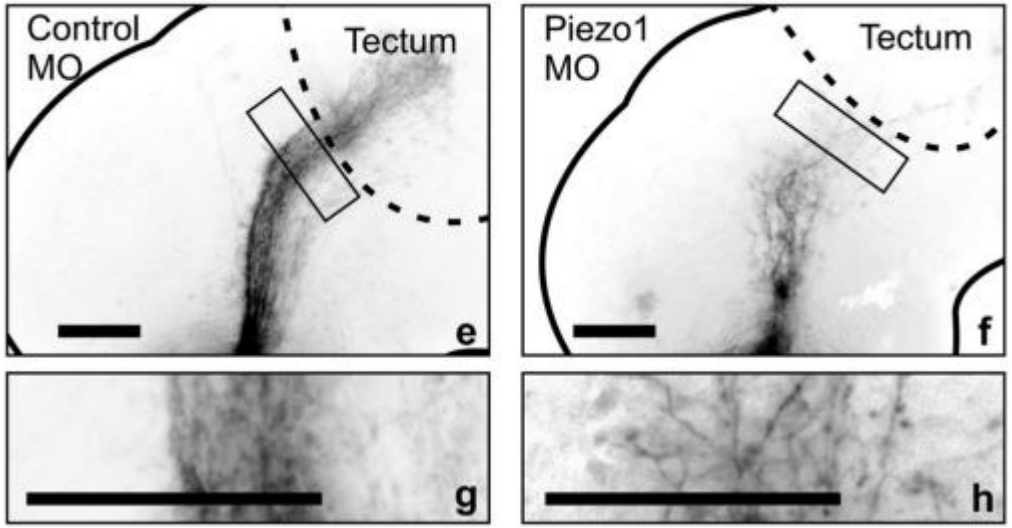
Koser et al., 2016

Señales mecánicas





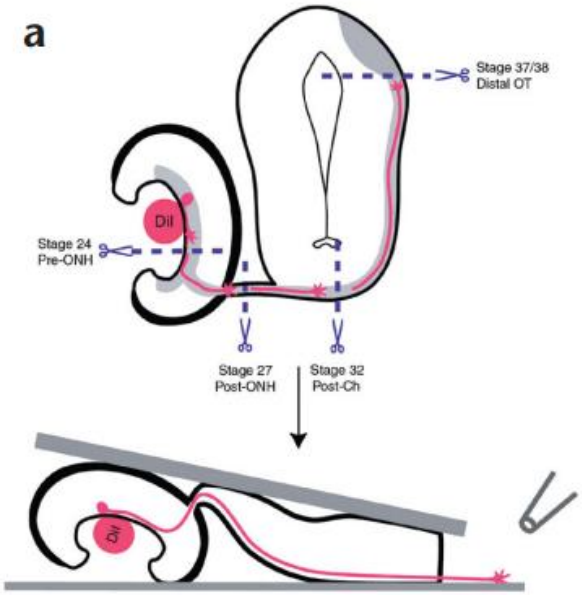


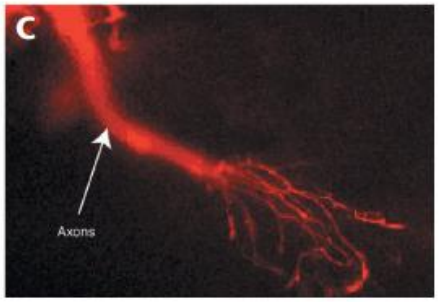


Koser et al., 2016

El reloj de la neurona

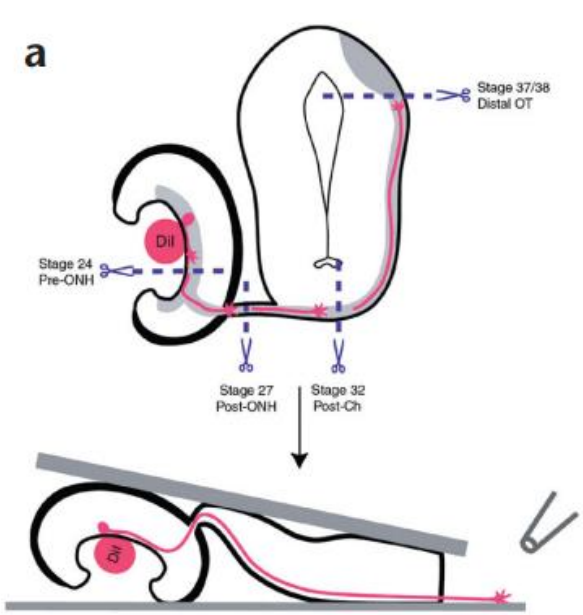
Shewan et al., 2002

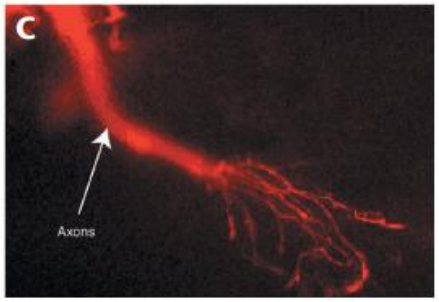


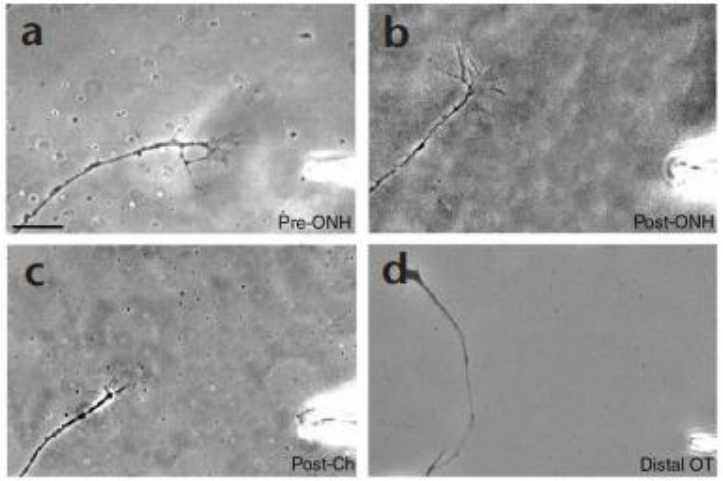


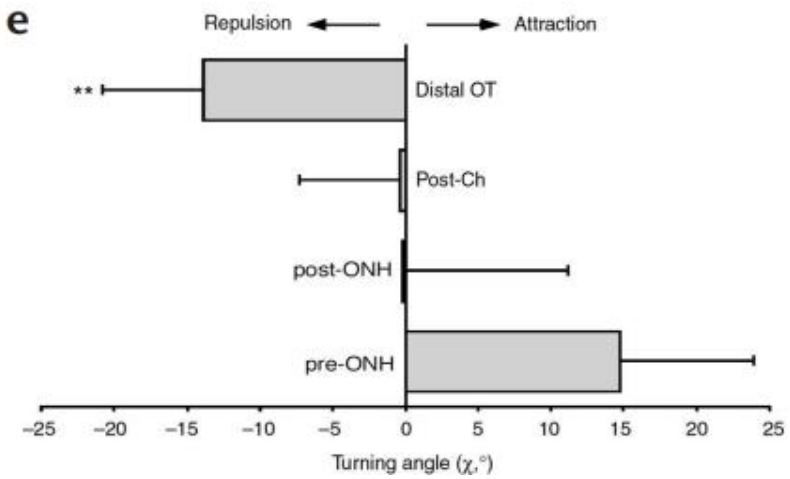
El reloj de la neurona

Shewan et al., 2002



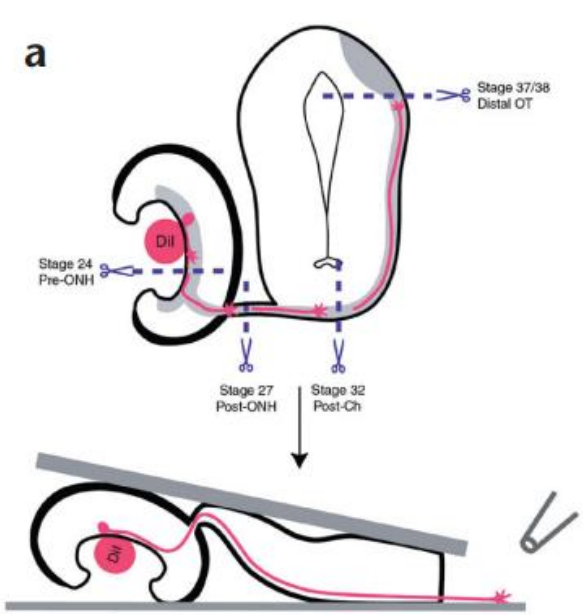


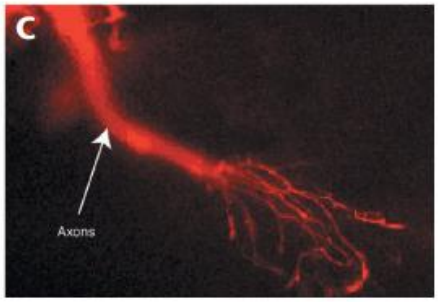


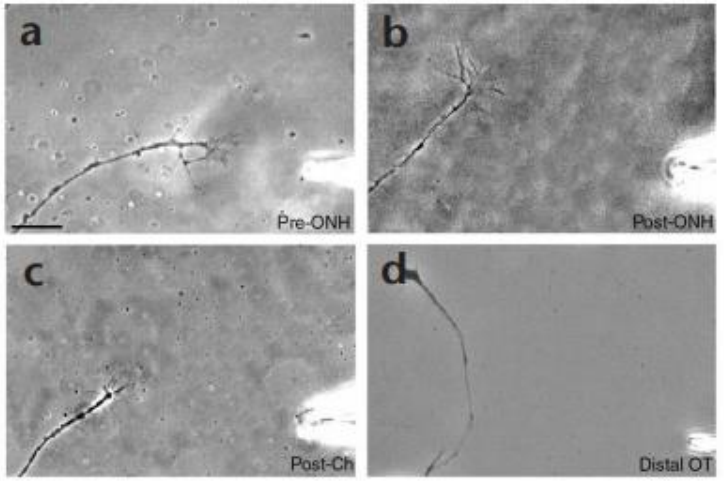


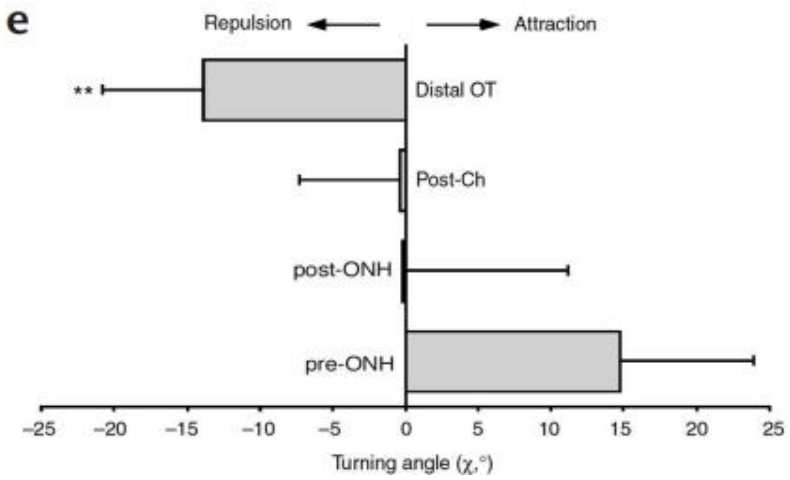
El reloj de la neurona

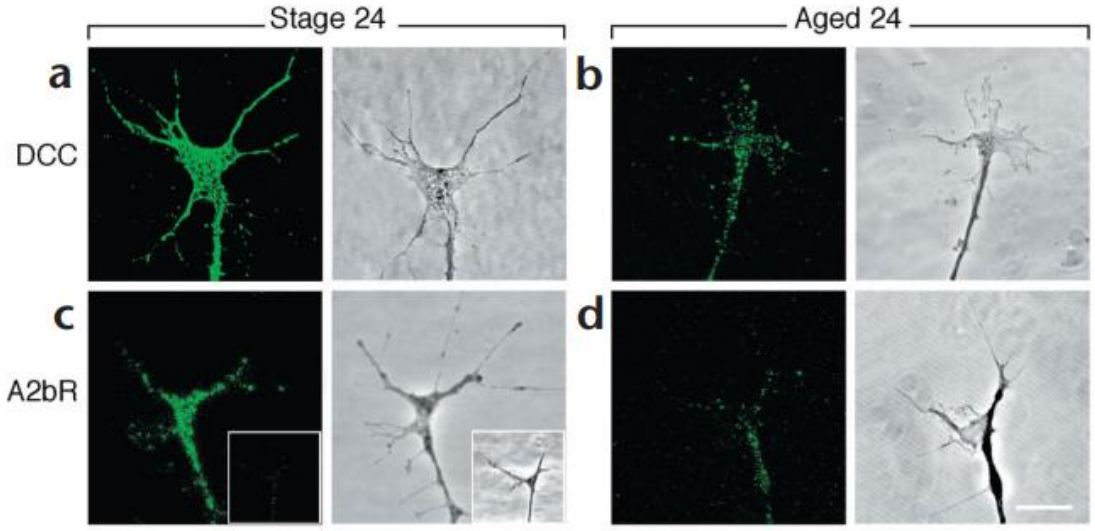
Shewan et al., 2002





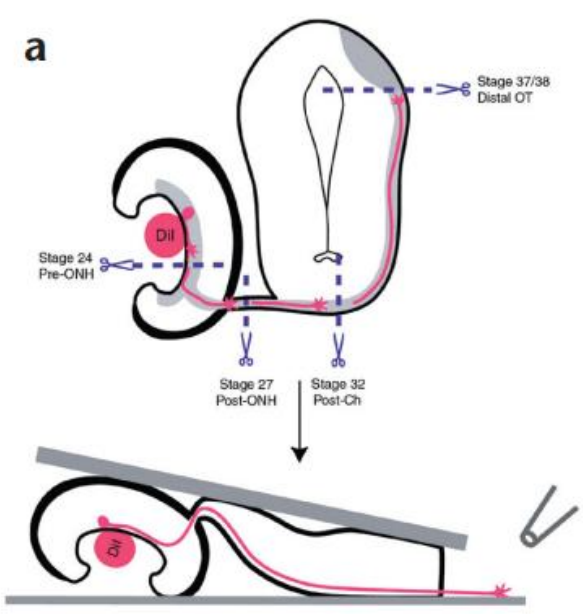


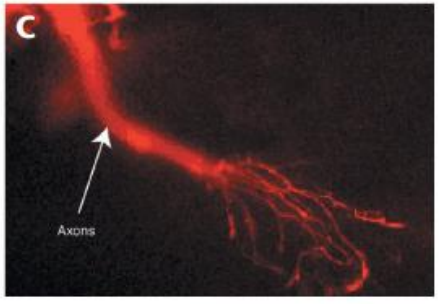


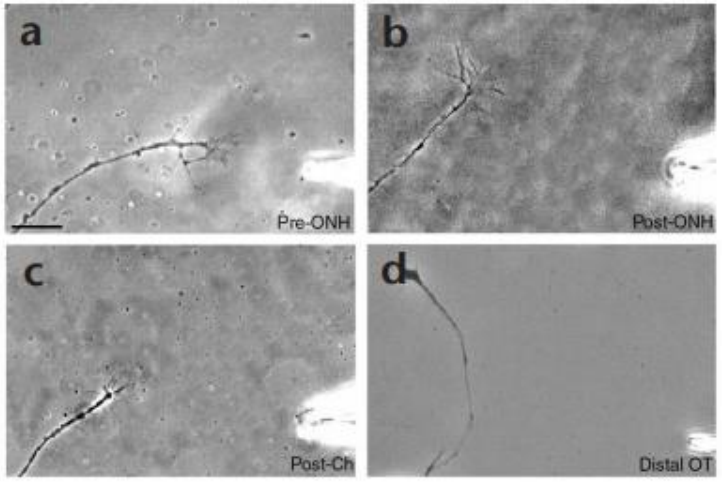


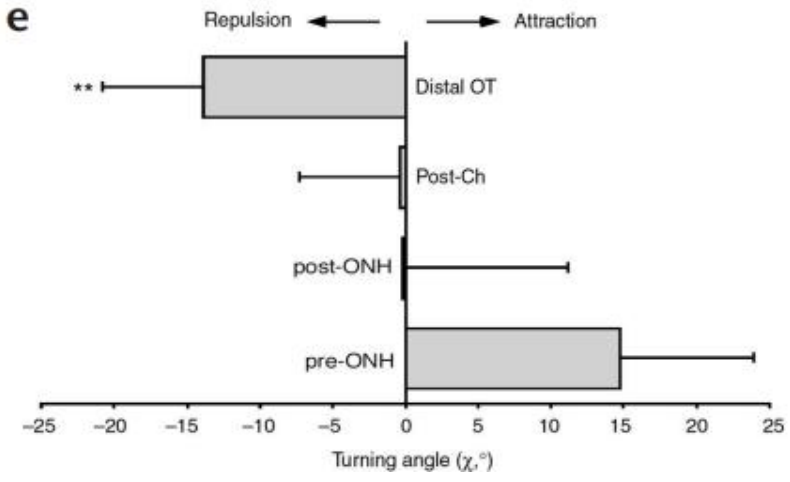
El reloj de la neurona

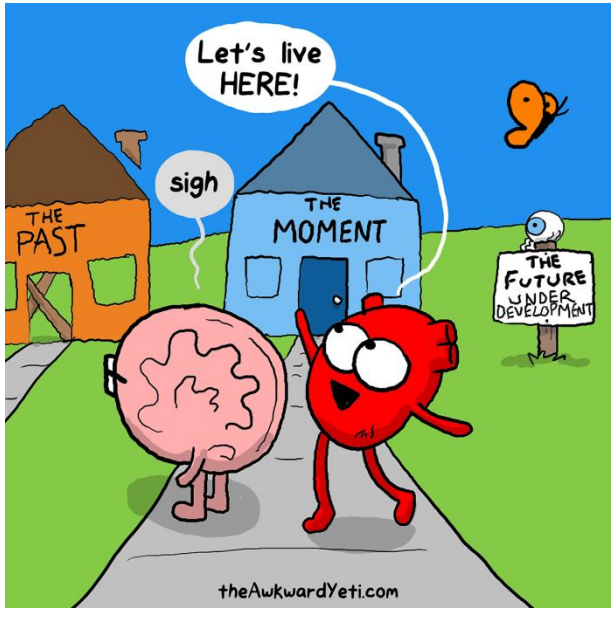
Shewan et al., 2002





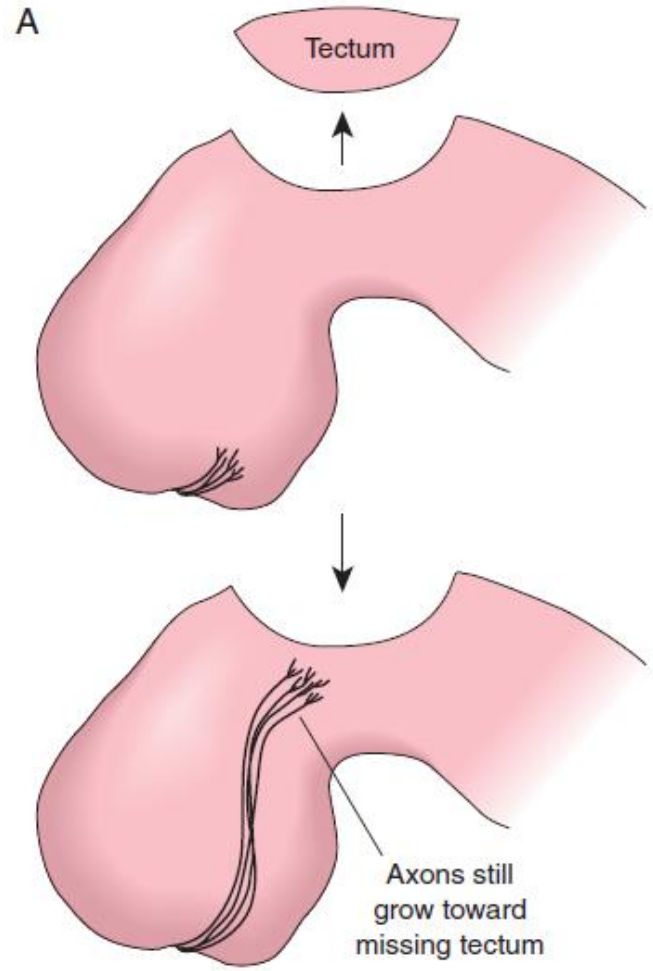


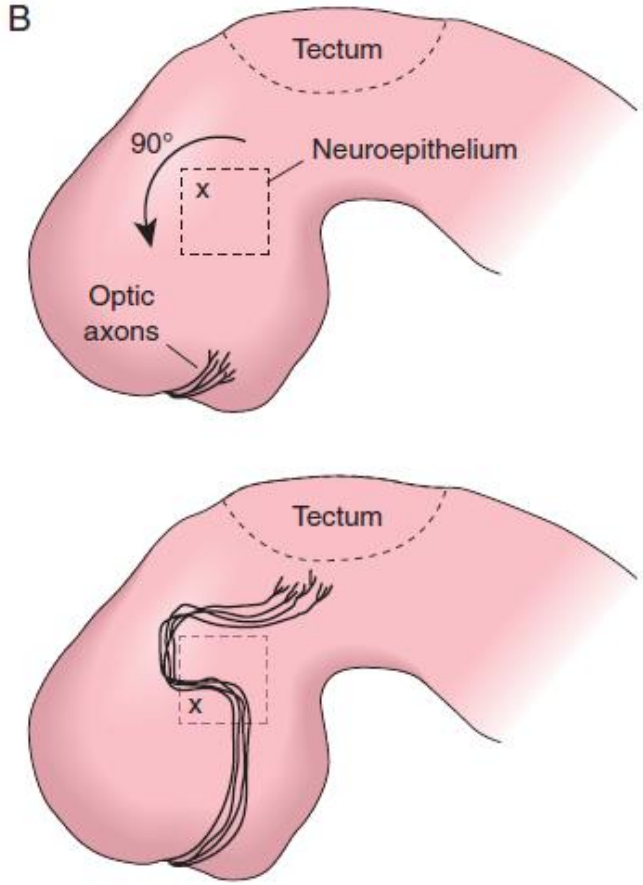




El cono de crecimiento se guía por las señales que tiene en el momento

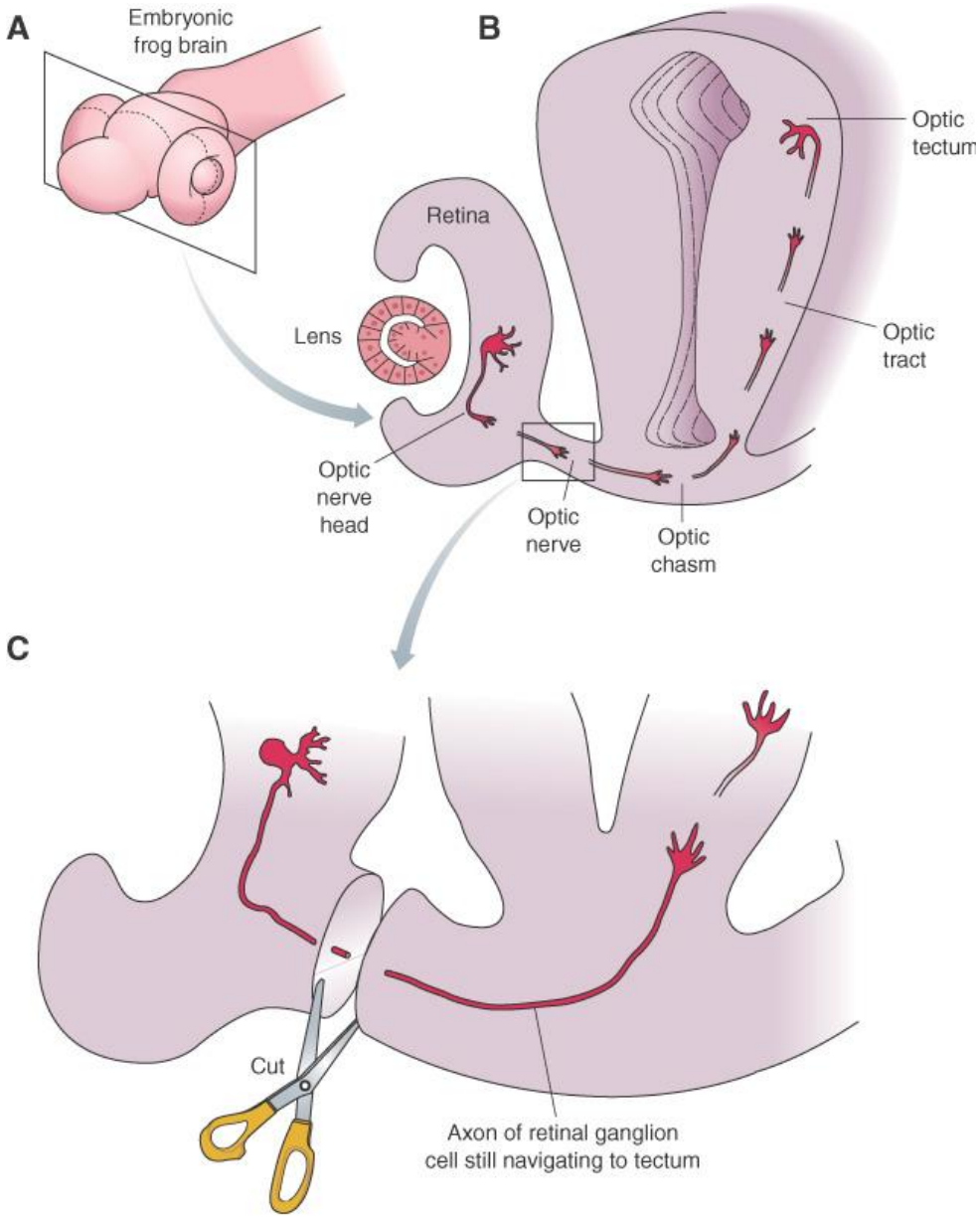
El reloj de la neurona



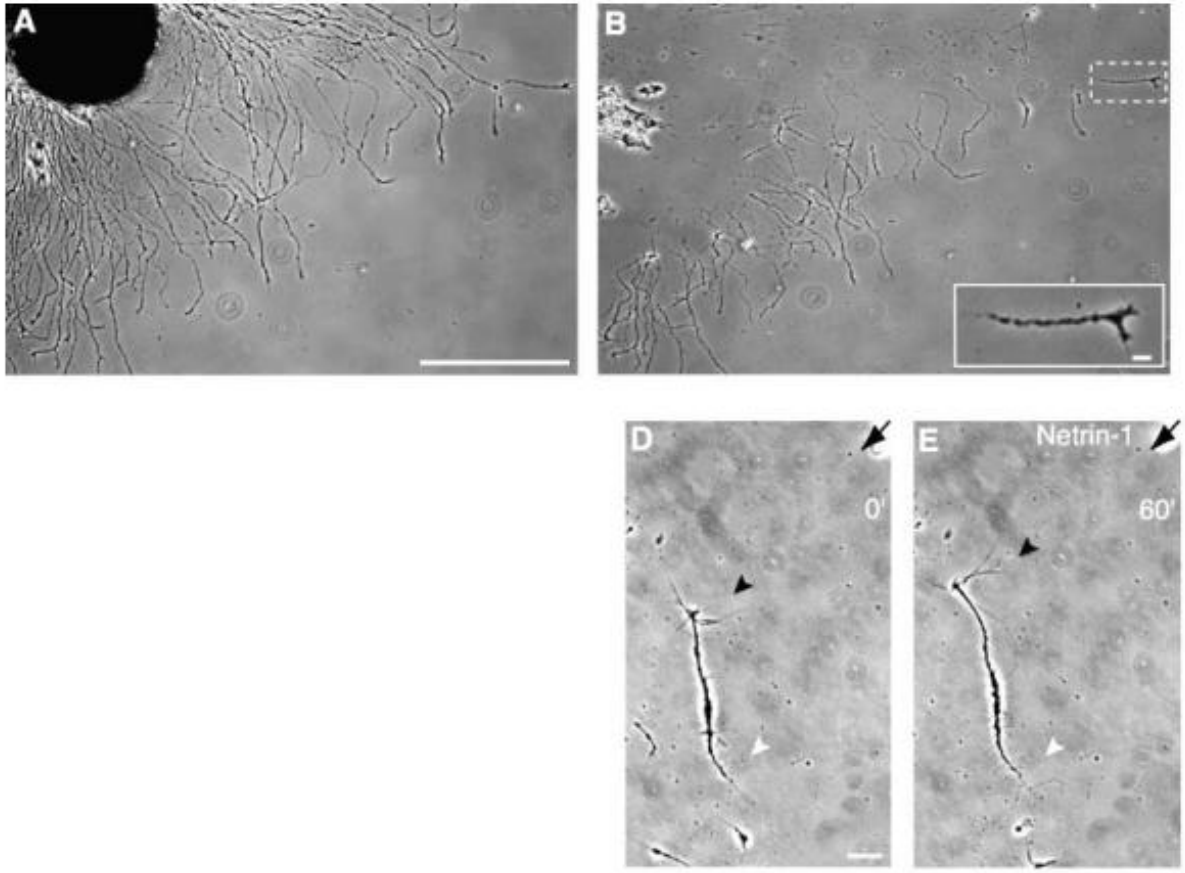


El cono de crecimiento se guía por las señales que tiene en el momento

La independencia del cono

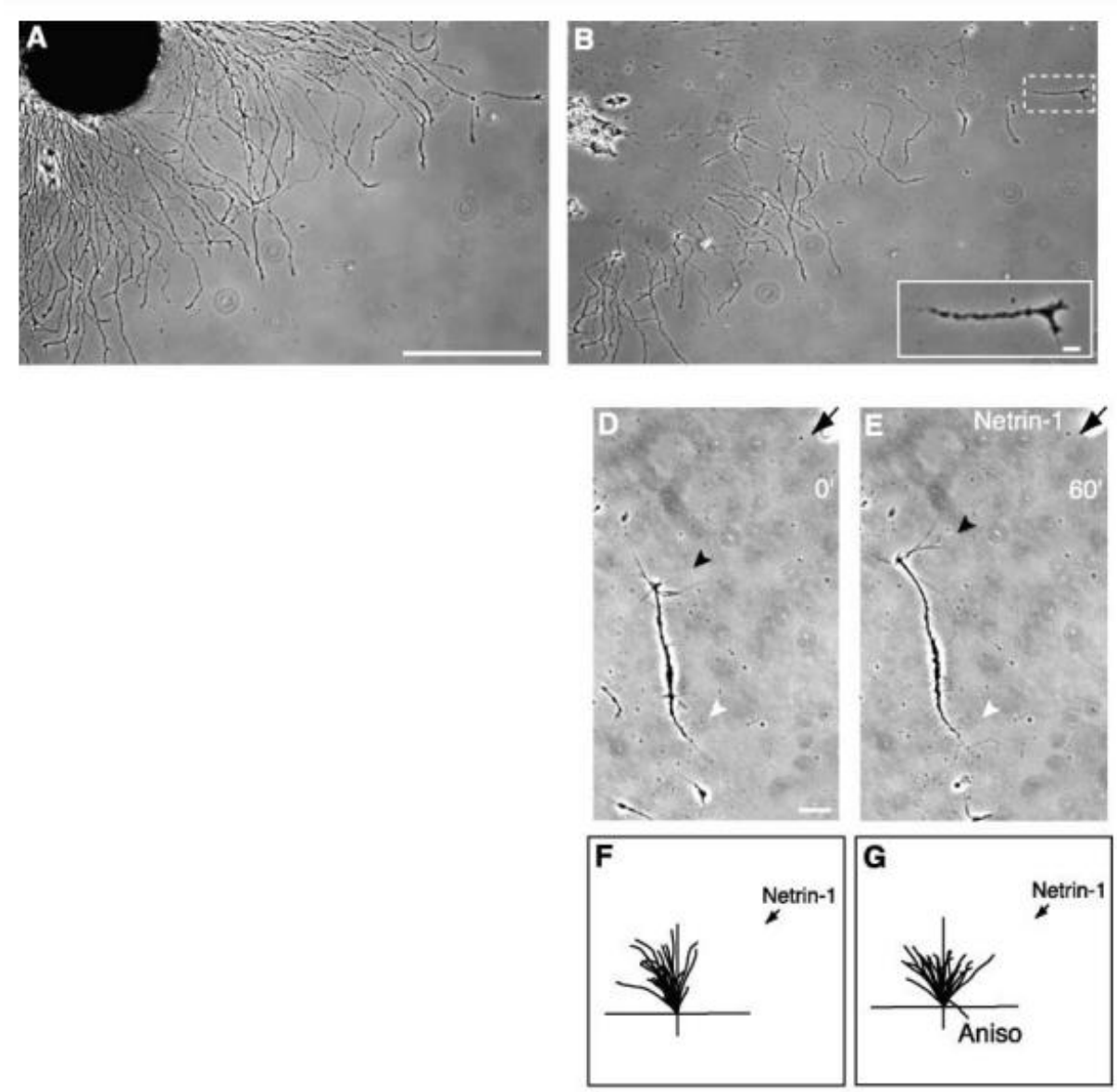


Síntesis local de proteínas



Campbell & Holt, 2001

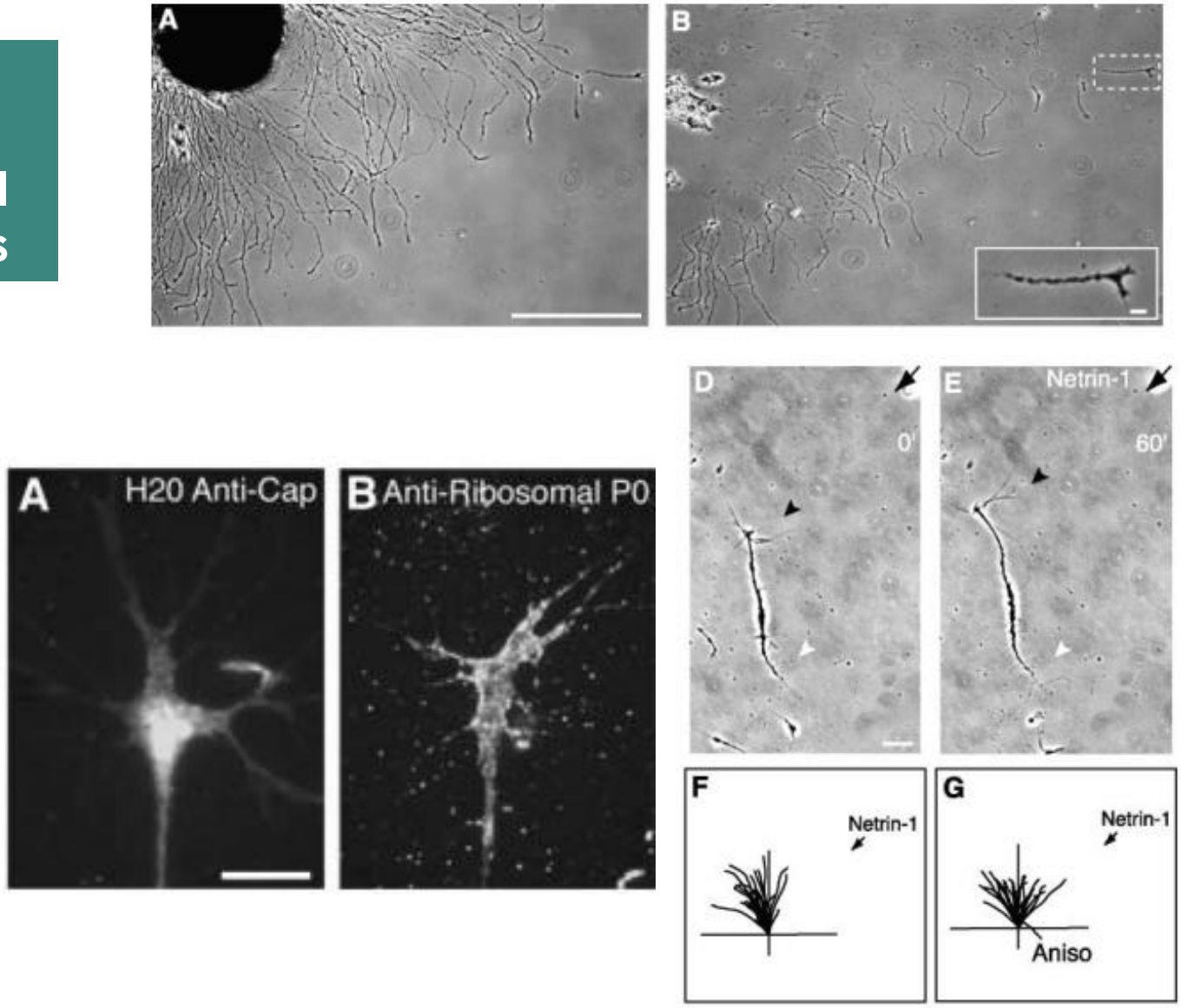
Síntesis local de proteínas



Campbell & Holt, 2001

Síntesis local de proteínas

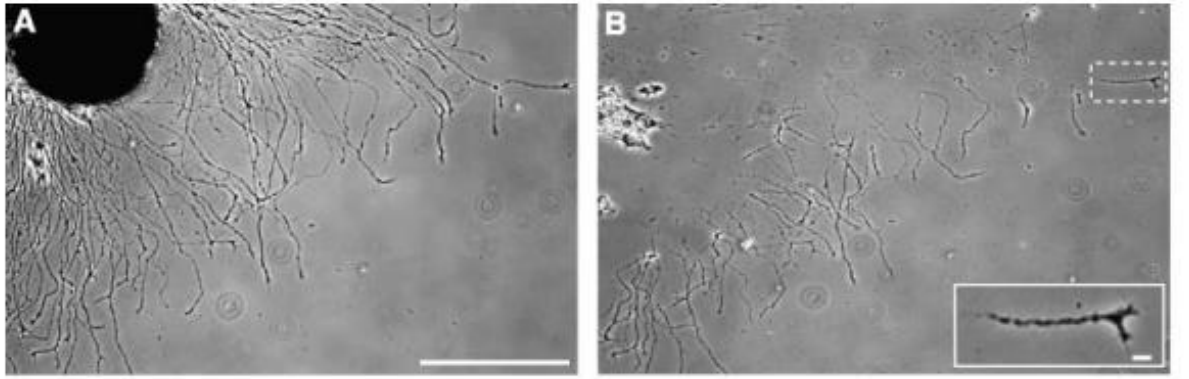
El estímulo induce la síntesis local de proteínas

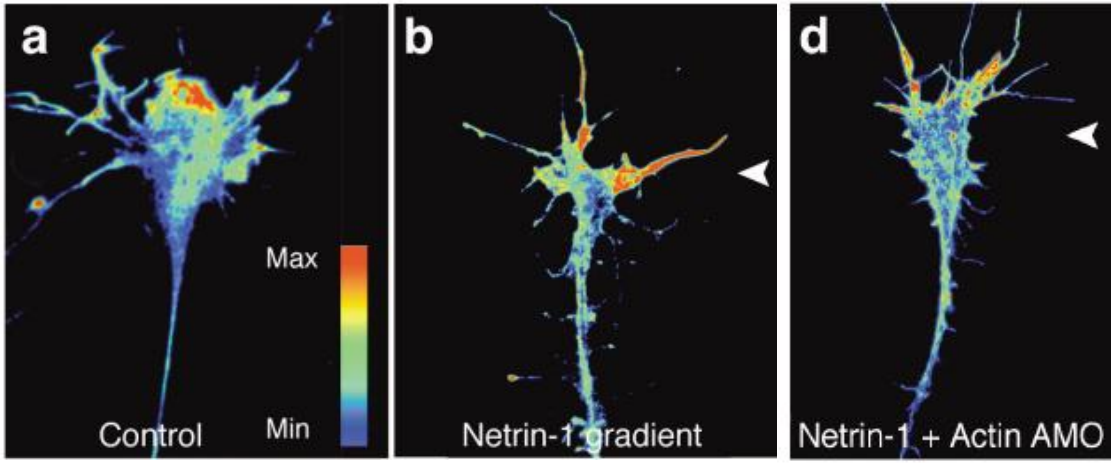


Campbell & Holt, 2001

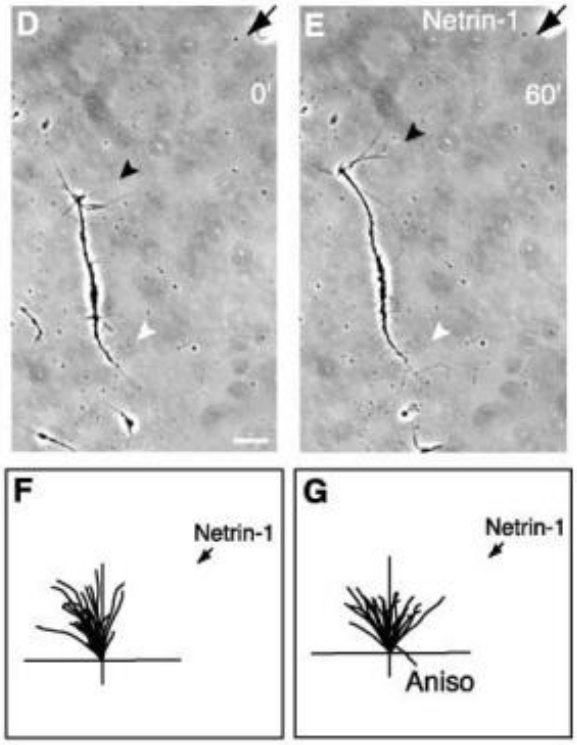
Síntesis local de proteínas

El estímulo induce la síntesis local de proteínas



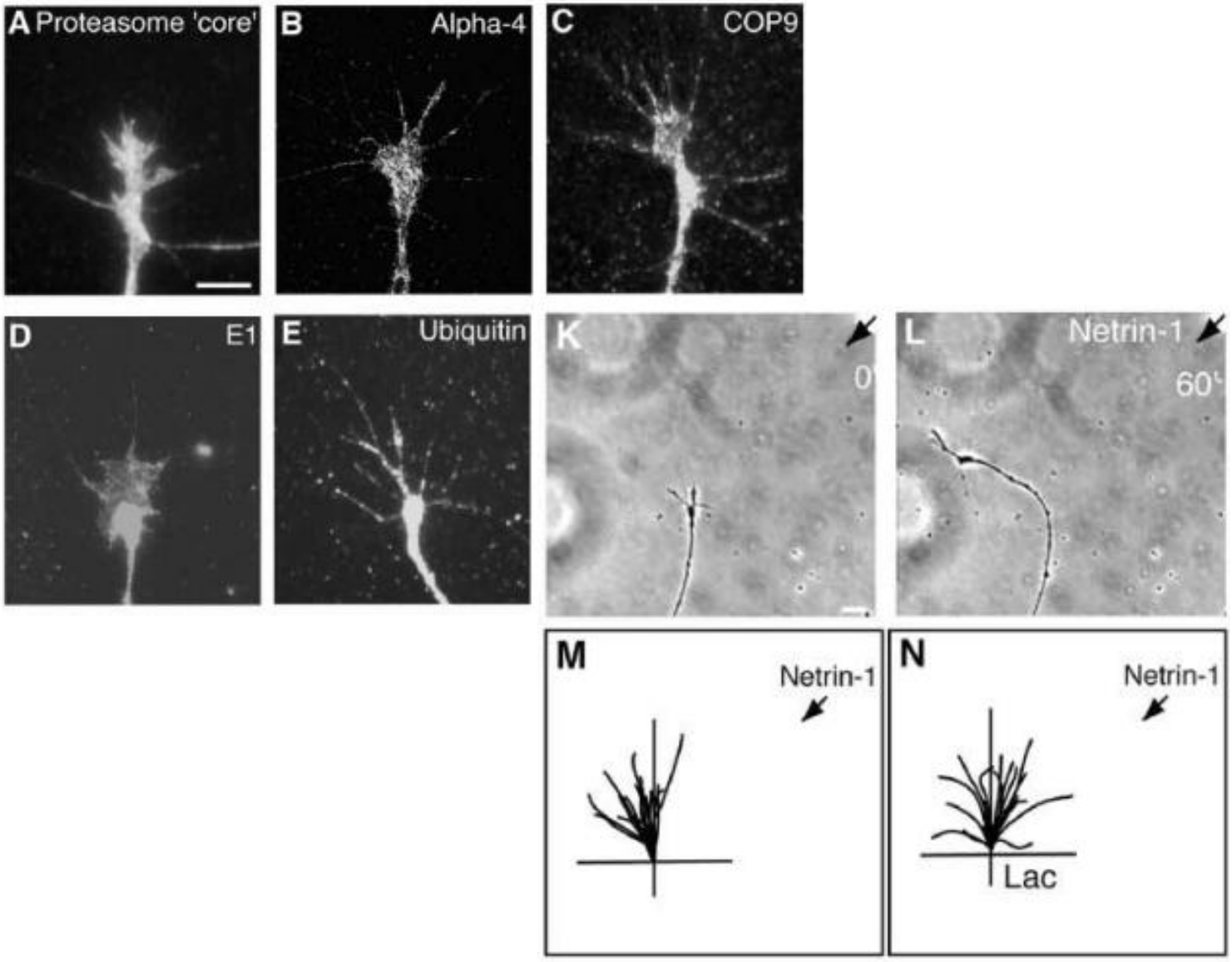


Leung et al., 2006



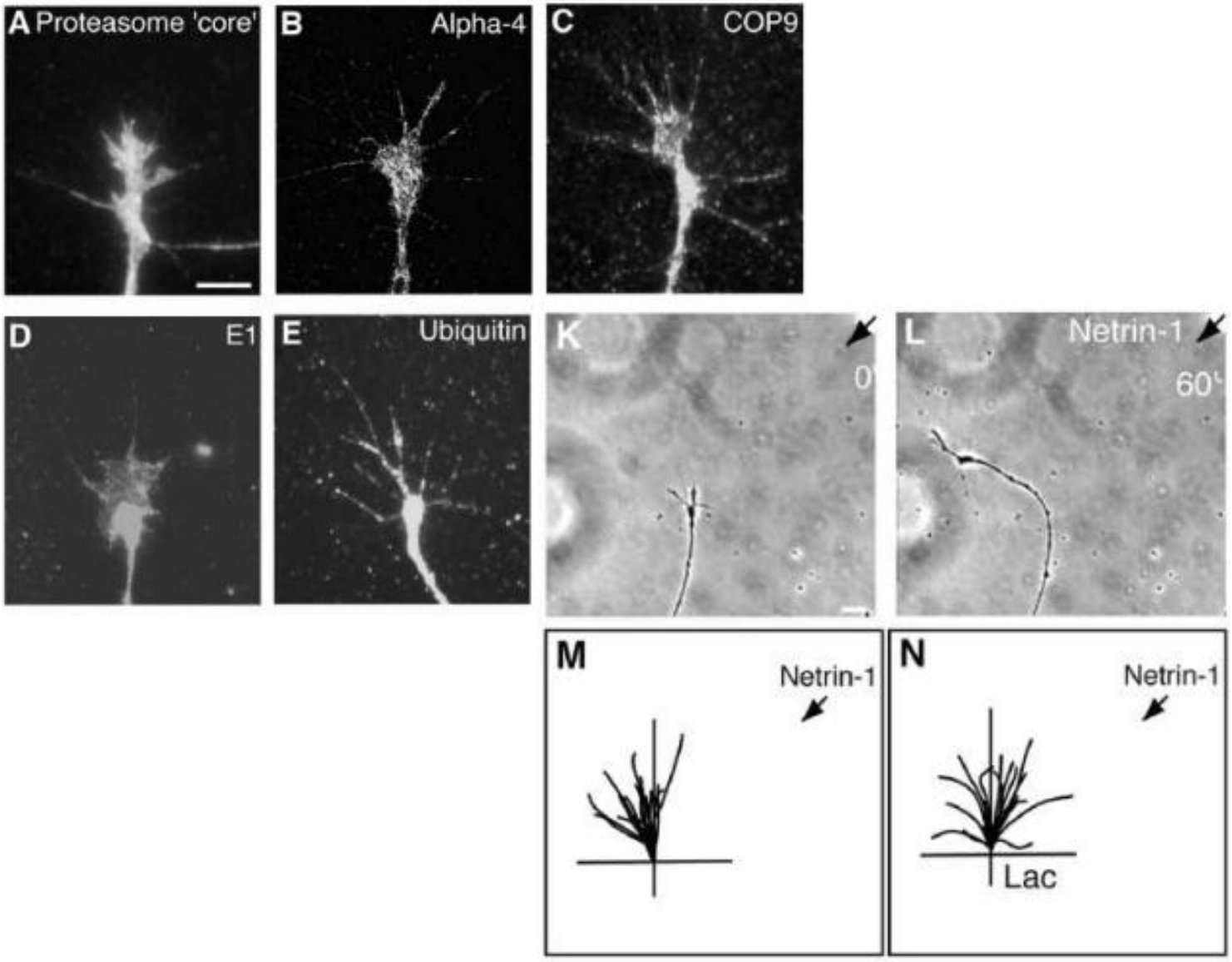
Campbell & Holt, 2001

Síntesis local de proteínas y degradación



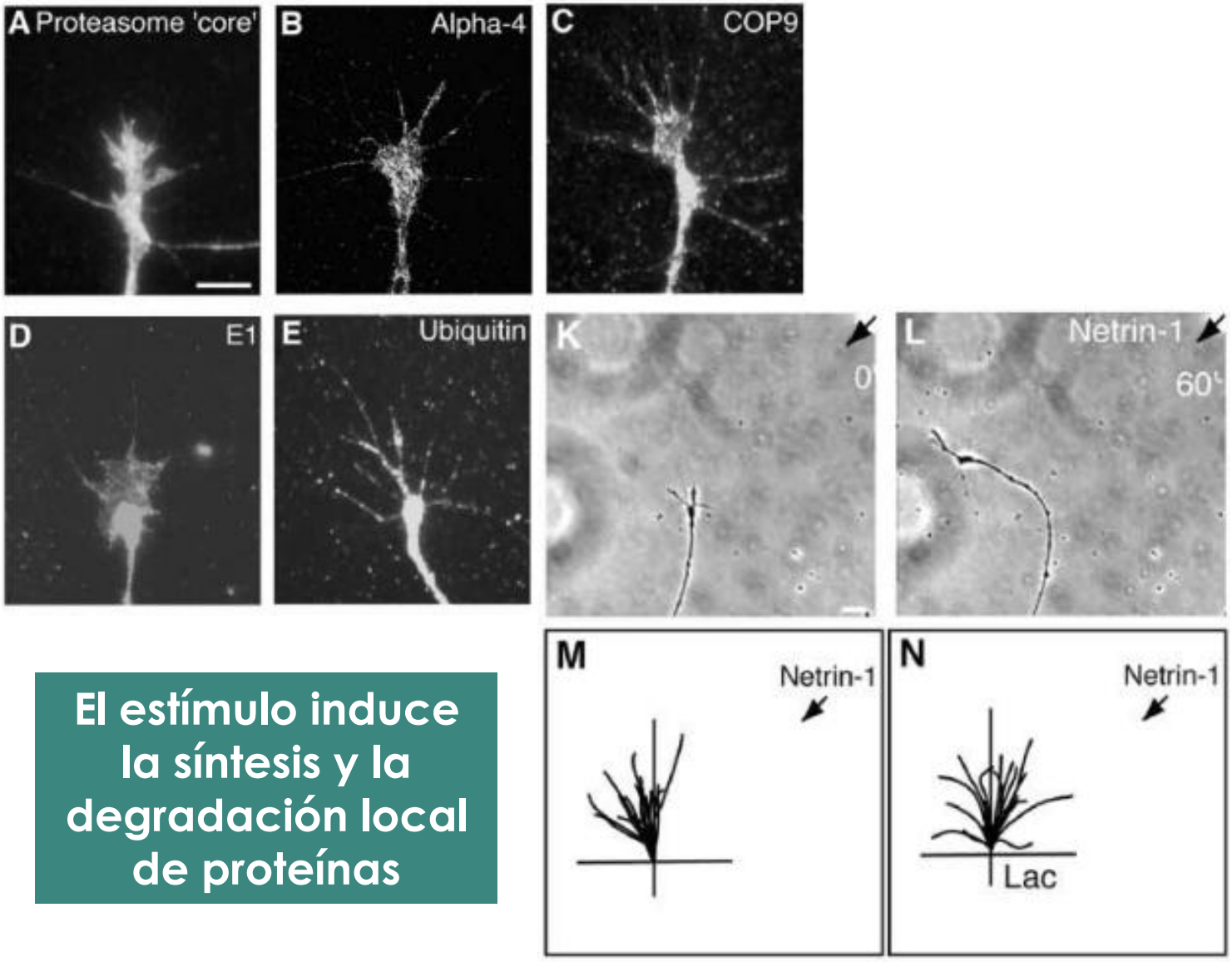
Campbell & Holt, 2001

Síntesis local de proteínas y degradación



Campbell & Holt, 2001

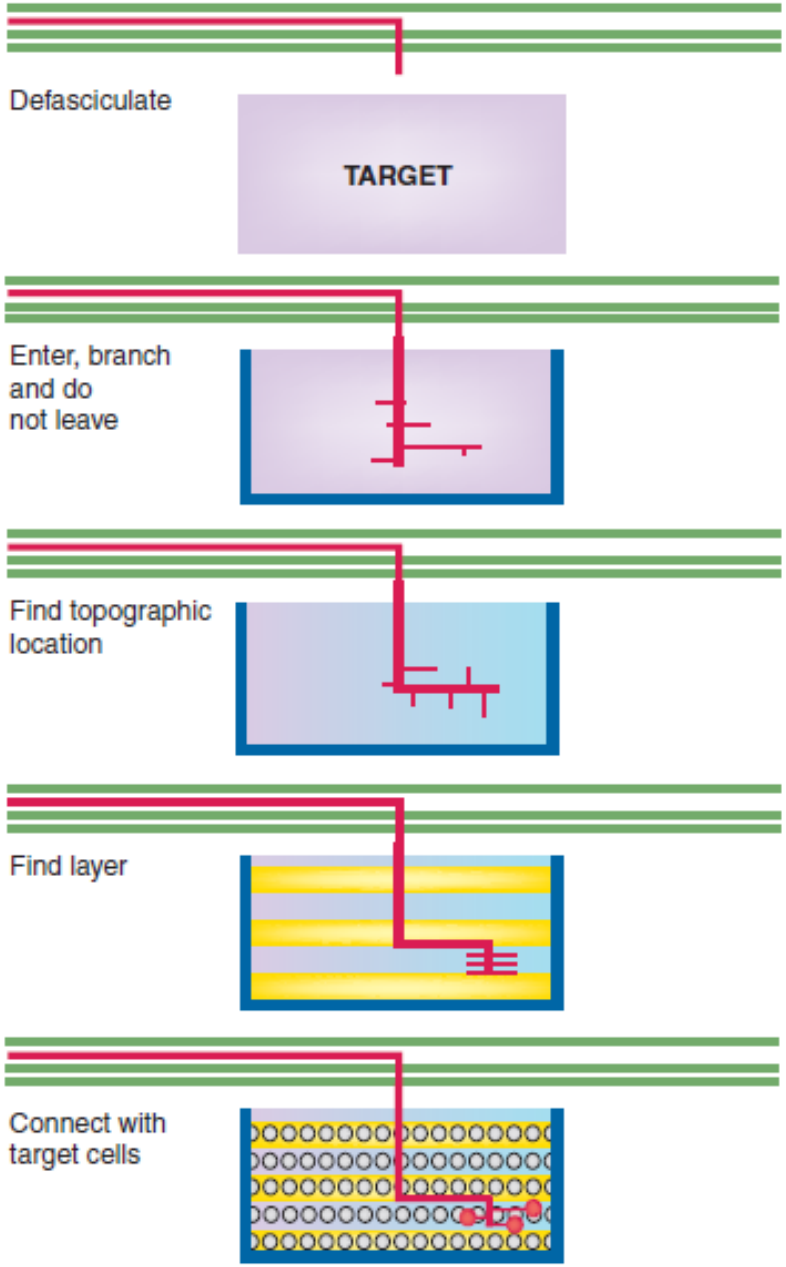
Síntesis local de proteínas y degradación



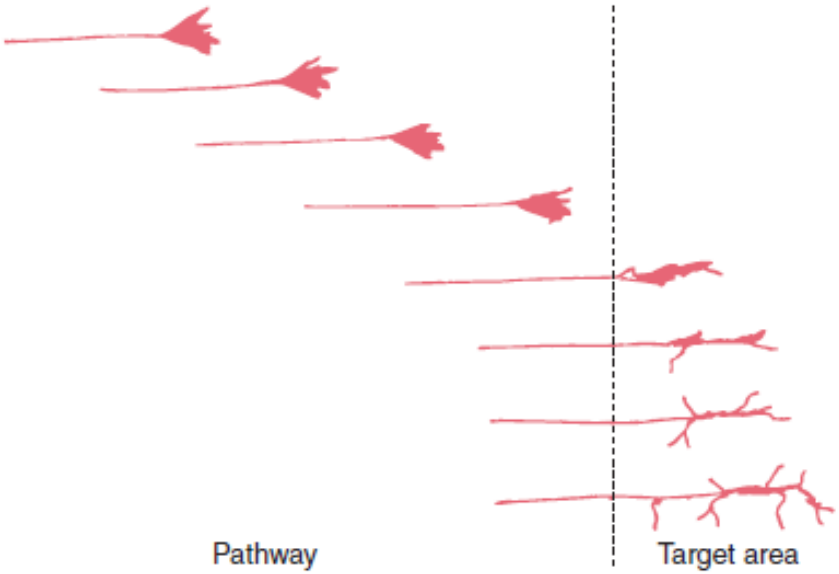
El estímulo induce la síntesis y la degradación local de proteínas

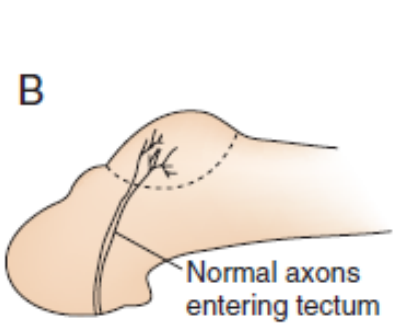
Campbell & Holt, 2001

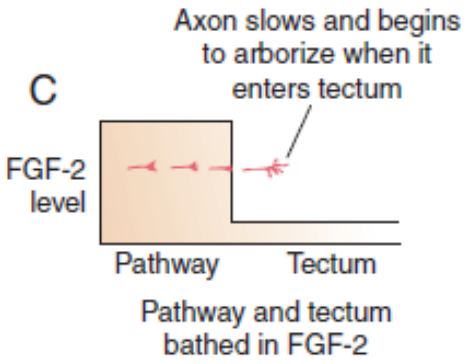
Inervación del blanco



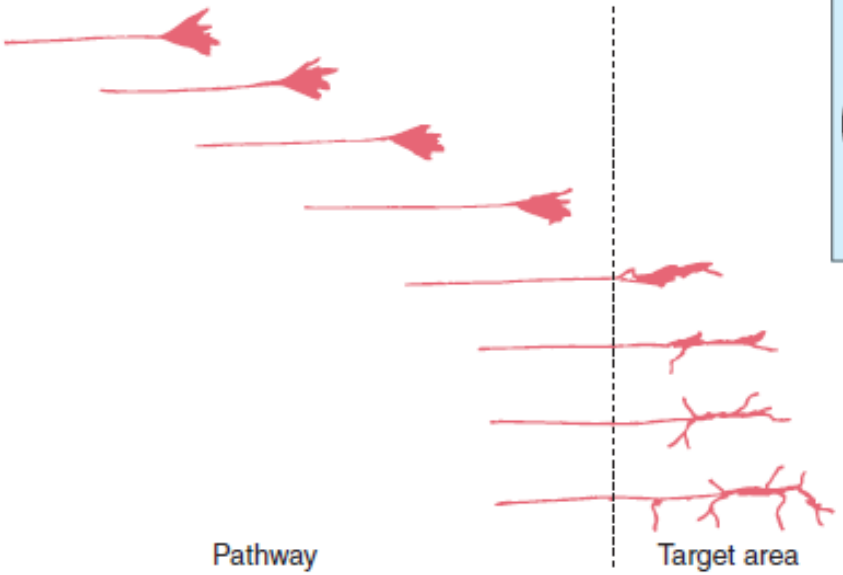
Inervación del blanco

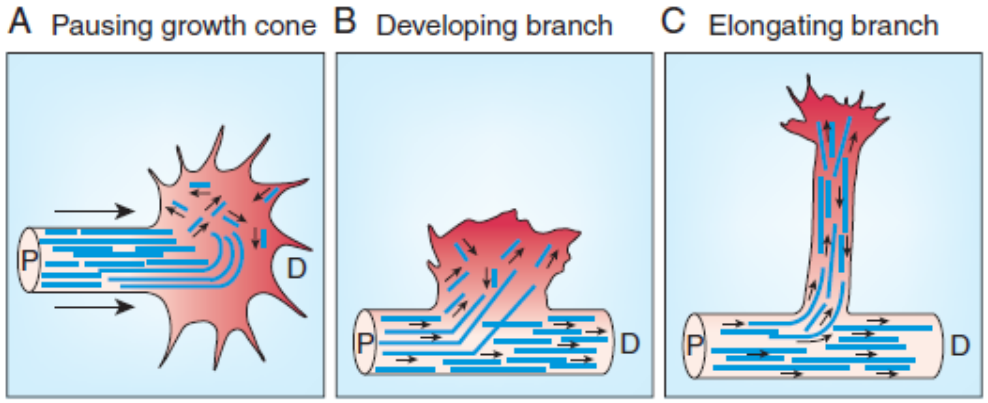


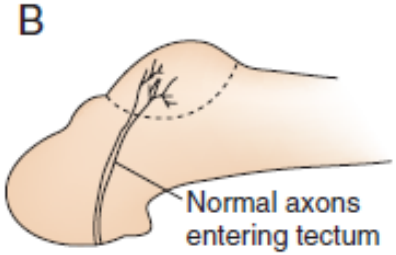


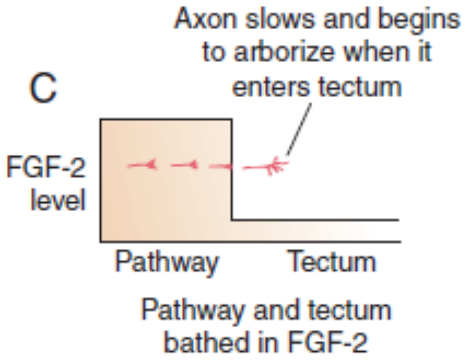


Inervación del blanco

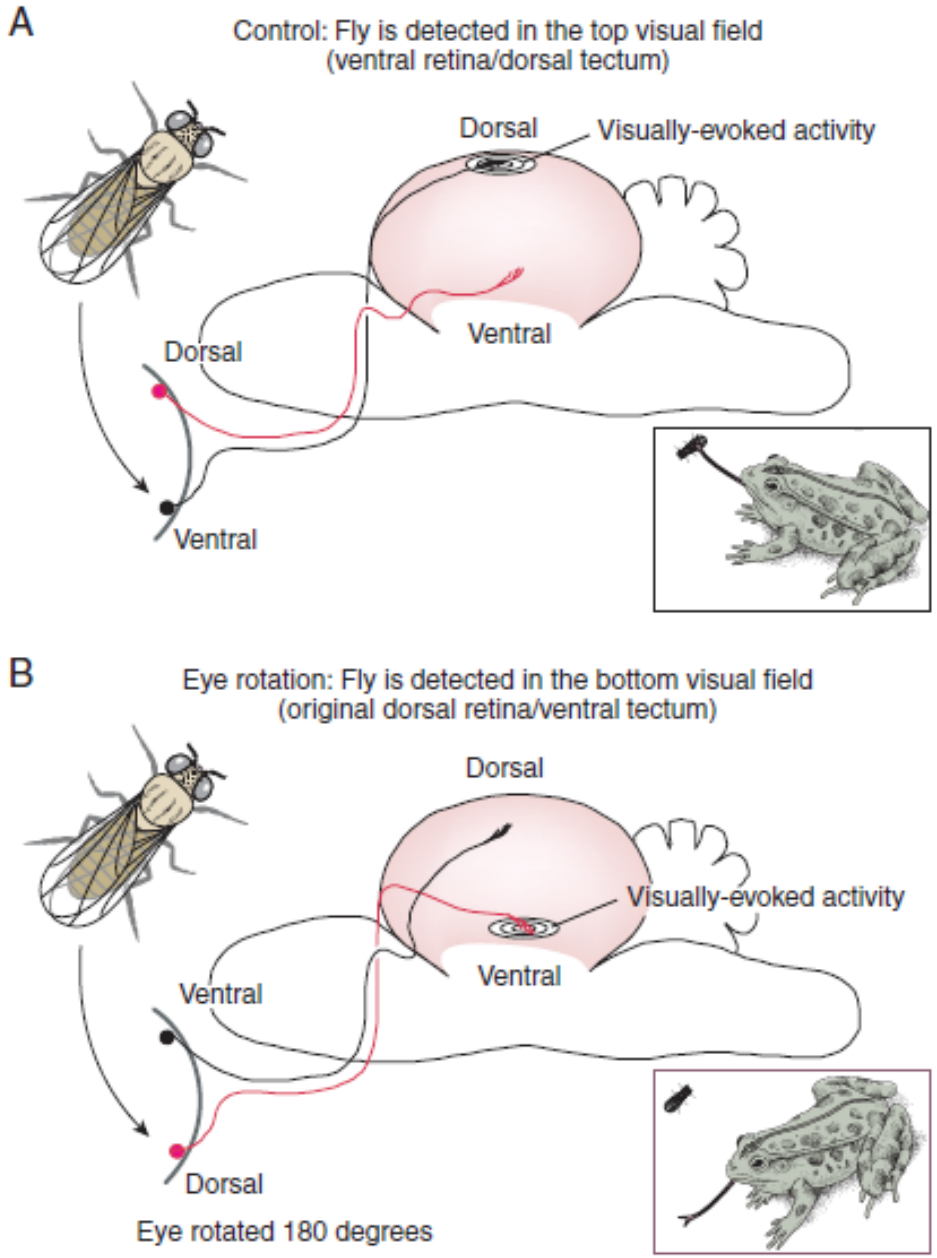


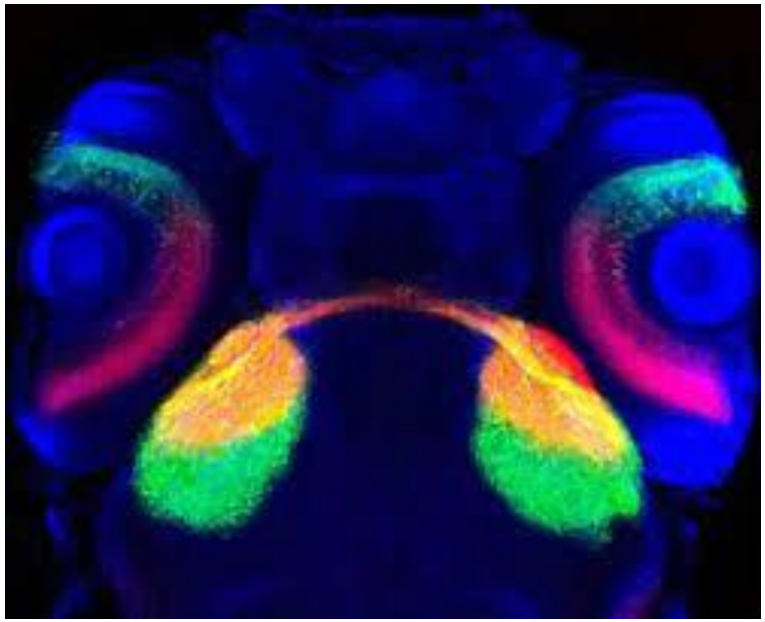




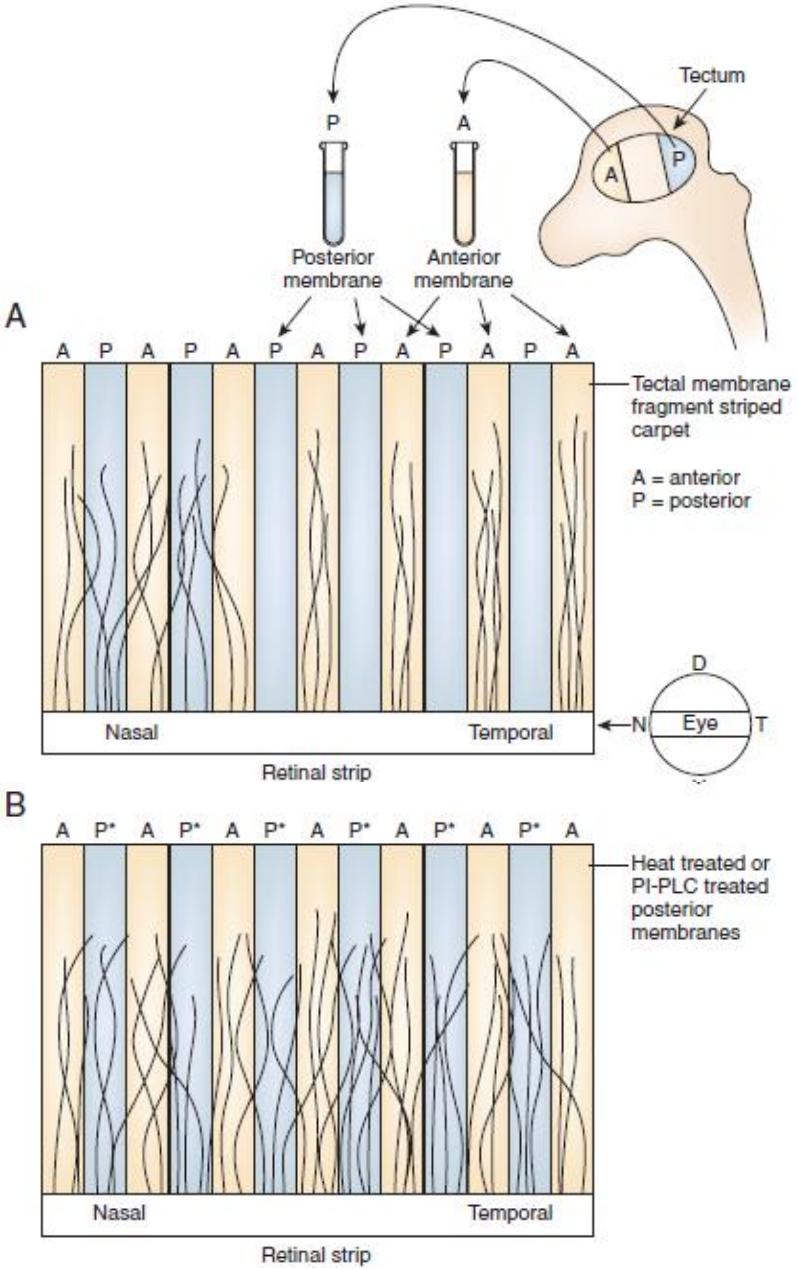


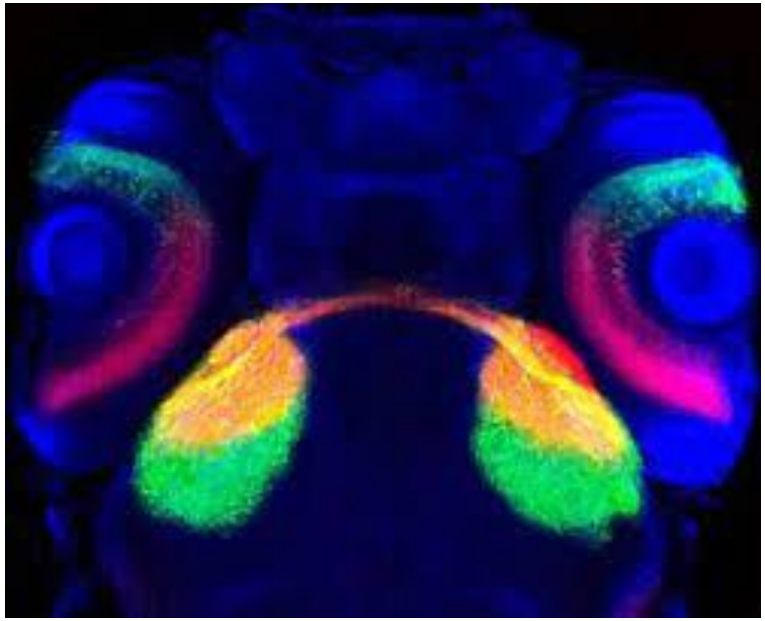
Mapas topográficos



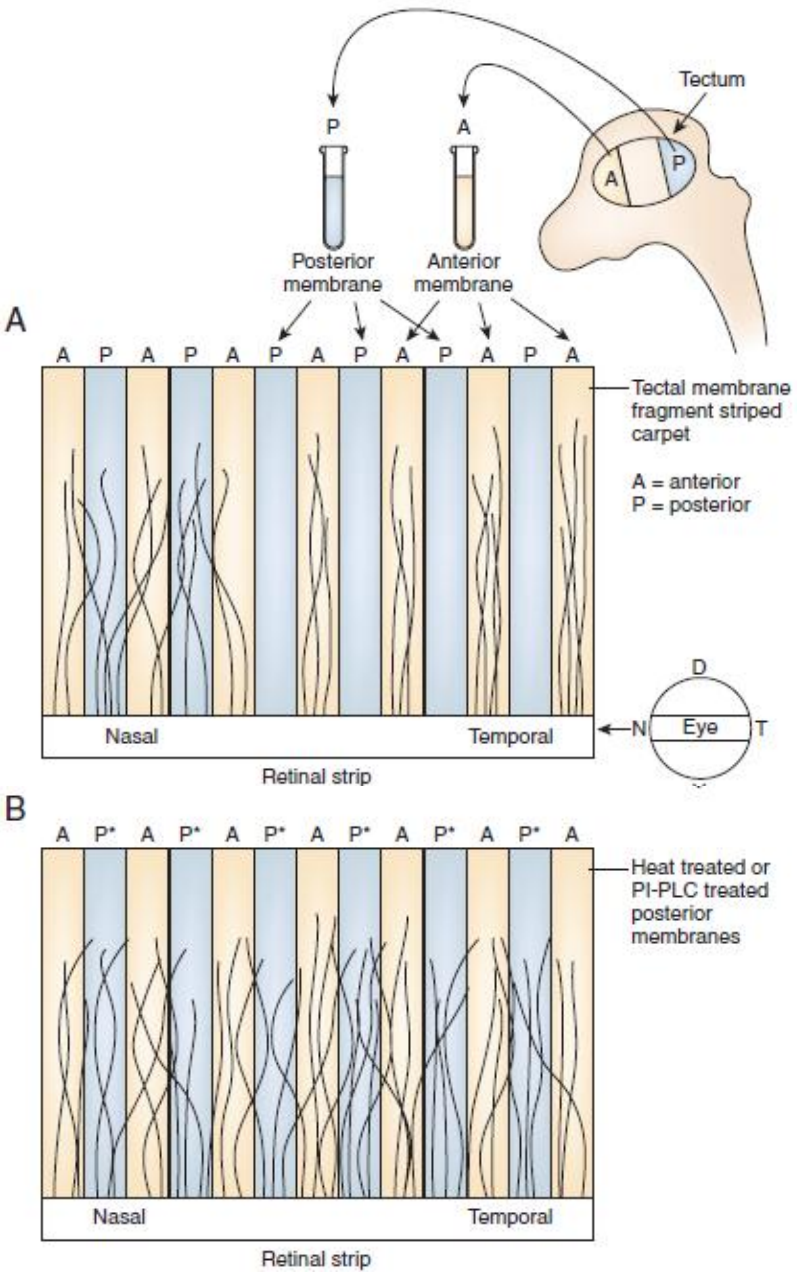


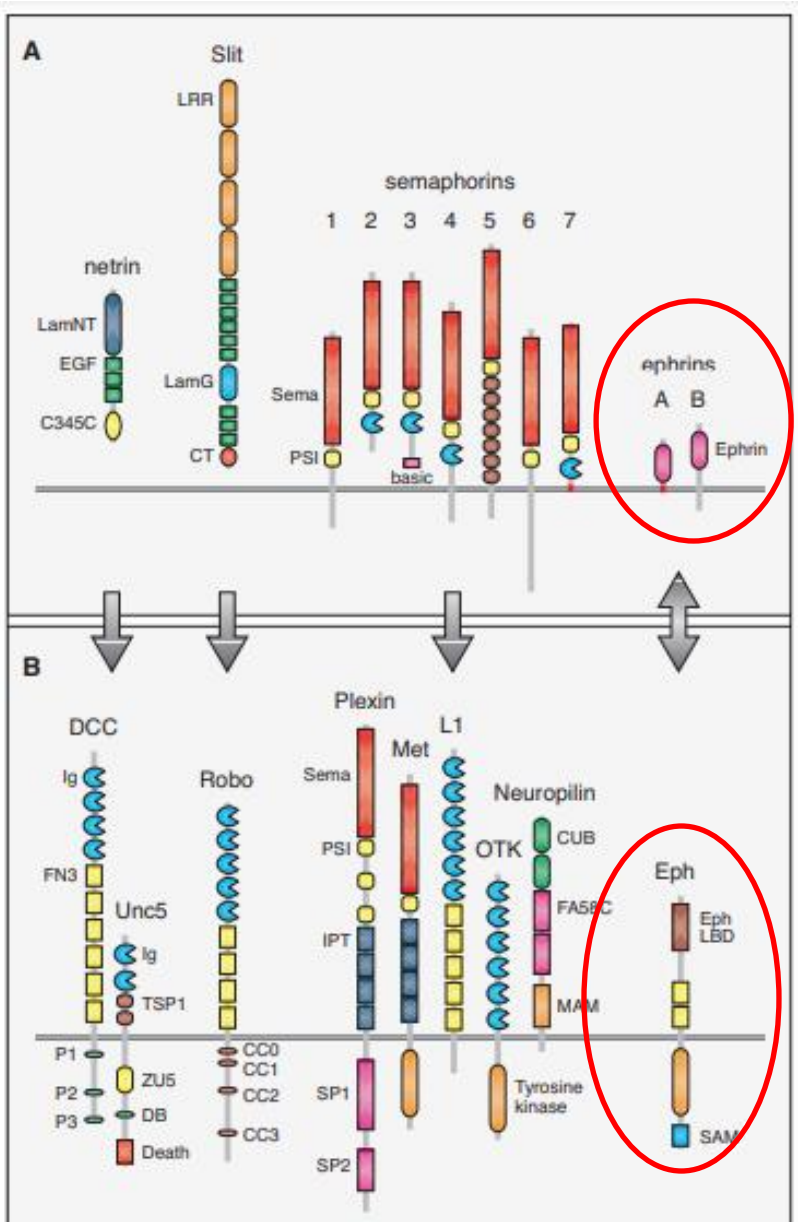
Mapas topográficos





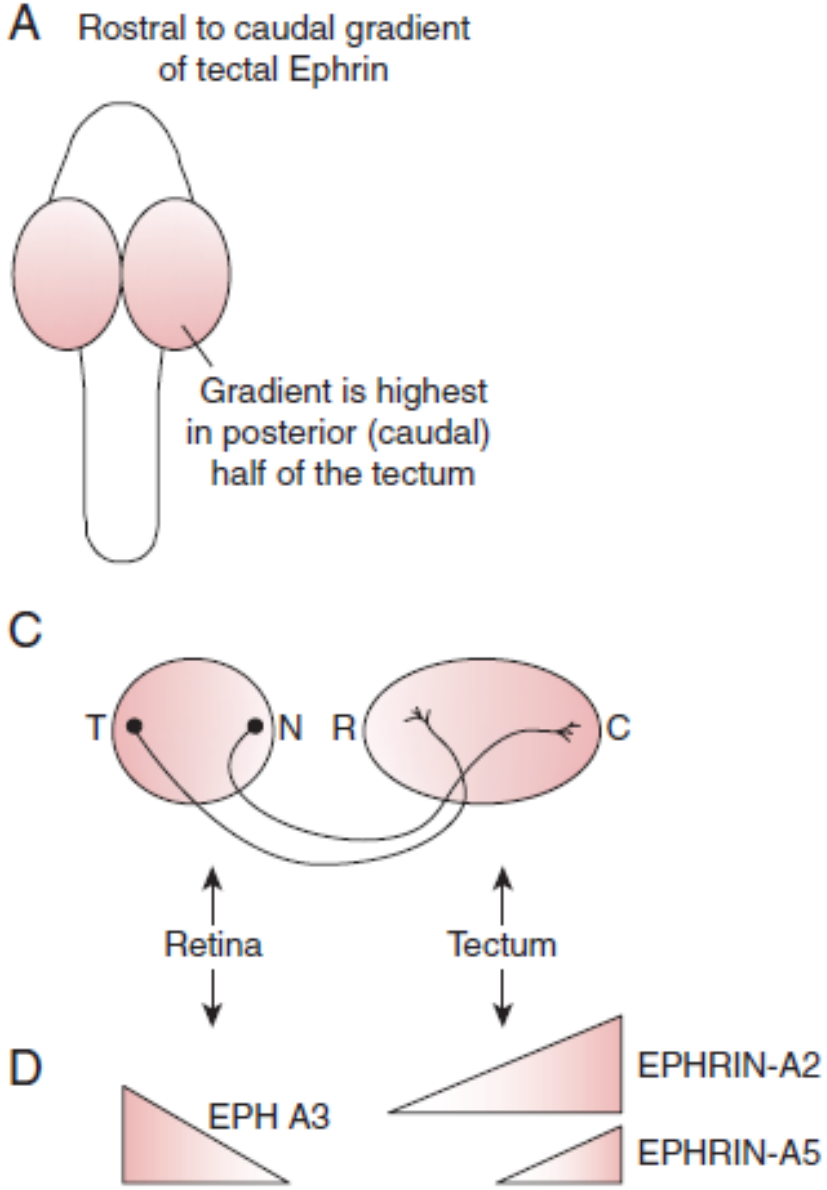
Mapas topográficos

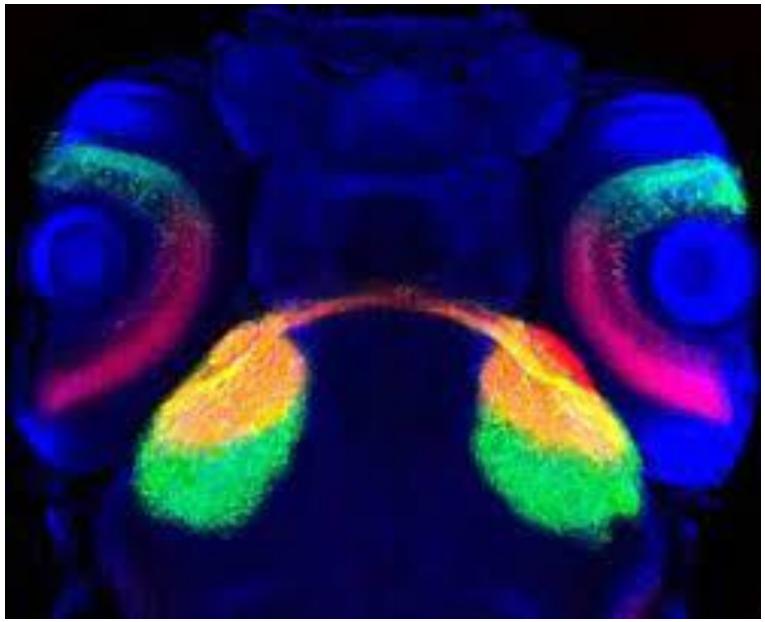




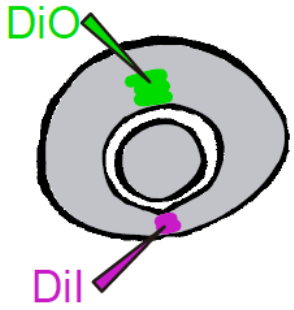
Dickson, 2002

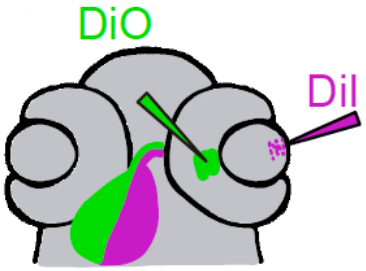
Mapas topográficos

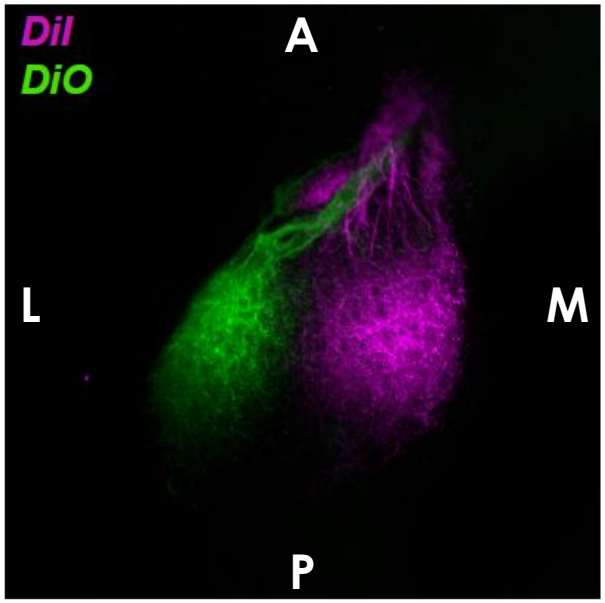




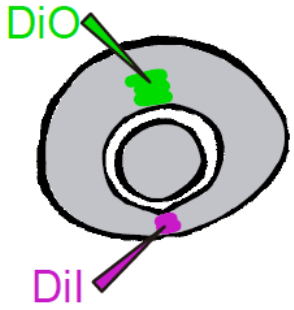
Mapas topográficos



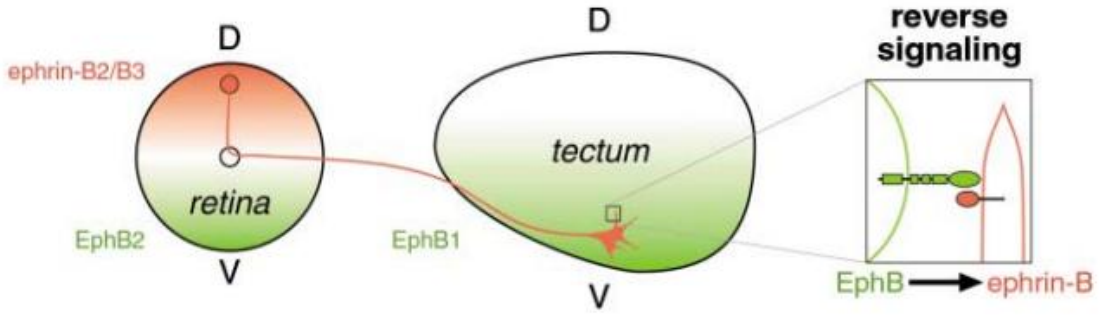


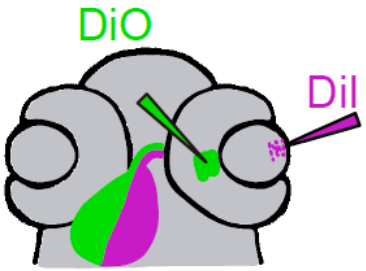


Mapas topográficos

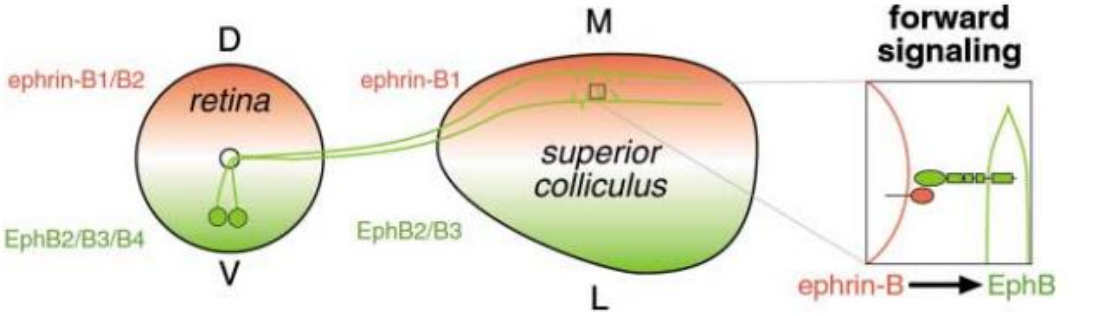


Xenopus

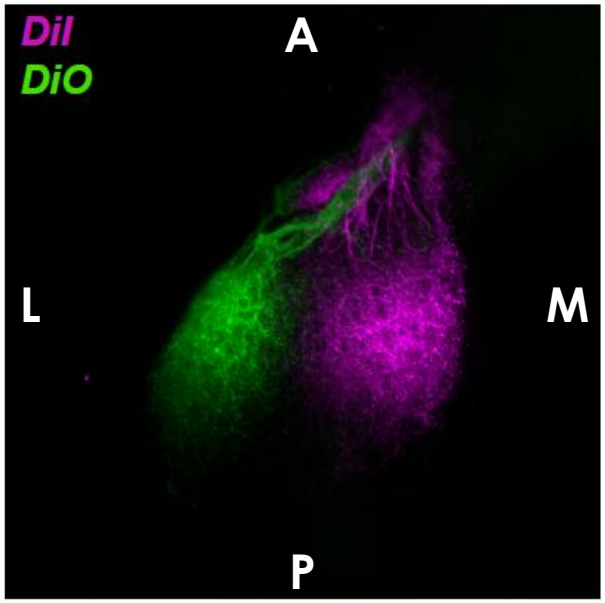




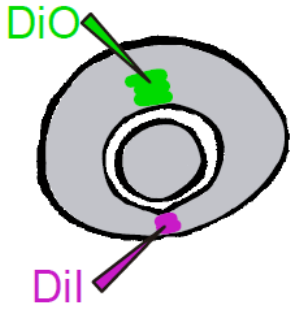
mouse



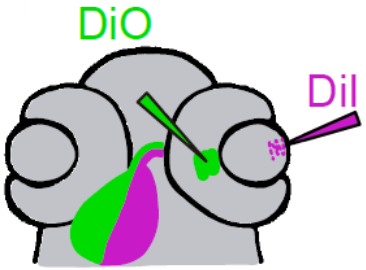
Pittman & Chien, 2002



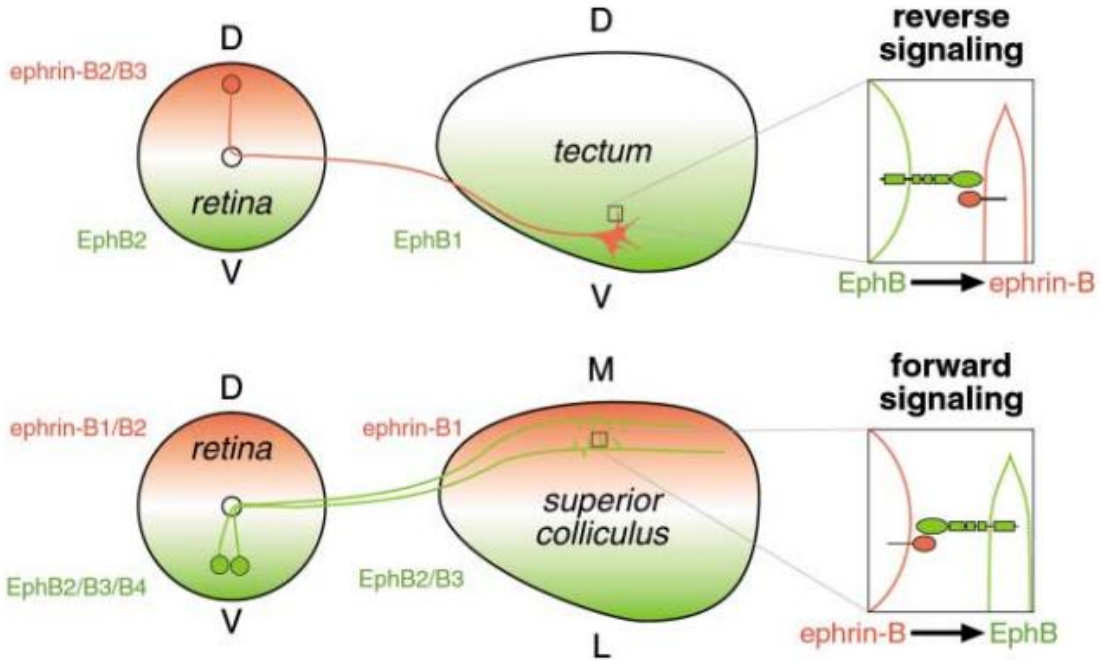
Mapas topográficos



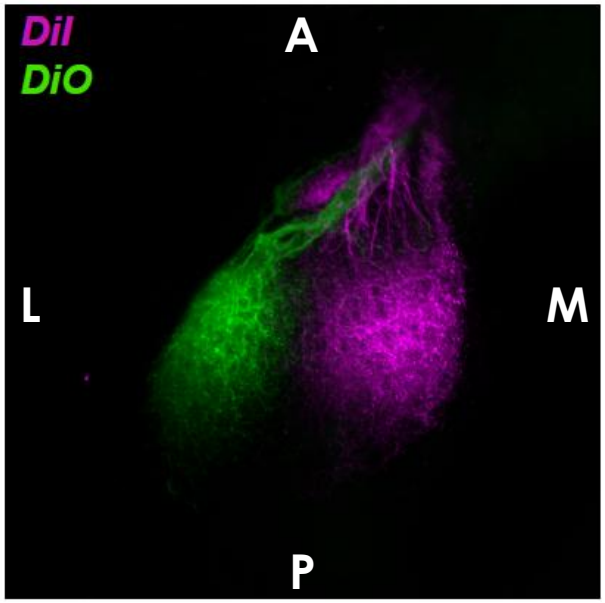
Xenopus



mouse

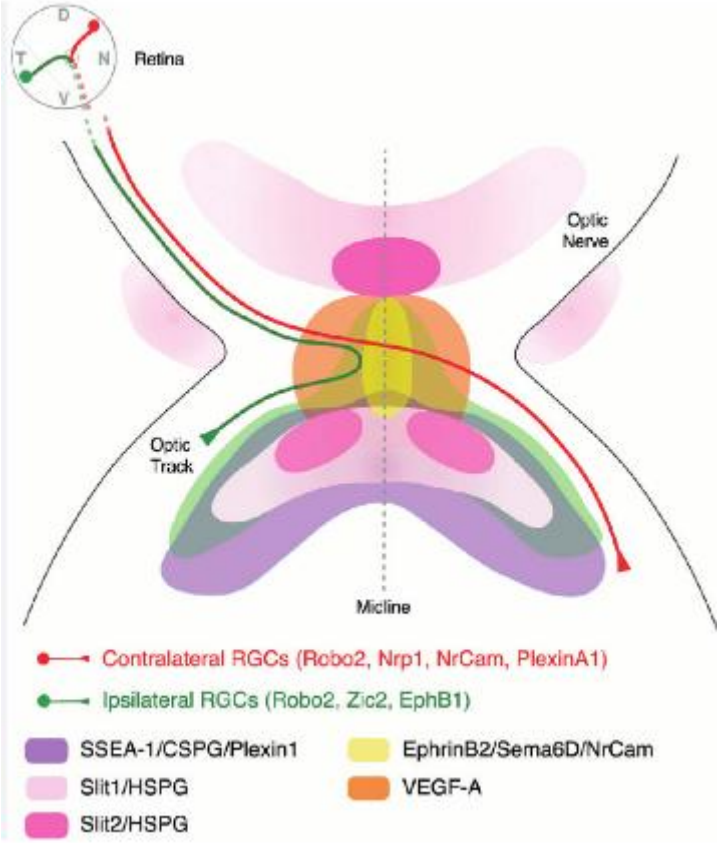


Pittman & Chien, 2002



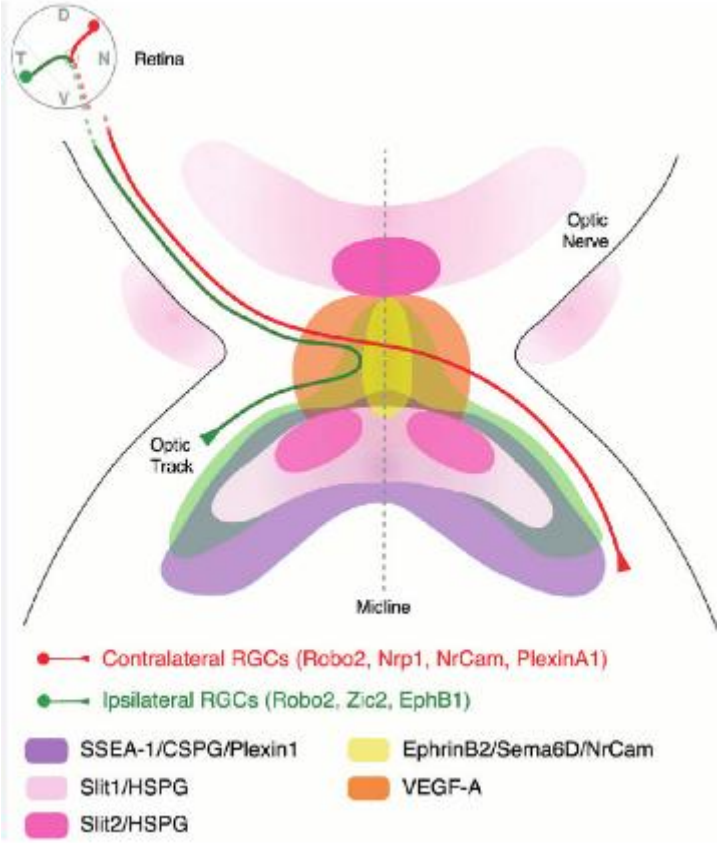
Un gradiente de Efrinas en el tectum que permite la formación de los mapas retinotópicos

Proyecciones ipsilaterales

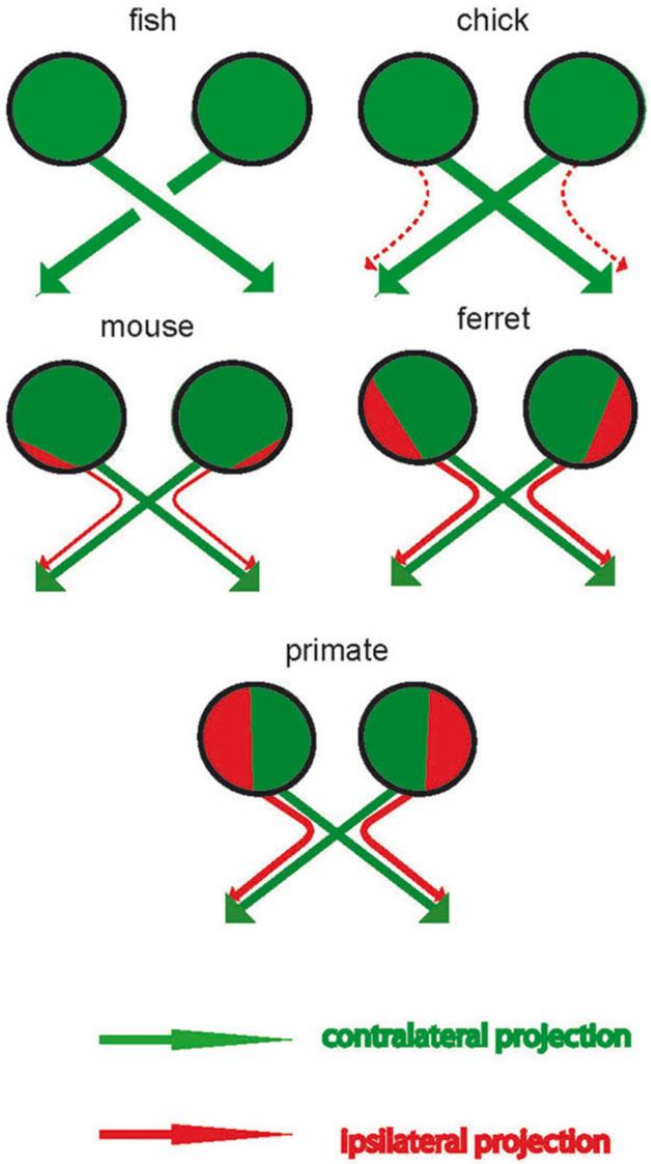


Erskine & Herrera, 2014

Proyecciones ipsilaterales



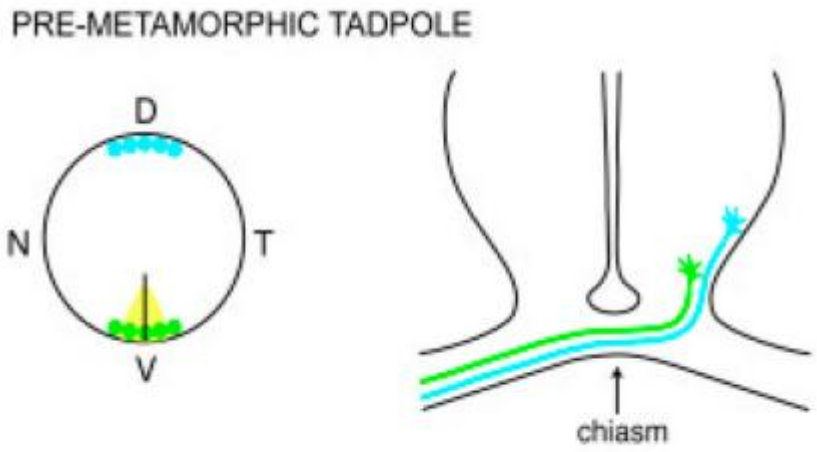
Erskine & Herrera, 2014



Larsson, 2015

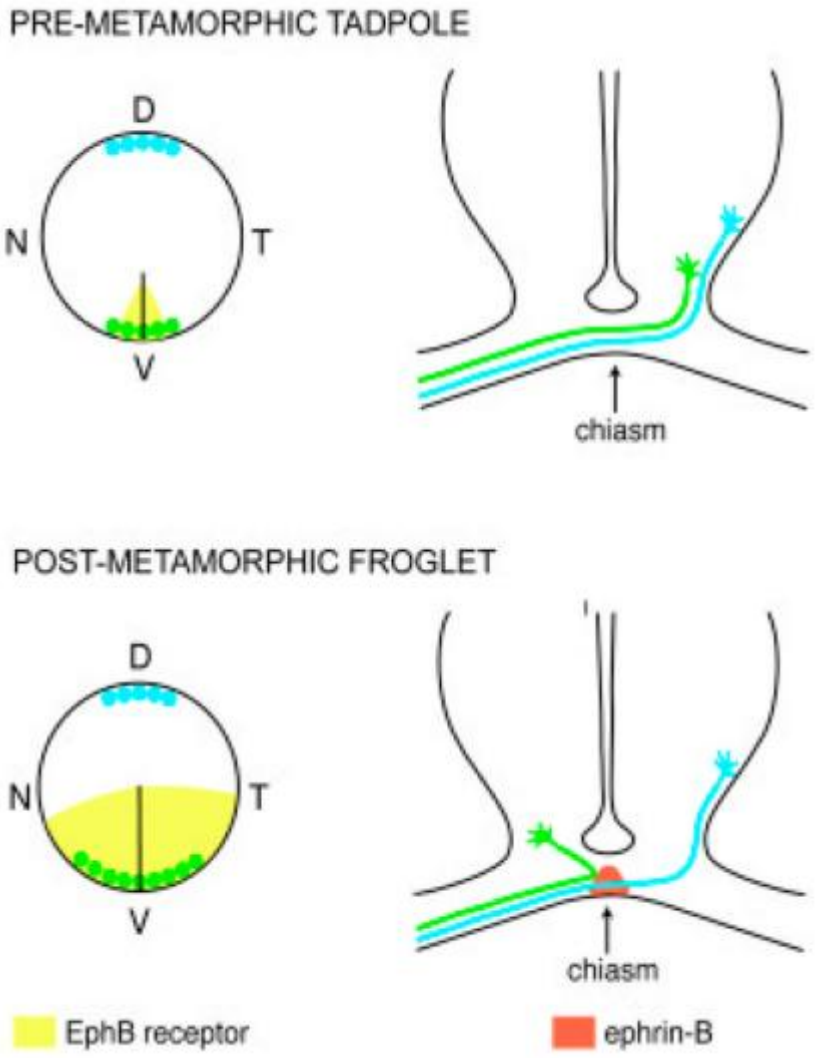
Proyecciones ipsilaterales

Proyecciones ipsilaterales



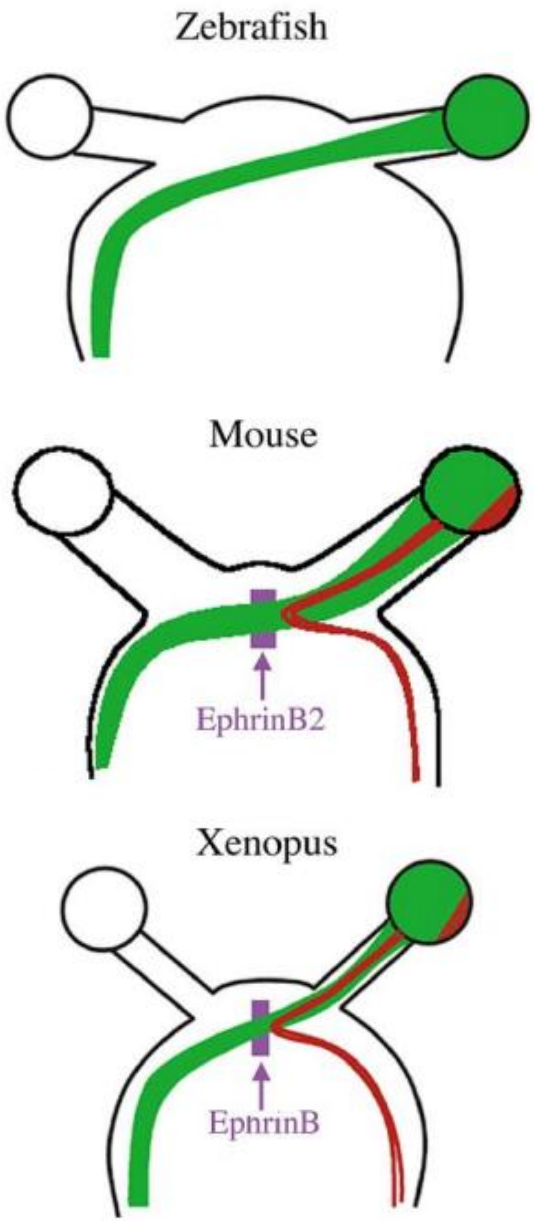
Mann et al., 2004

Proyecciones ipsilaterales

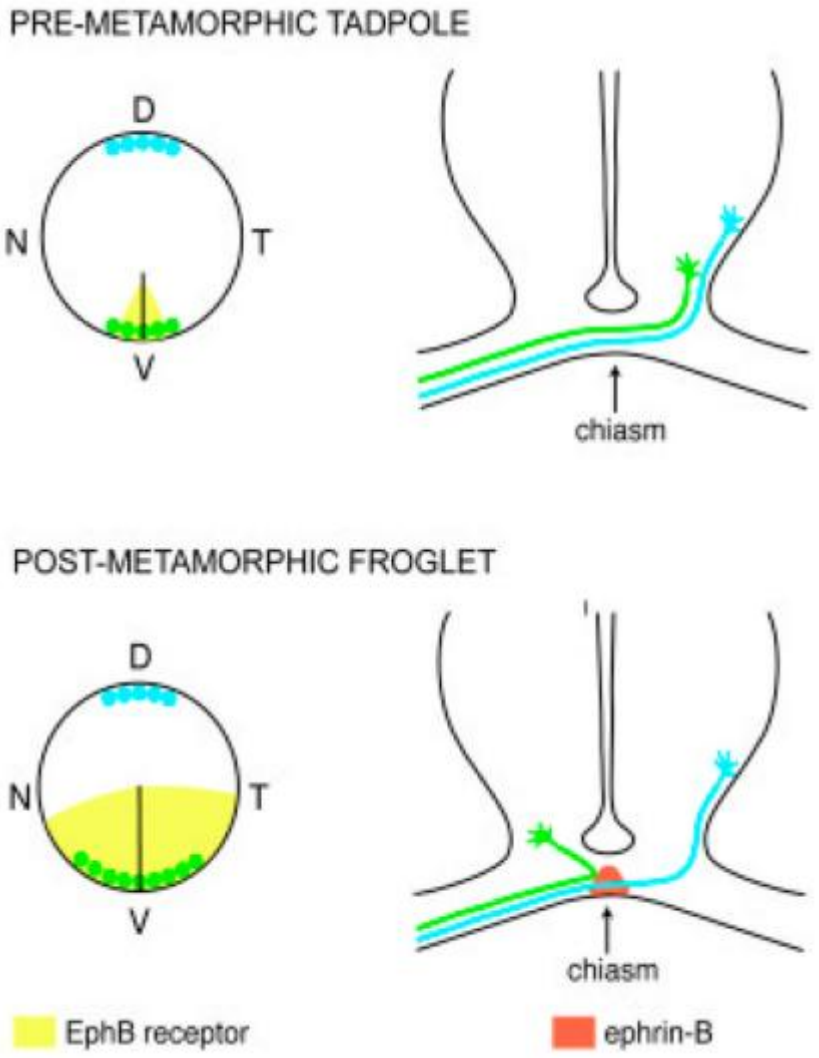


Mann et al., 2004

Proyecciones ipsilaterales

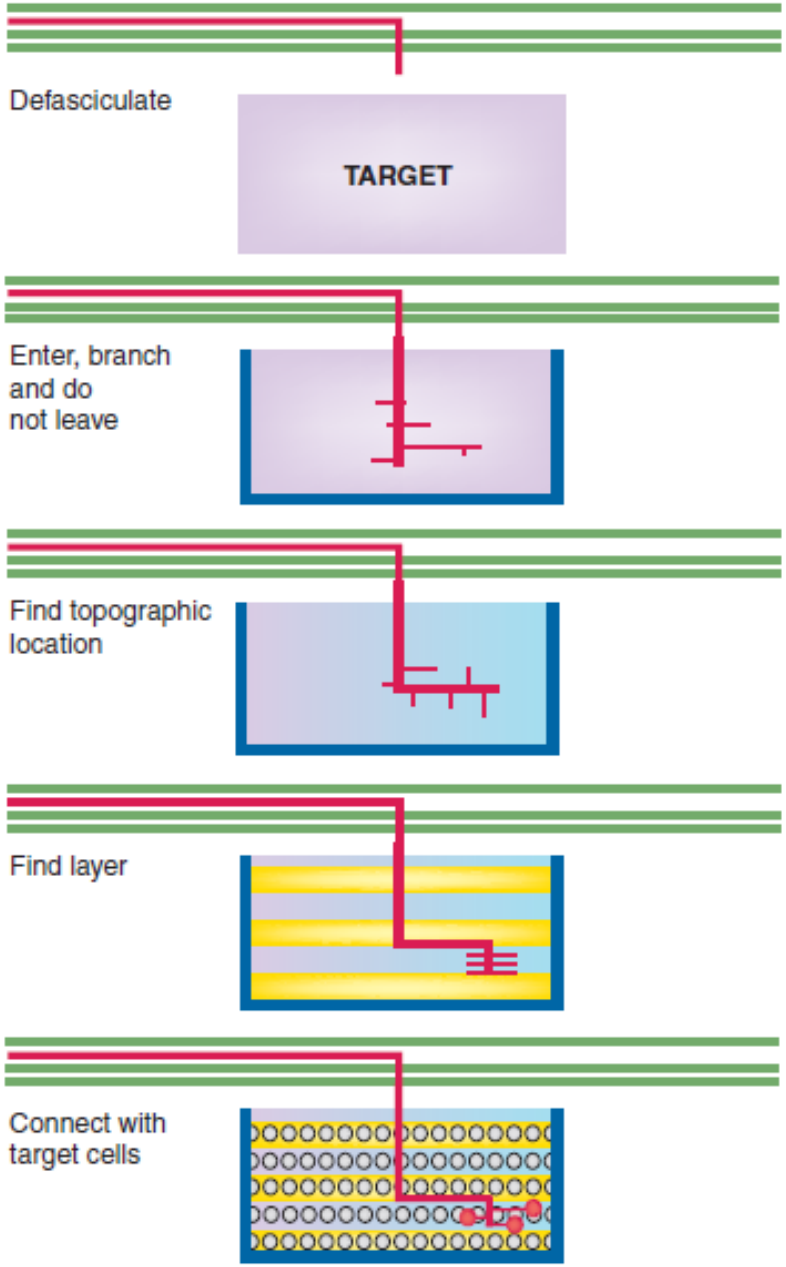


Jeffery & Erskine, 2005

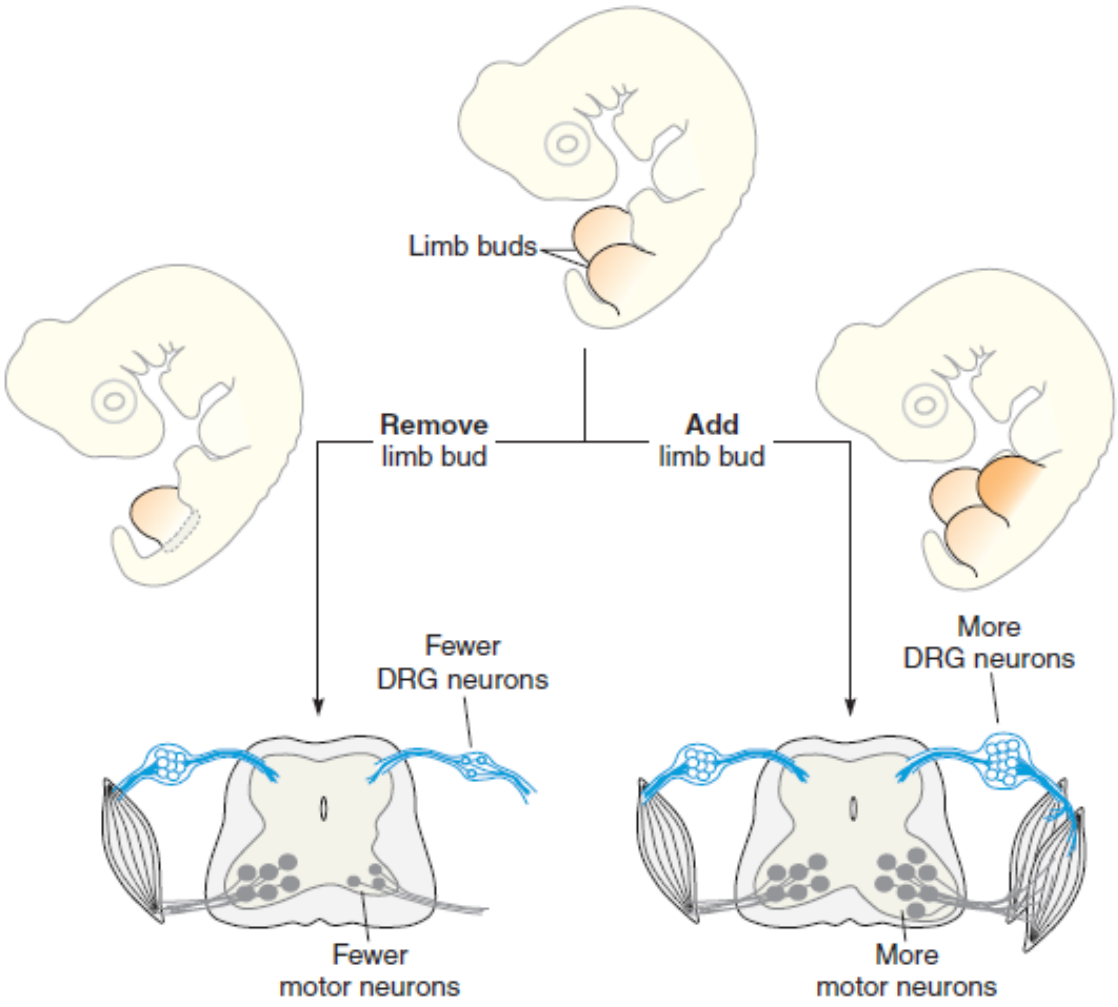


Mann et al., 2004

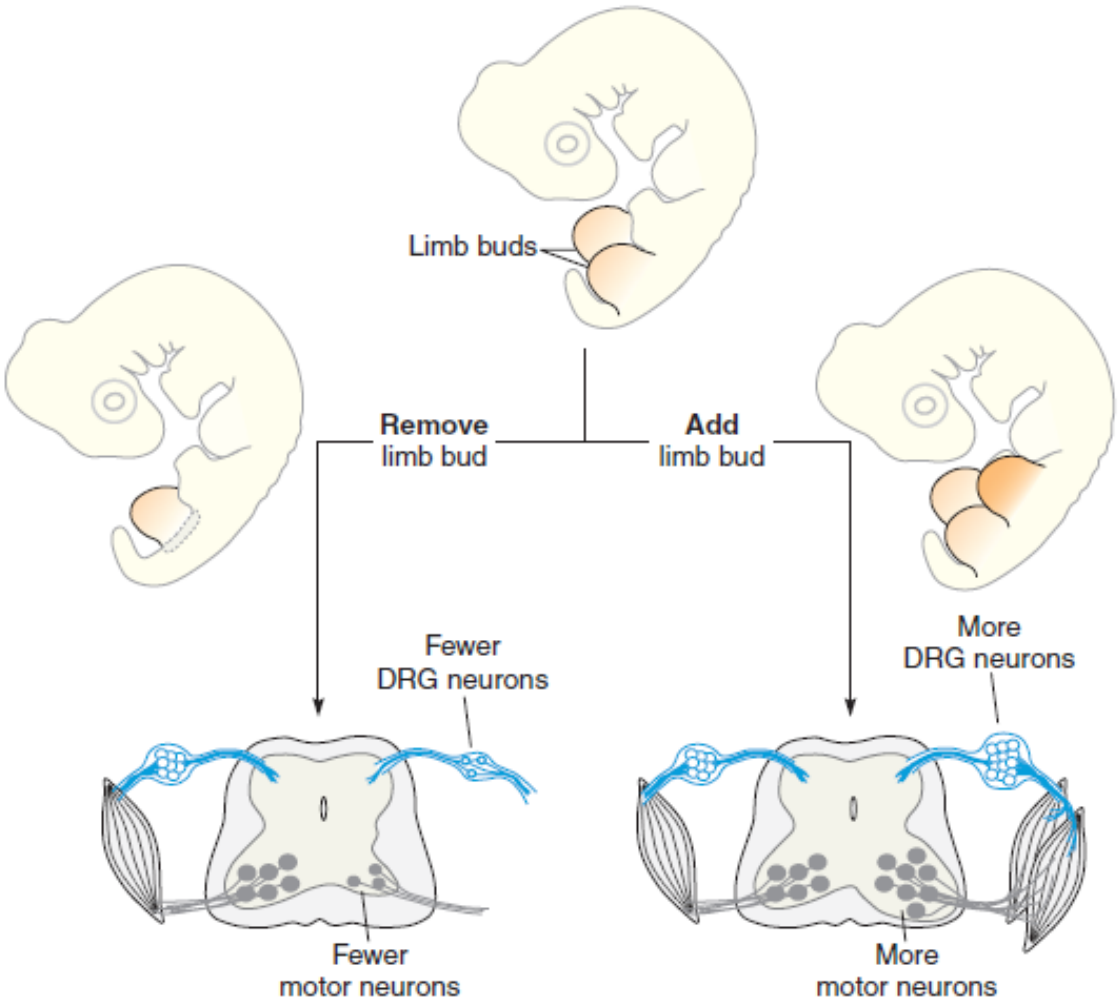
Inervación del blanco

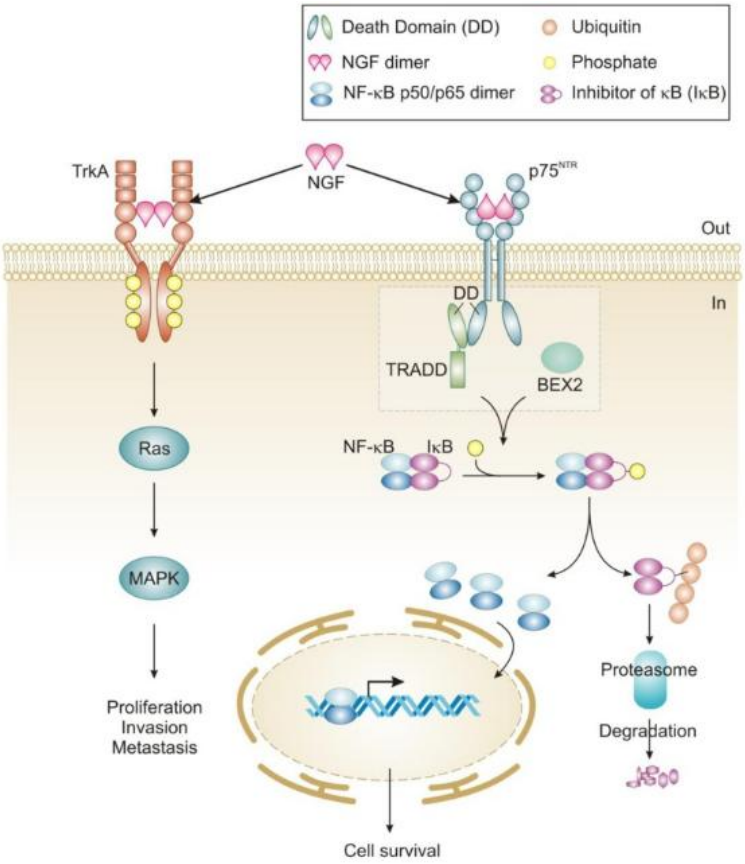


Factores de supervivencia



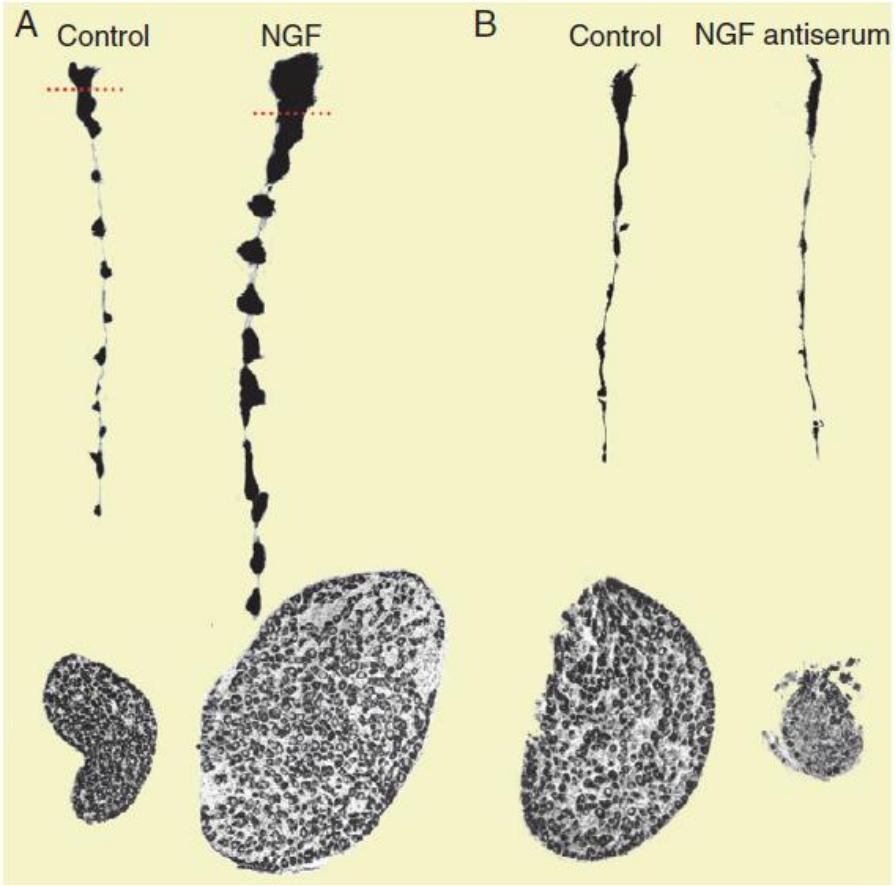
Factores de supervivencia

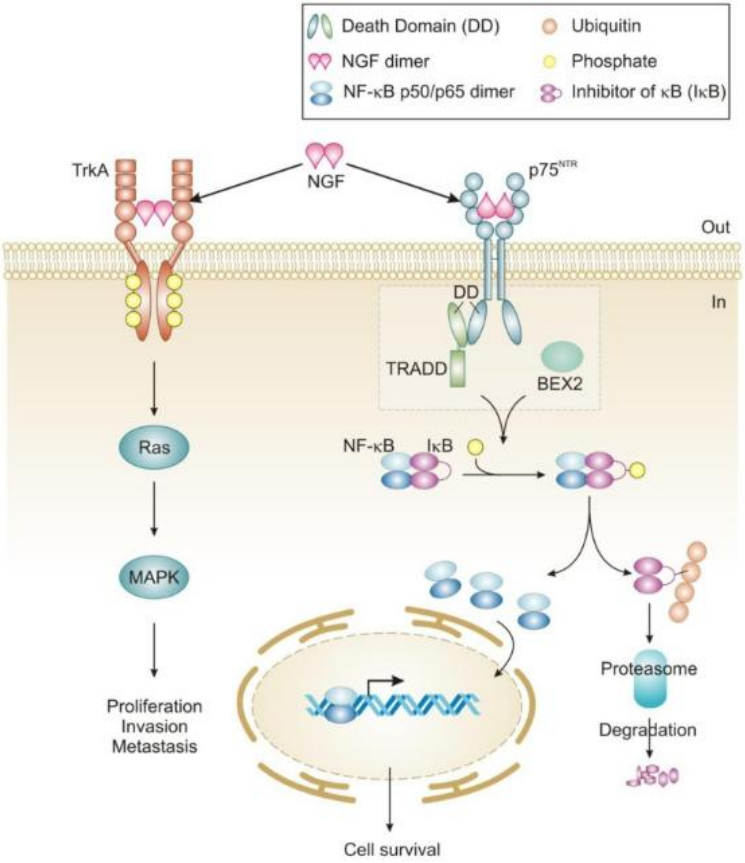




Molloy et al., 2011

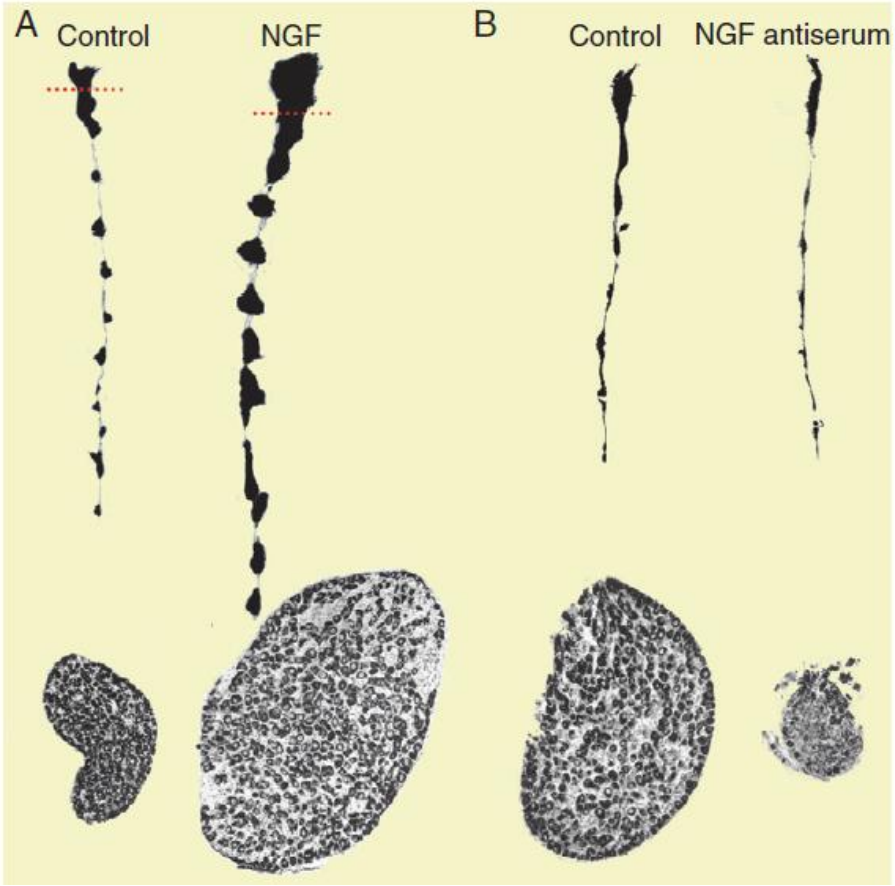
Factores de supervivencia

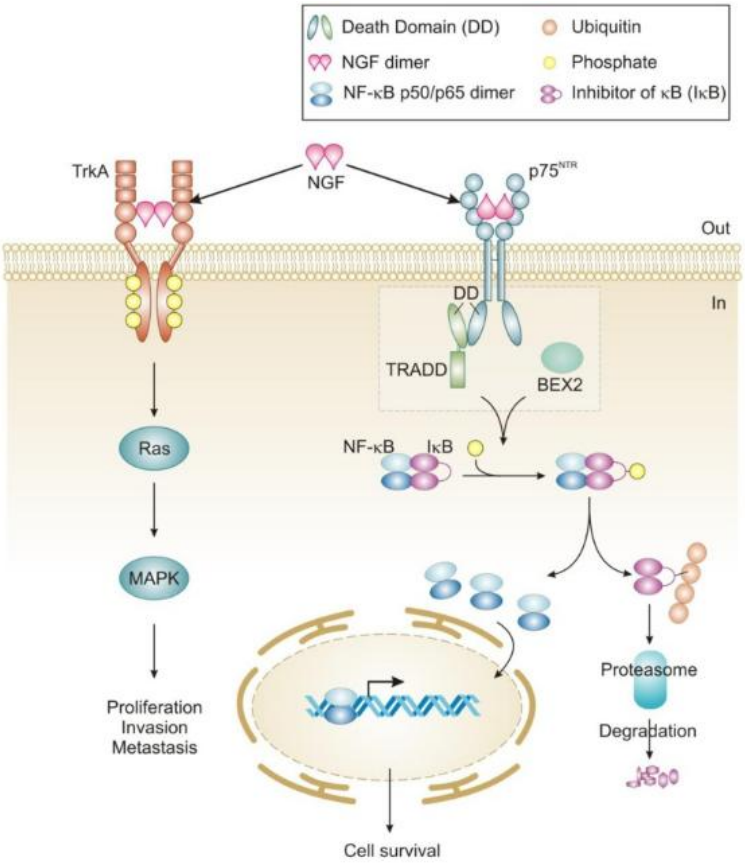




Molloy et al., 2011

Factores de supervivencia





Molloy et al., 2011

La neurona precisa recibir señales tróficas del tejido blanco para sobrevivir