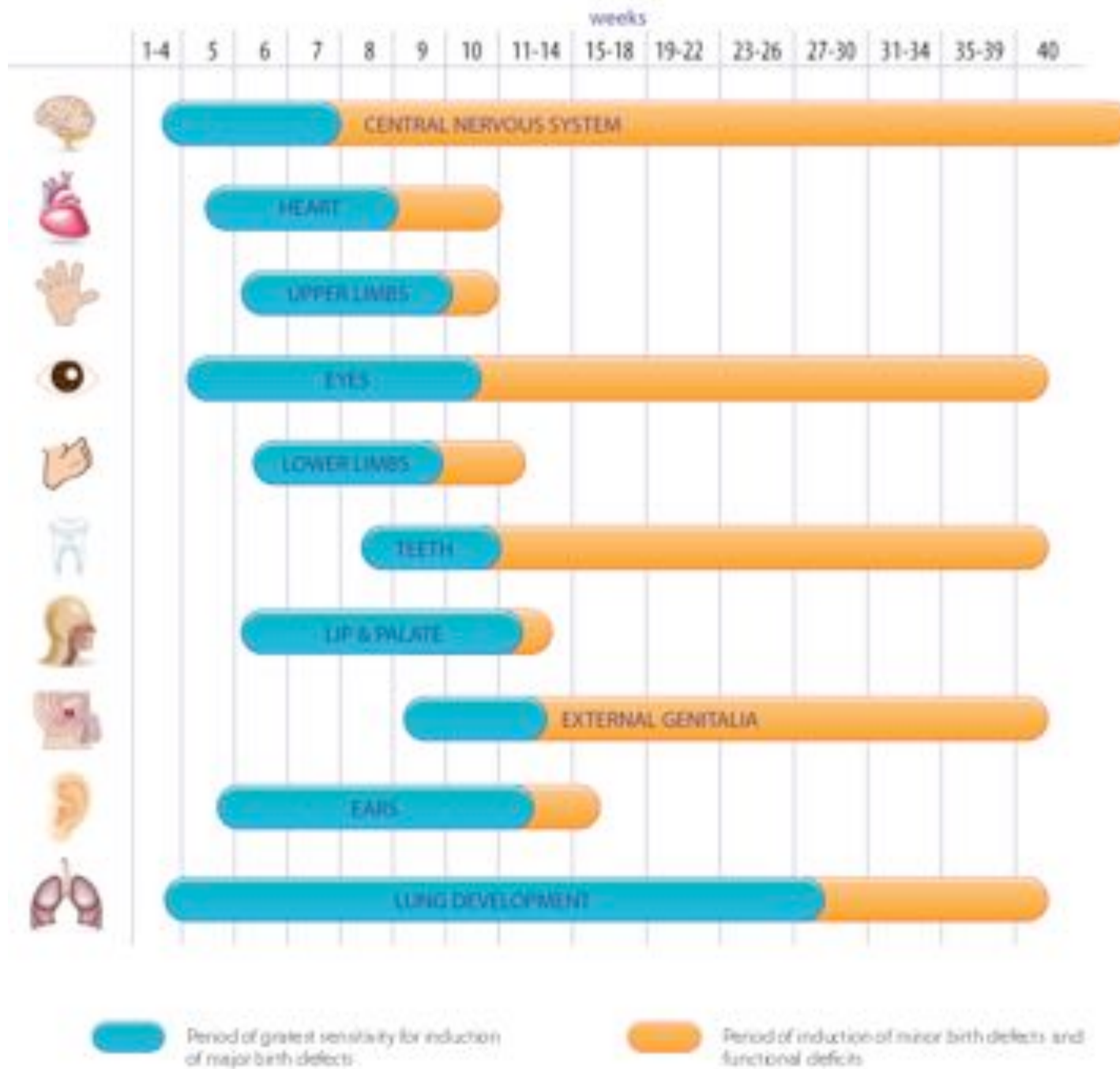
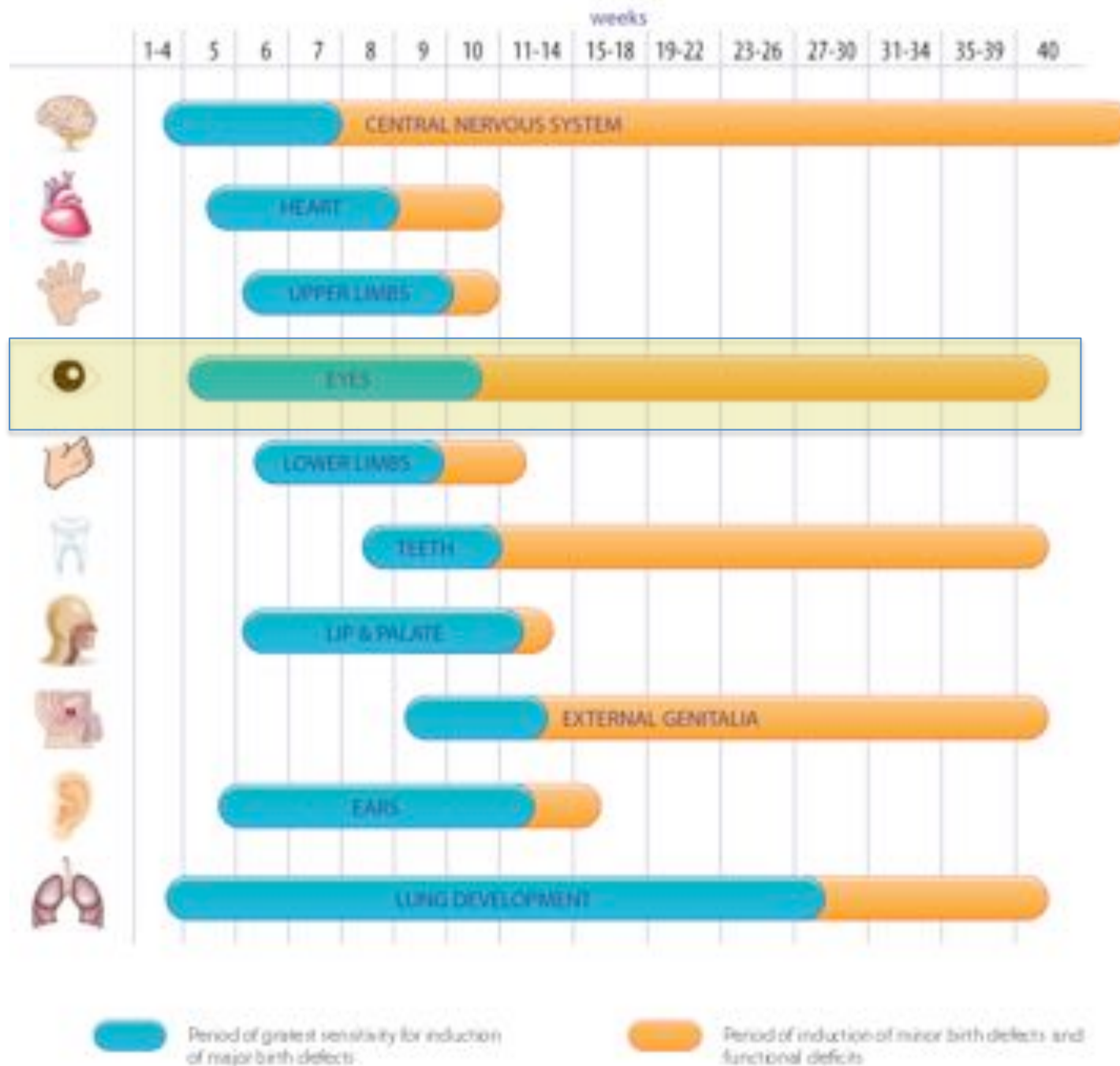


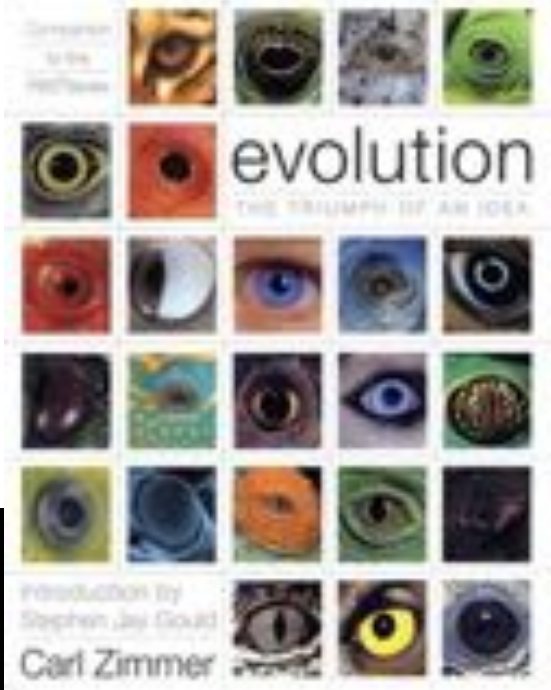
ORGANOGENESE:



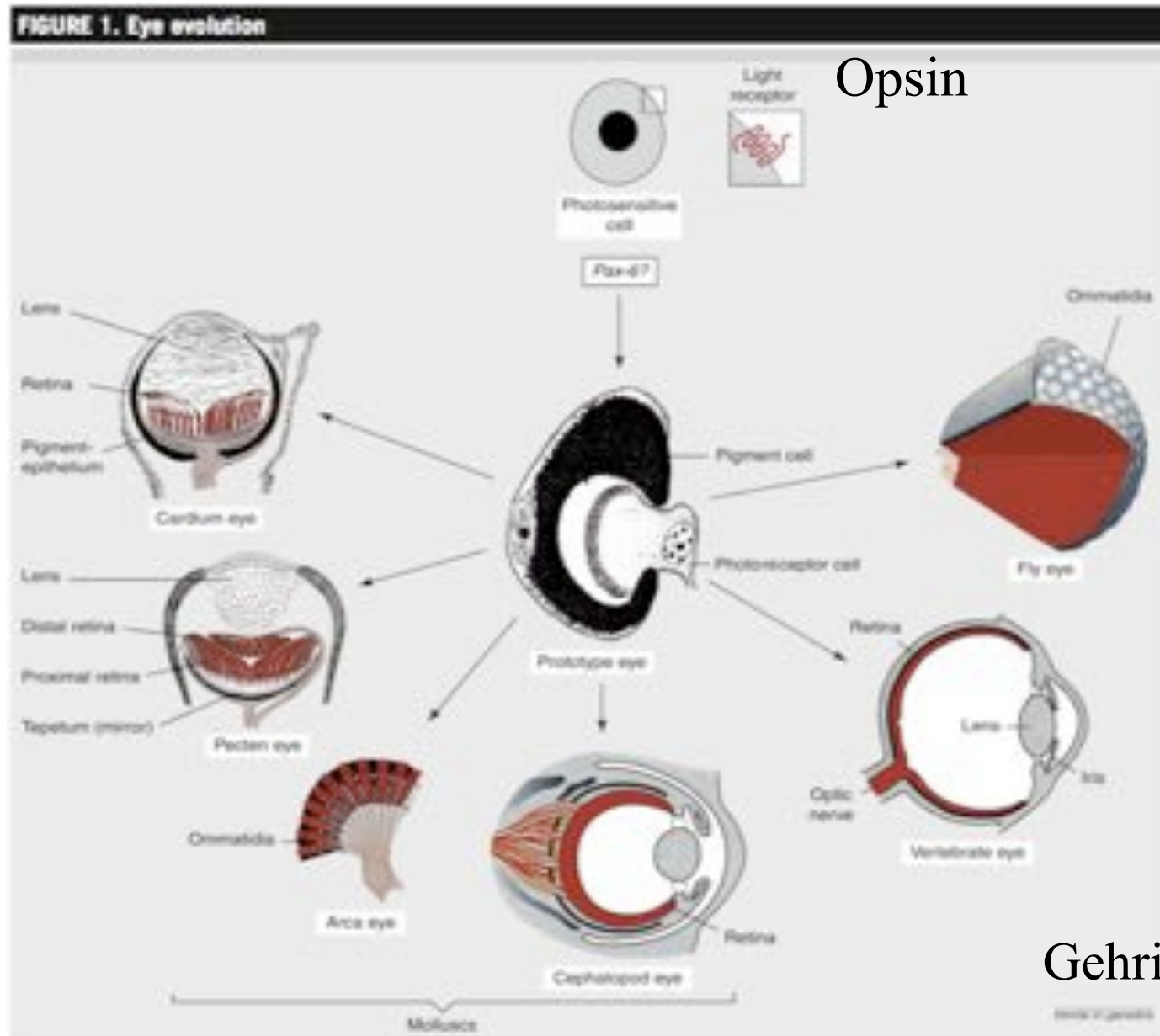
ORGANOGENESE:



Tipos de Olhos

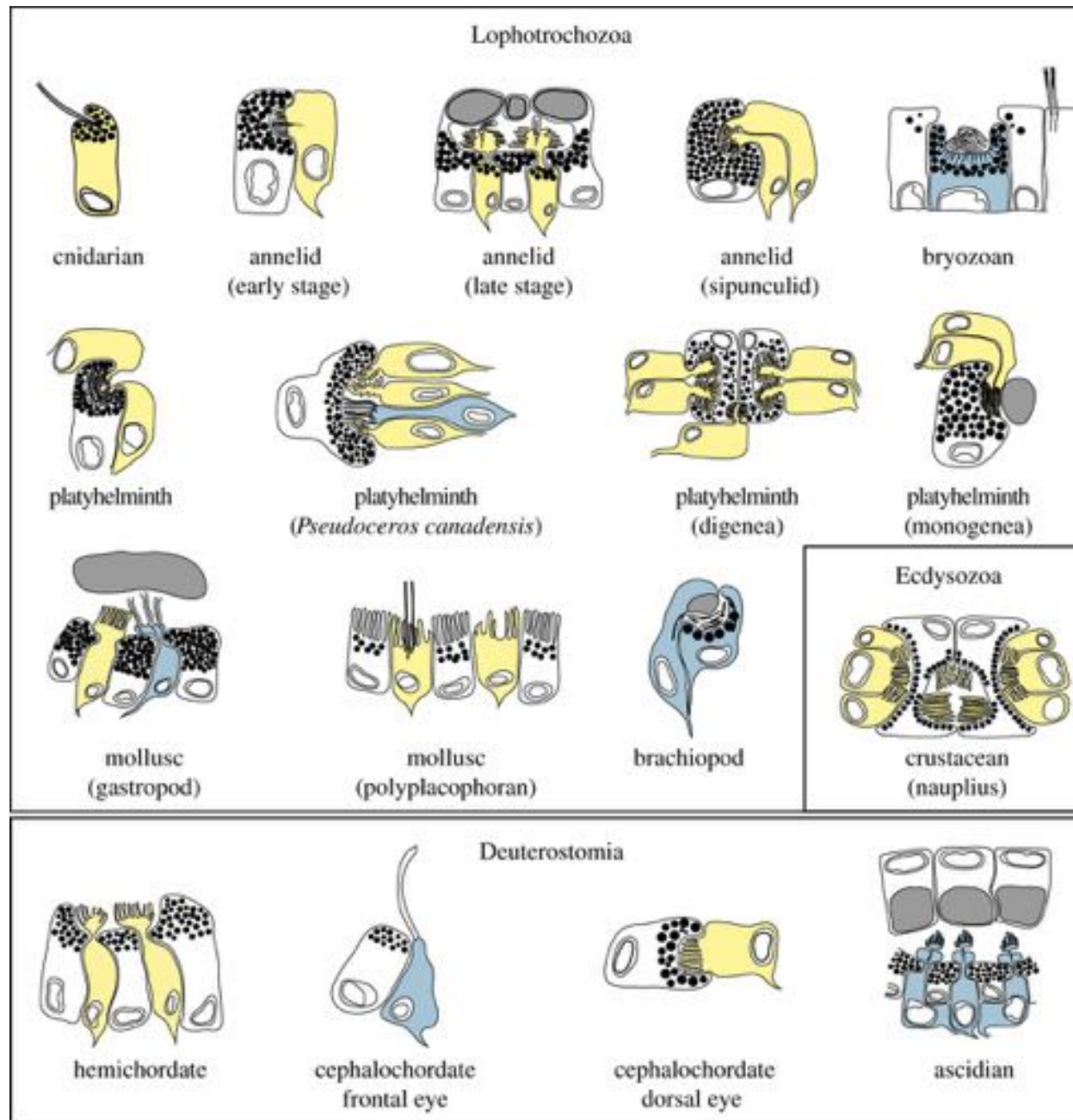


OlhOs, estruturas homólogas?

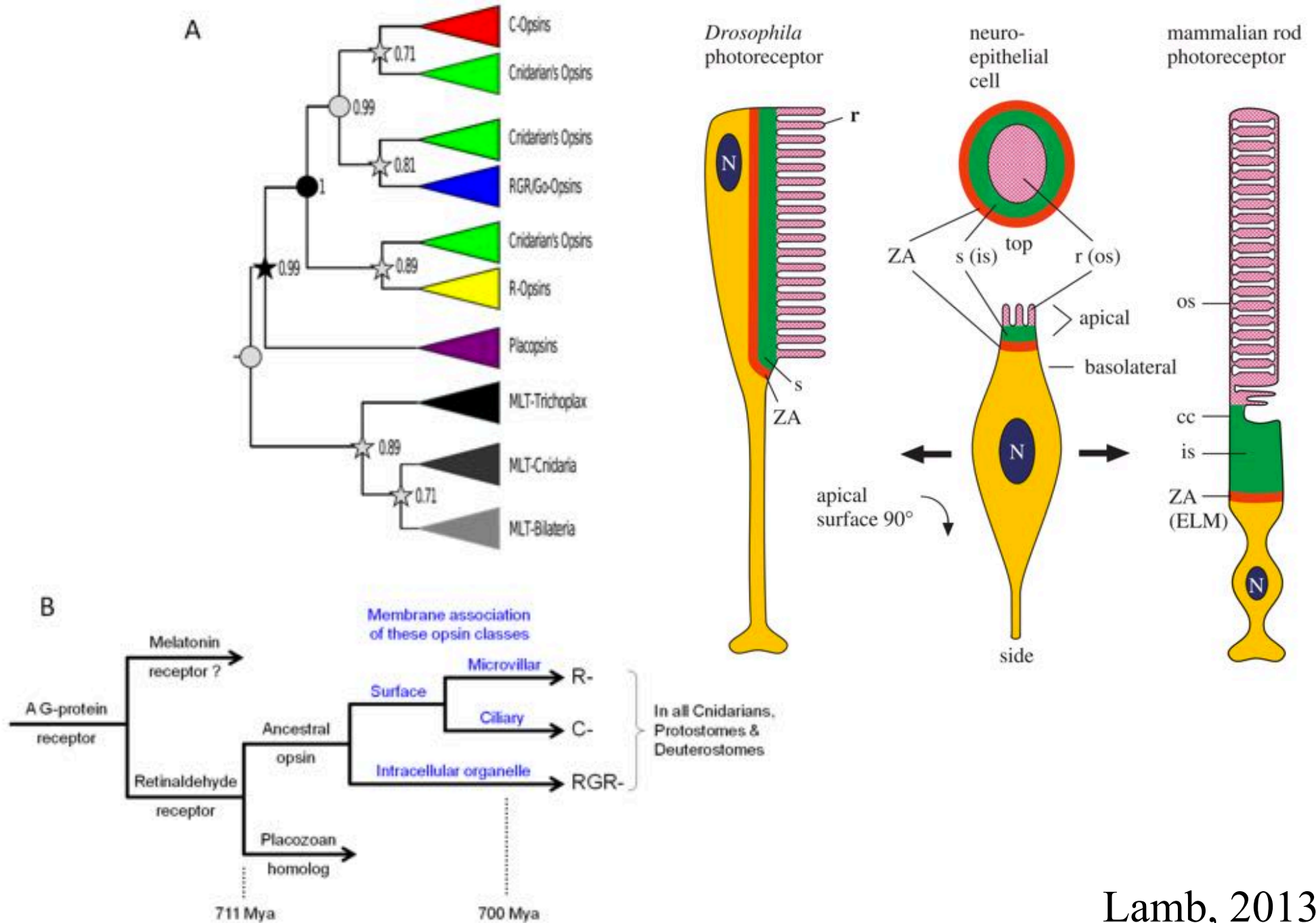


Gehring 1999

Diversity of planktonic eyes in simple larvae (Randel & Jékely, 2016)



Evolução das opsinas e células fotoreceptoras:

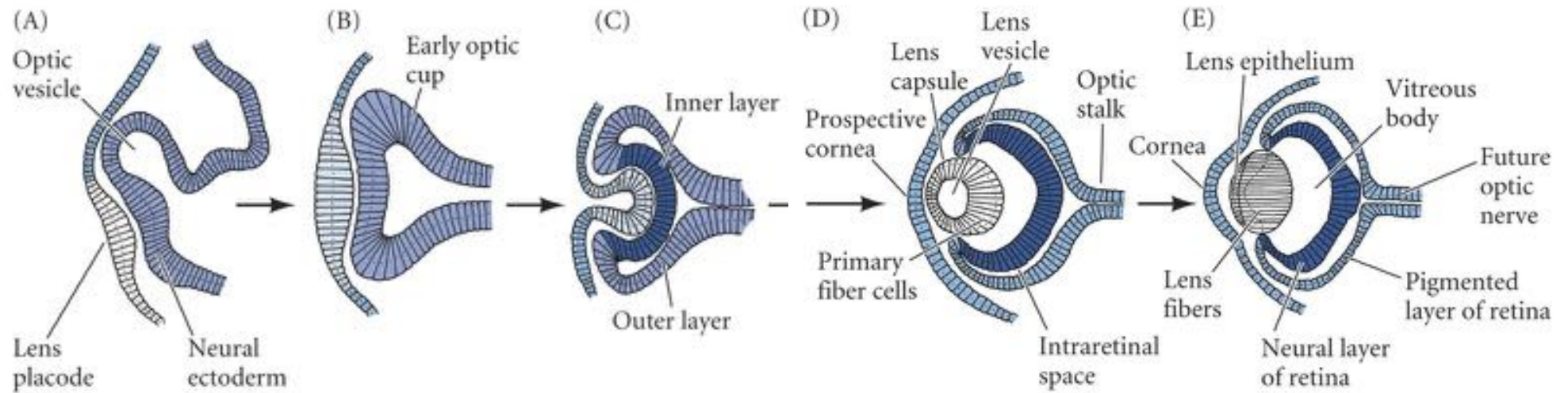




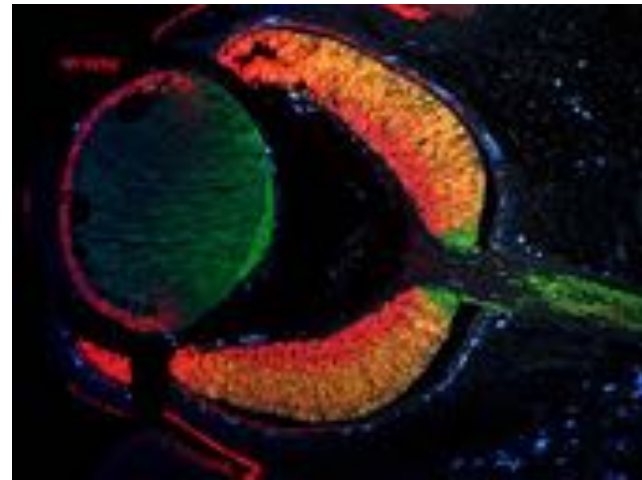
CASO DE ESTUDO: PAX6 E OLHOS

“Master Control Gene of Eye
Development”

Desenvolvimento do olho no camundongo



DEVELOPMENTAL BIOLOGY, Seventh Edition, Figure 8.8 (Part 2) © Garland Science, Inc. © 2005 All rights reserved.

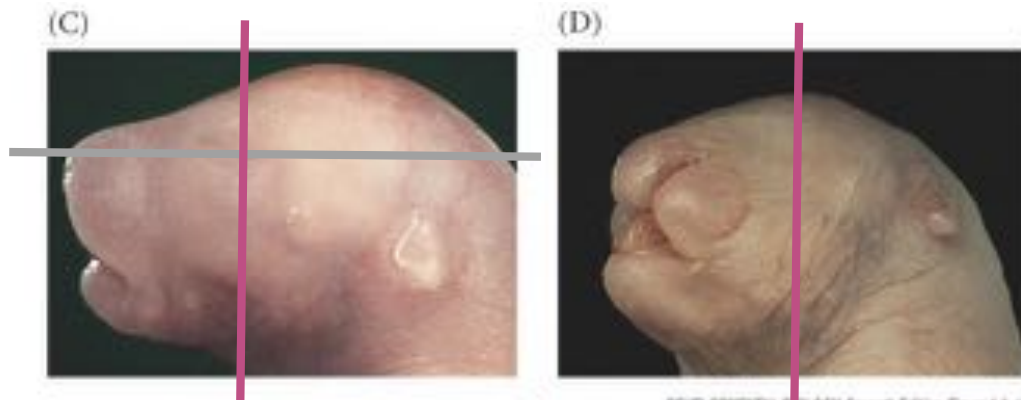


Pax6

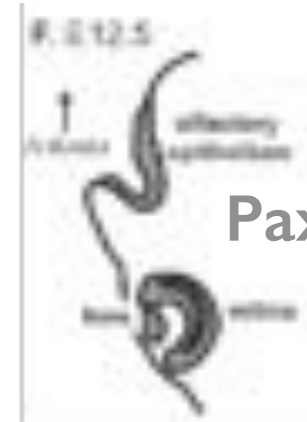
Sox2

Van Heyningen, MRC

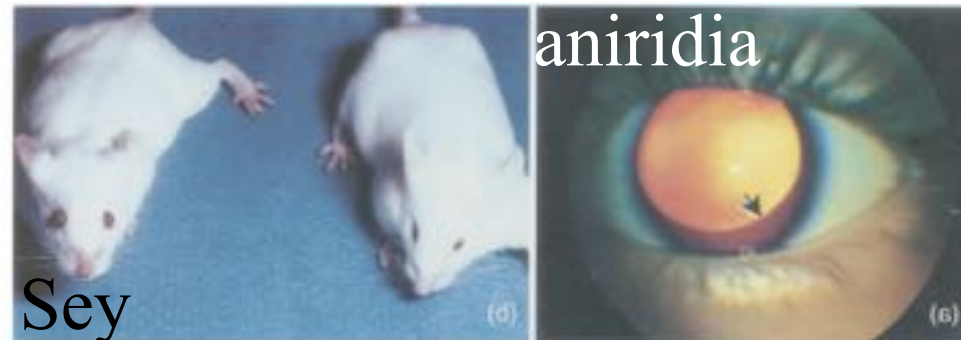
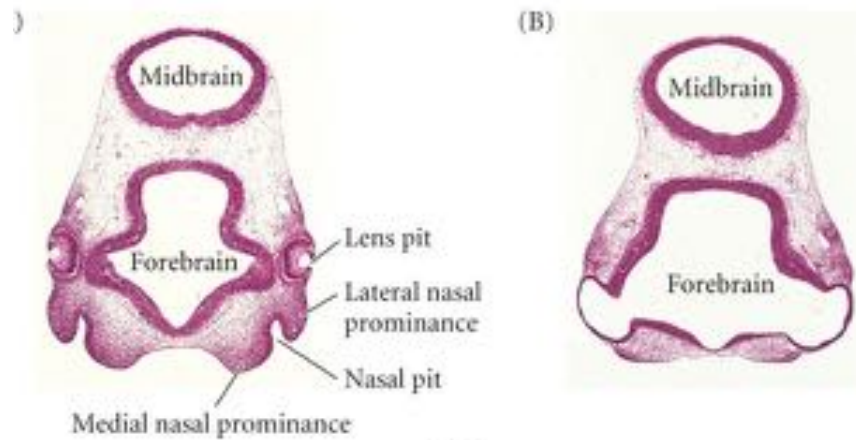
Y por que Pax 6?



DEVELOPMENTAL BIOLOGY, Seventh Edition, Figure 8.2 © Garland Science 2004

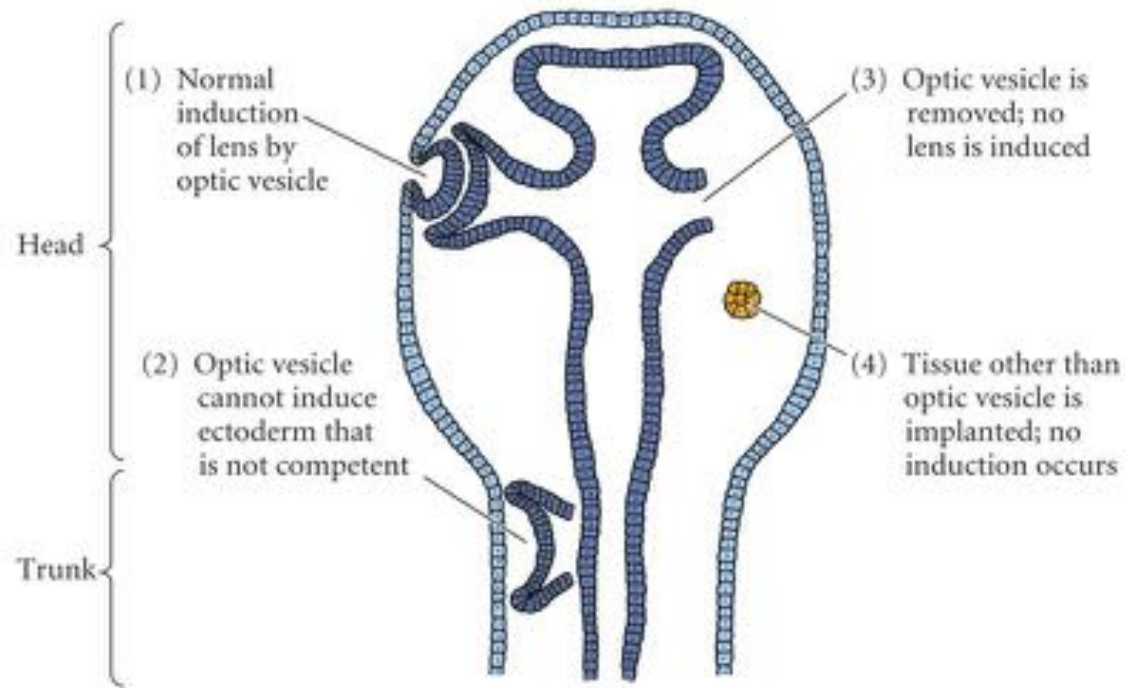


Simpson & Price, 2002



Hanson 1995

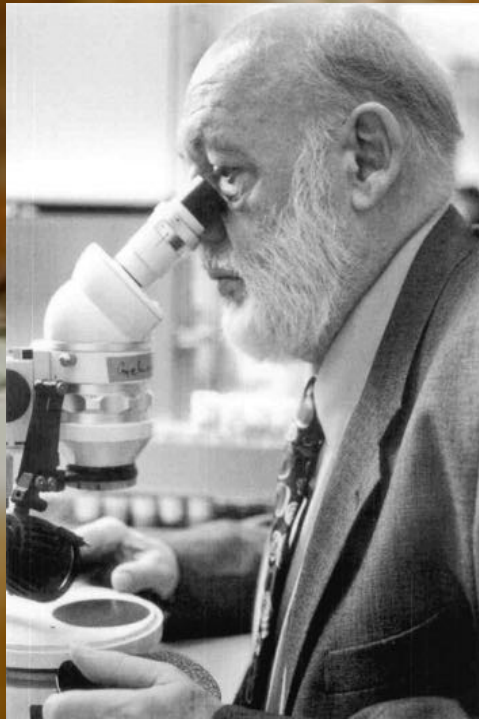
Indução do lente: experimentos de transplante



DEVELOPMENTAL BIOLOGY, Seventh Edition, Figure 8.1 © 2003 All rights reserved.

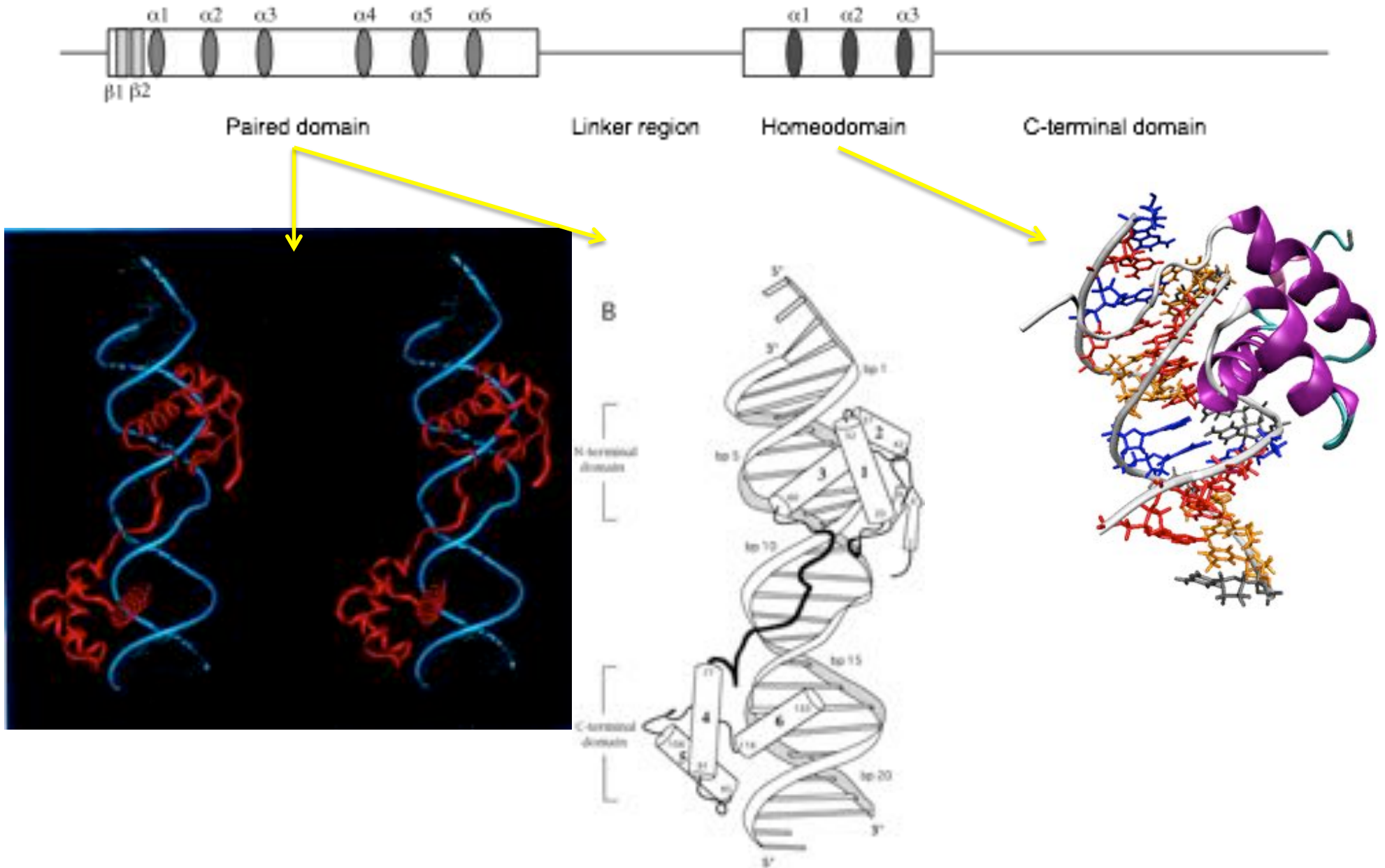
La formación del lente a partir del **ectodermo** requiere la acción de Pax 6

Walter Gehring
Pax 6 em *Drosophila melanogaster*



Kowalevsky Award 2003
Kyoto Award 2000

eyeless/pax6 na mosca



(Xu, et al. 1999)

eyeless/pax6 na mosca

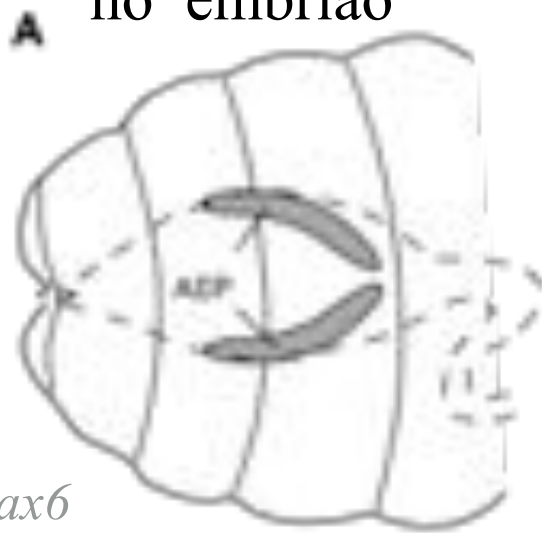


Expressão de *pax6* no primórdio de antena e olho

primórdio de antena-olho no embrião

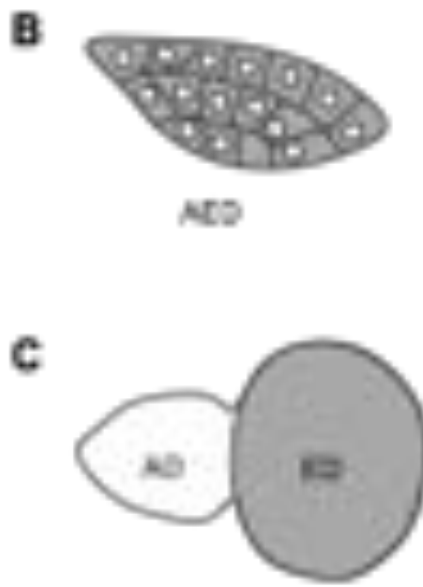
disco de antena-olho no estágio L1

disco de antena e disco de olho no estágio L3

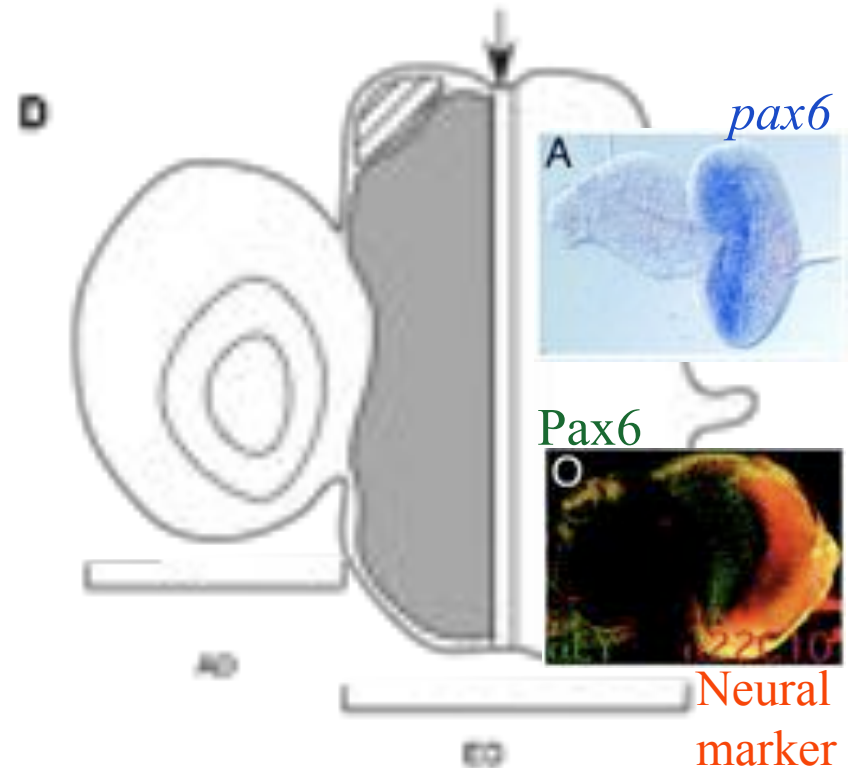


pax6 mRNA

Callaerts et al. 2006



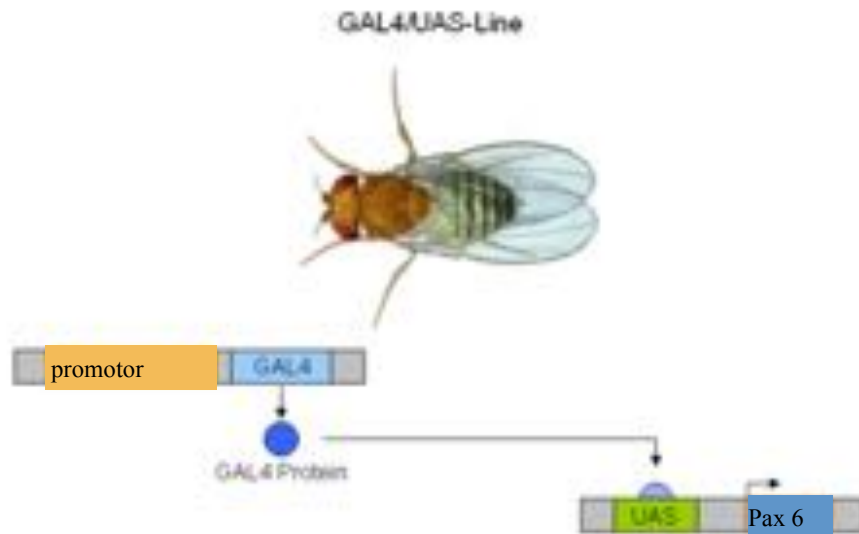
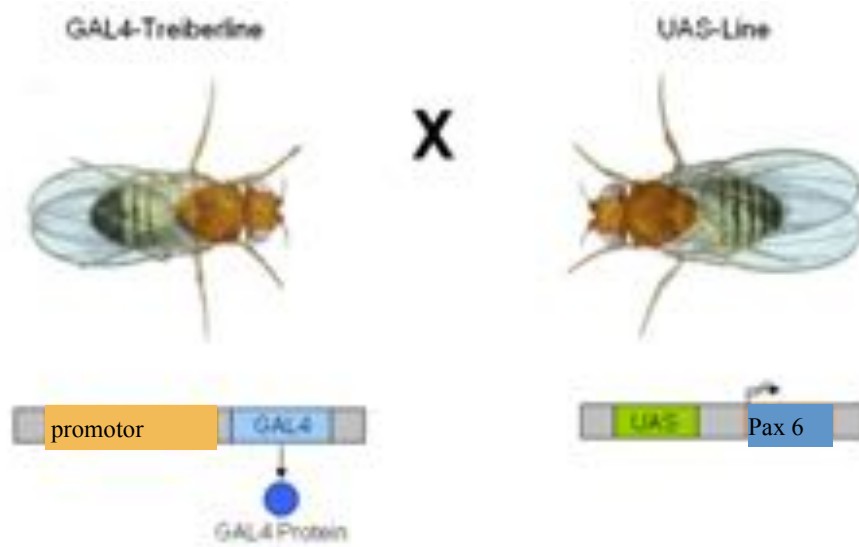
disco de antena y disco de ojo L2



Neural marker

Plaza et al. 2001

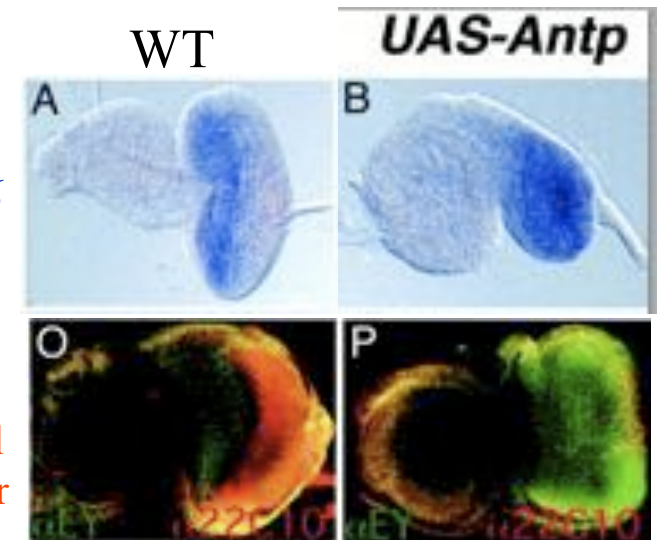
Sistema GAL4/UAS na *Drosophila melanogaster*



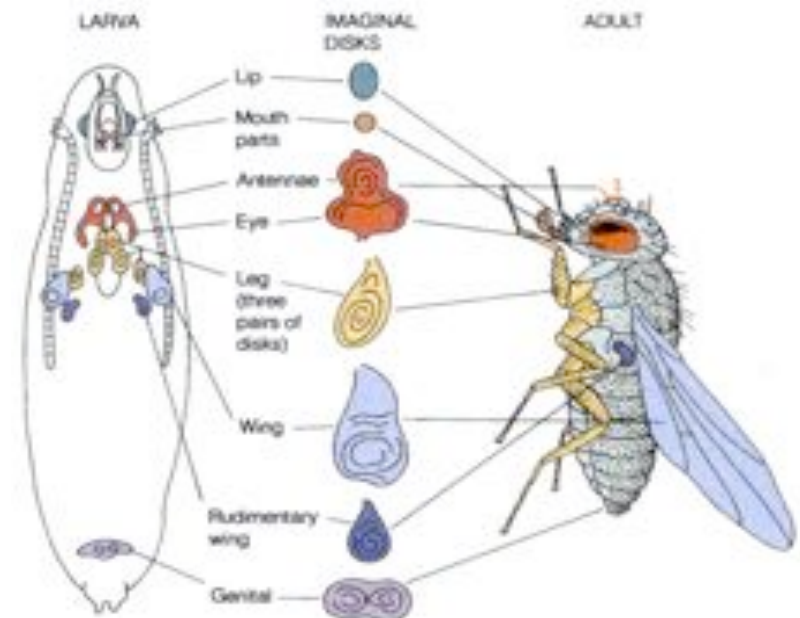
disco
de
antena
e disco
de olho
em L3

pax6

Pax6
Neural
marker



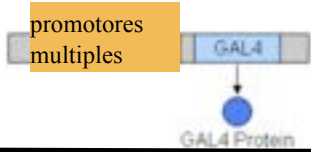
Plaza et al. 2001



MASTER gen: *pax6*

GAL4-Treiberline

Halder et al. 1995

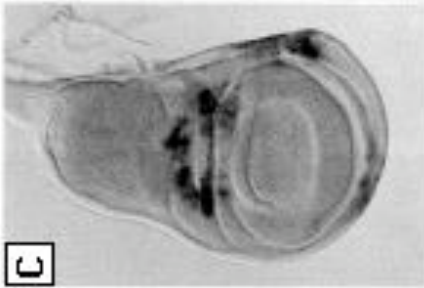


LacZ

disco de antena e disco de olho em L3



disco de aça em L3



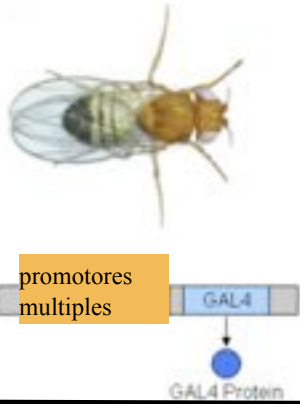
disco de perna em L3



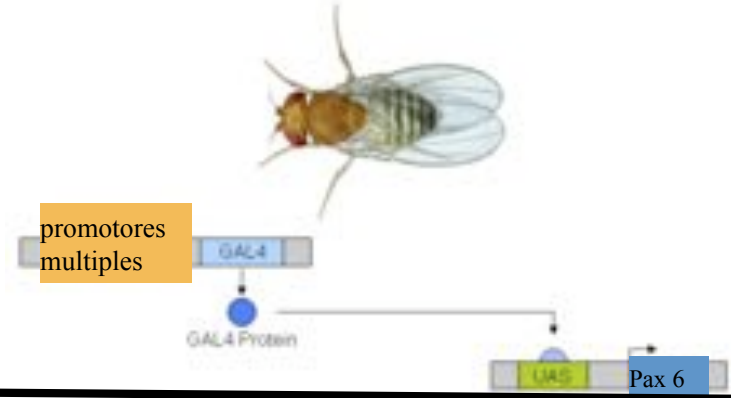
MASTER gen: *pax6*

Halder et al. 1995

GAL4-Treiberline

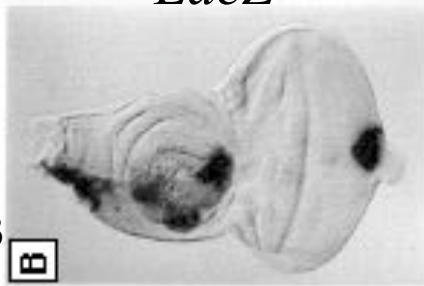


GAL4/UAS-Line

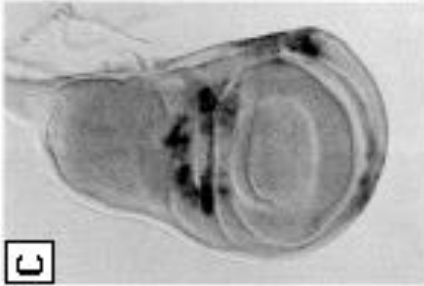


LacZ

disco de antena e disco de olho em L3



disco de aça em L3



disco de perna em L3



cabeza



antena



ala



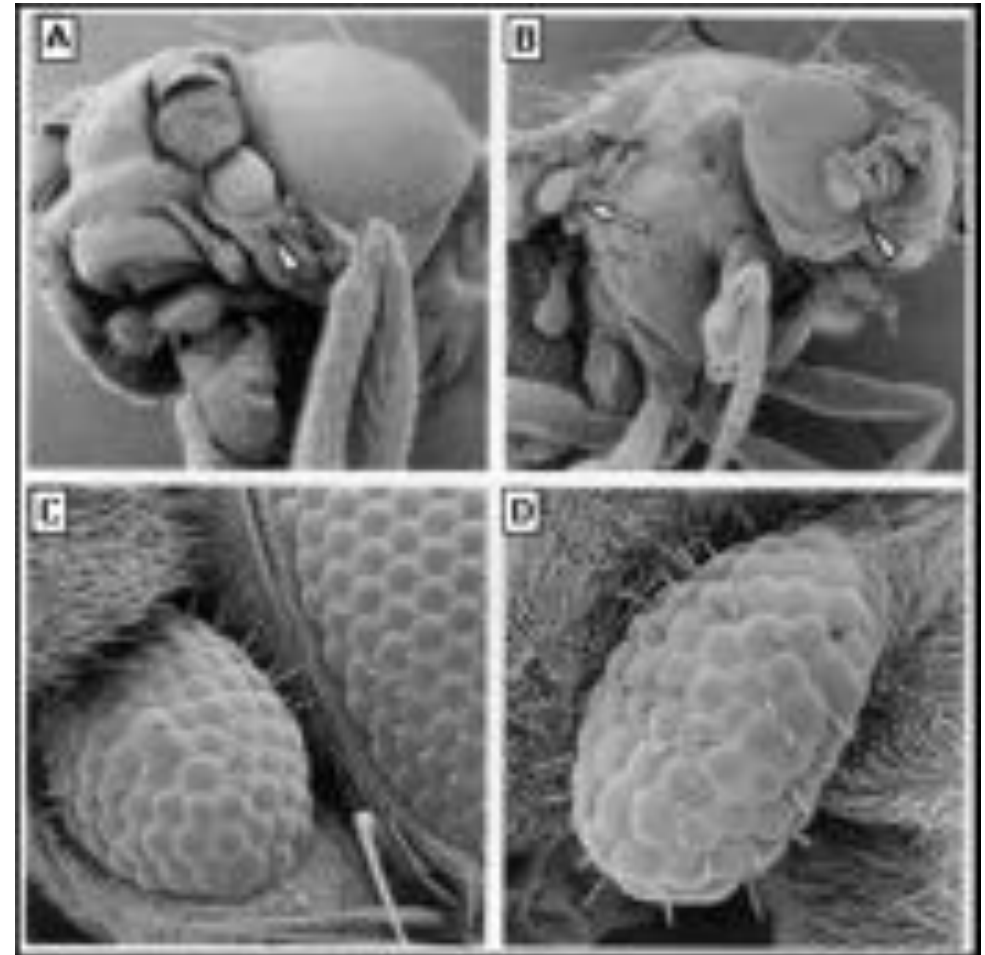
patas



pata

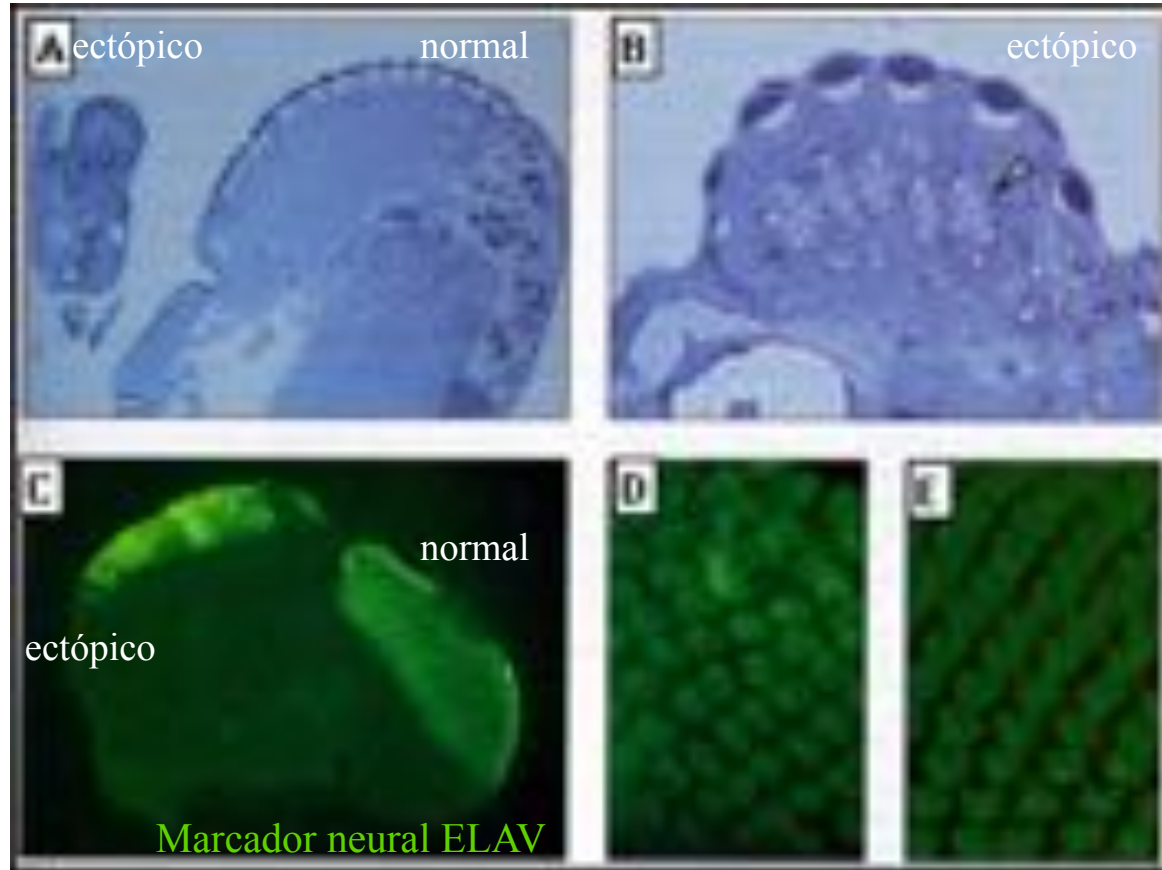


Microscopia electrónica de olhos ectópicos



Histologia e fotoreceptores em olhos ectópicos

Olhos adultos

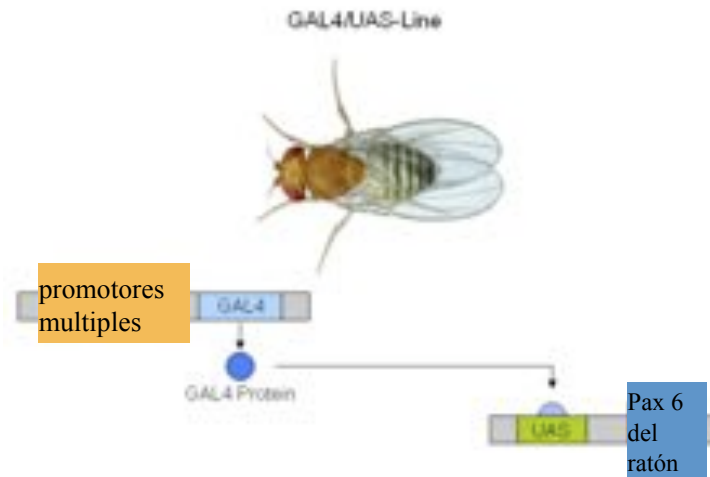


Azur II y azul de metileno

Disco de antena e
olho em L3

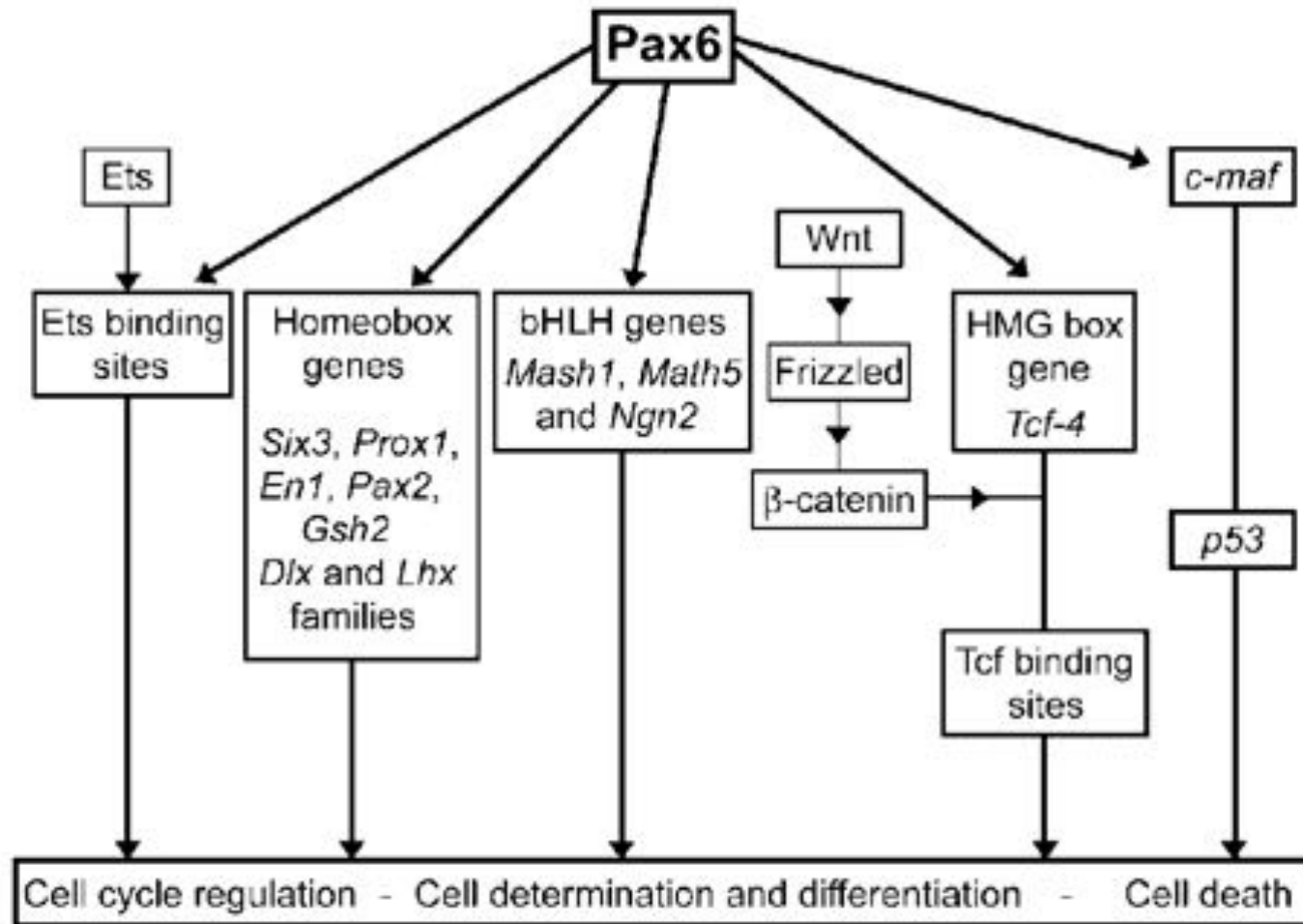
Marcador neural ELAV

Pax6 do camundongo tambem gera olhos ectópicos

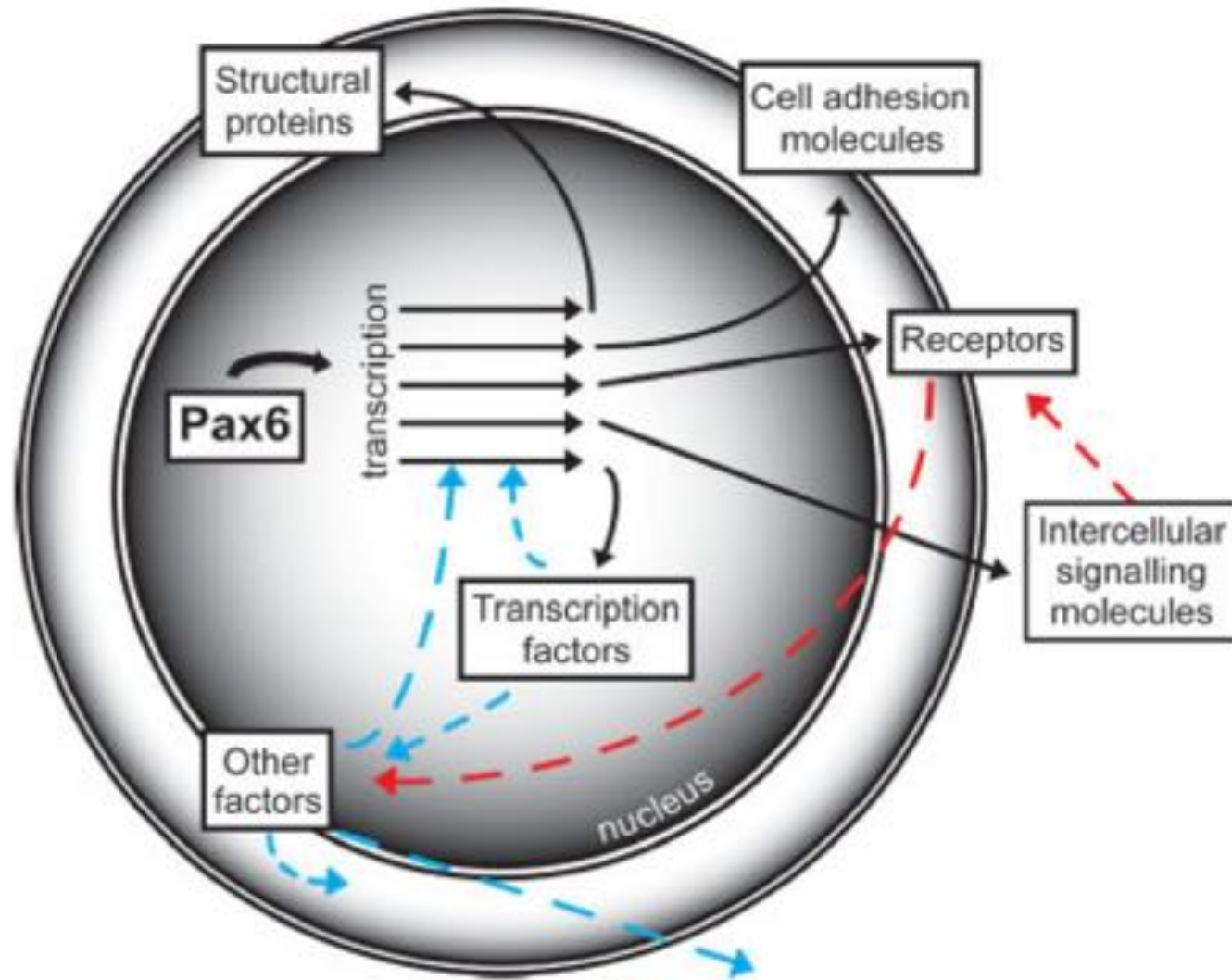


Efectos pleiotrópicos de Pax6

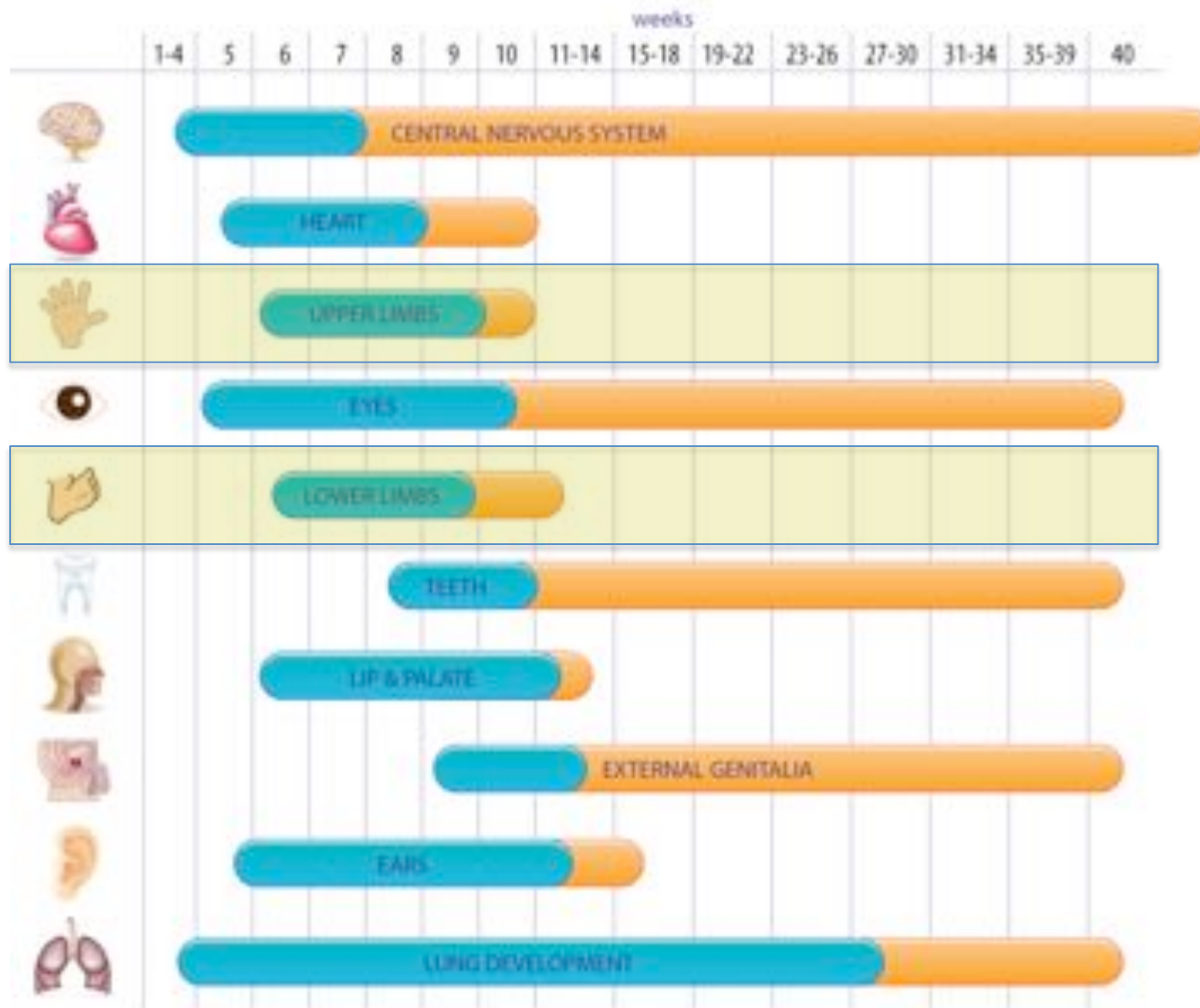
(MASTER ya no es tan MASTER, sino SUBMASTER)





Efectos pleiotrópicos de Pax6



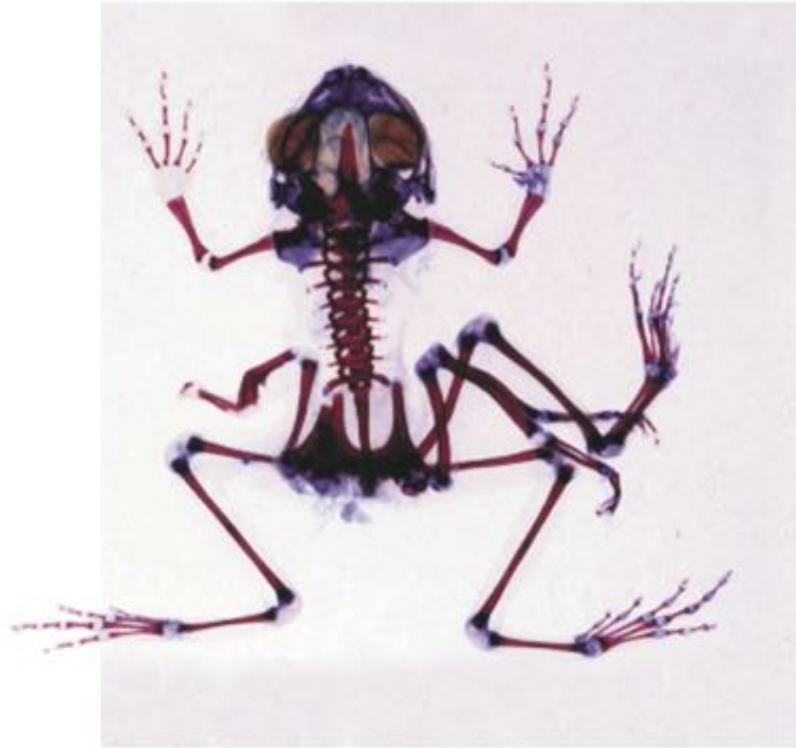
ORGANOGENESE:



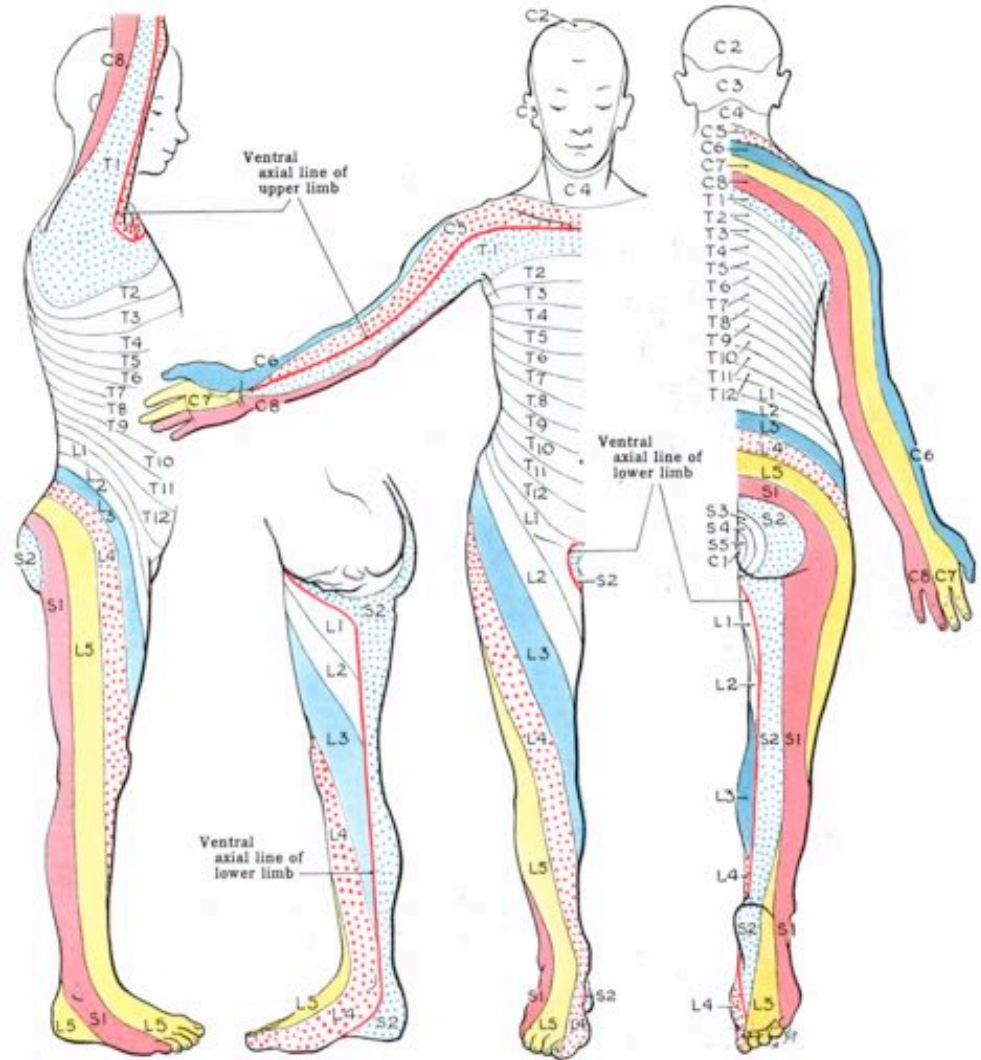
 Period of greatest sensitivity for induction of major birth defects.

 Period of induction of minor birth defects and functional deficits.

Dermatomas:

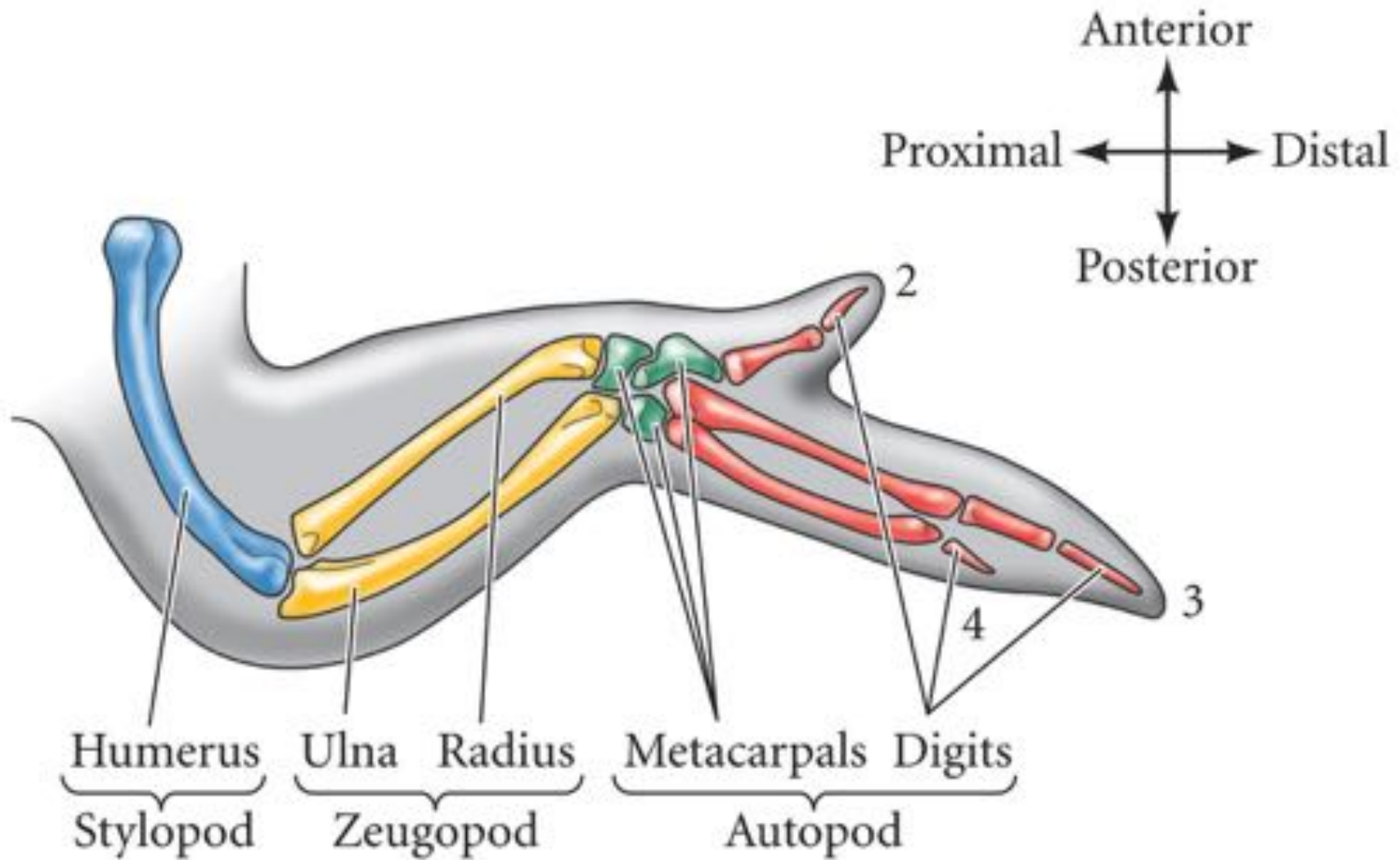


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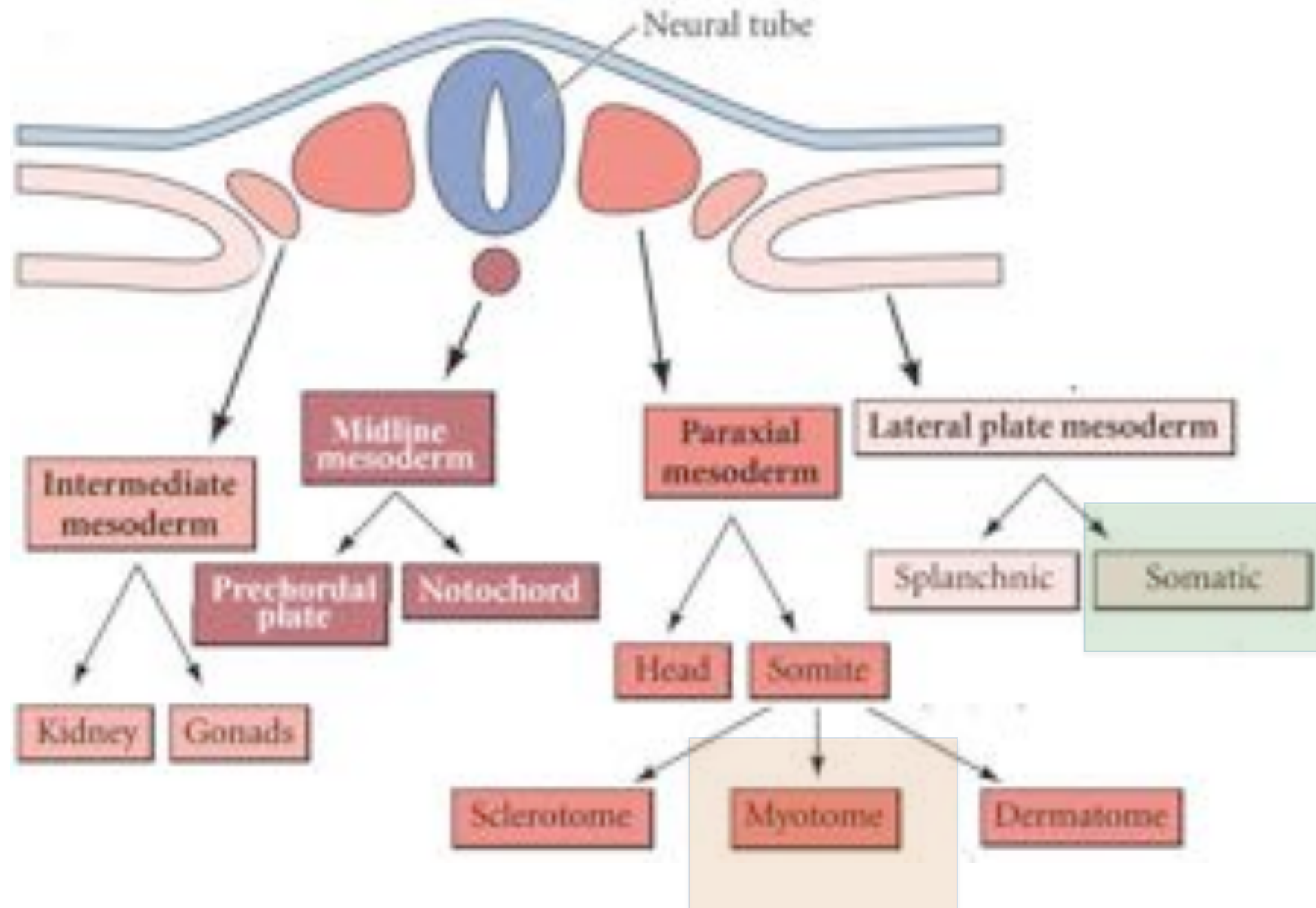


<http://www.youtube.com/watch?v=VpbdqGJ9LWk>

Skeletal pattern of the chick wing (limb axes)

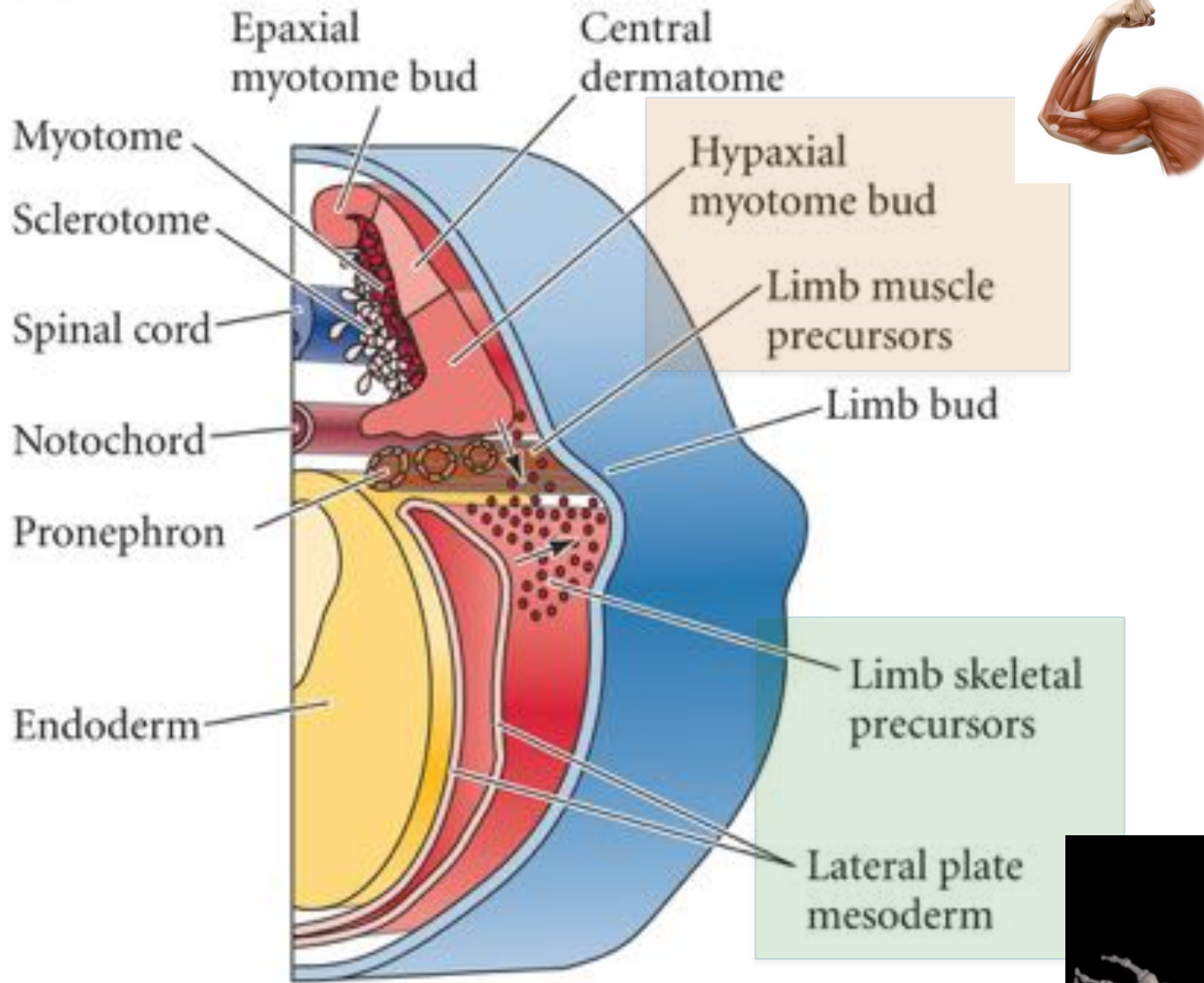


Mesoderm derivatives and limb bud precursors



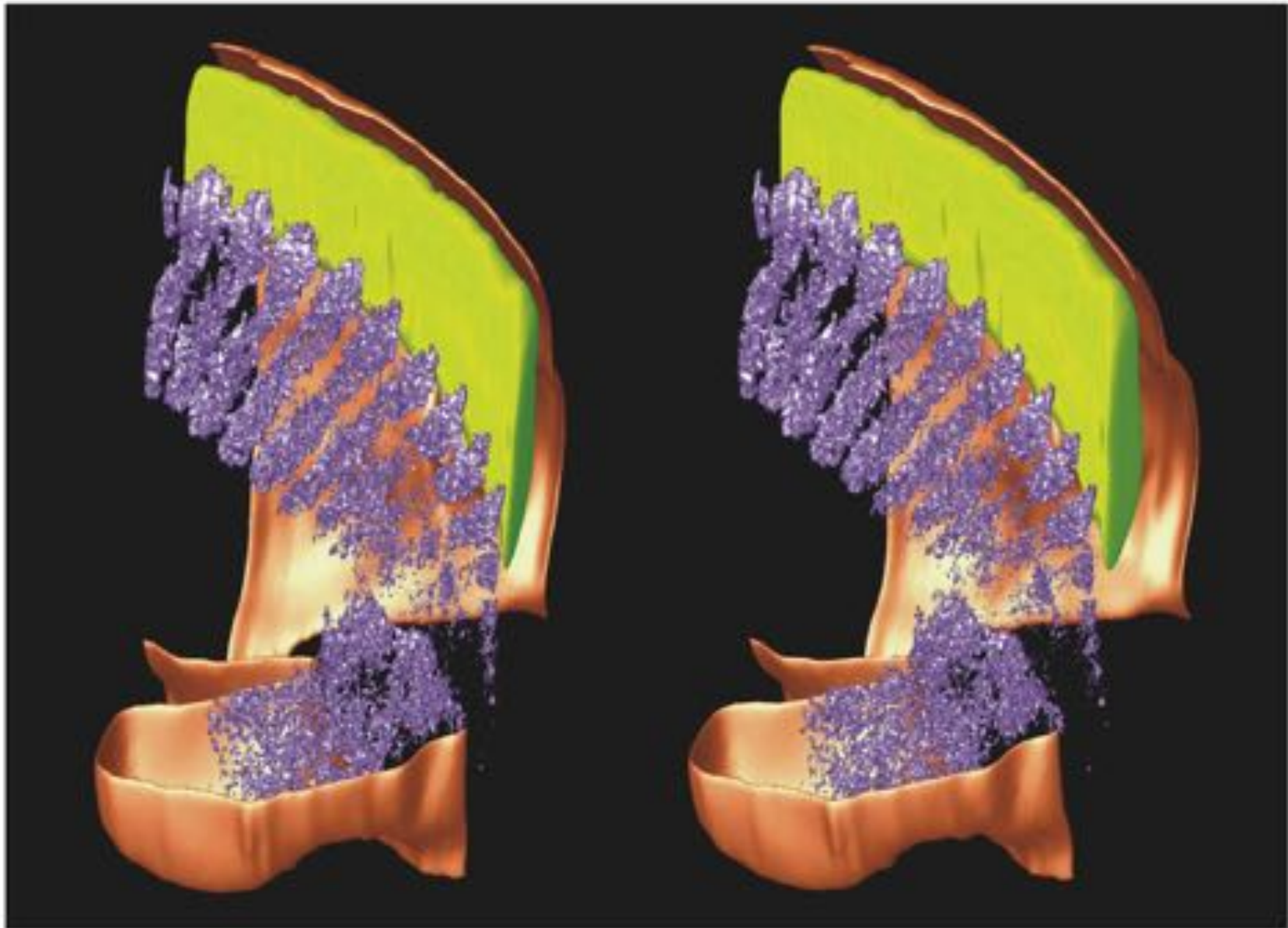
Proliferation of mesenchymal cells from the somatic region of the lateral plate mesoderm causes the limb bud in the amphibian embryo to bulge outward

(A)

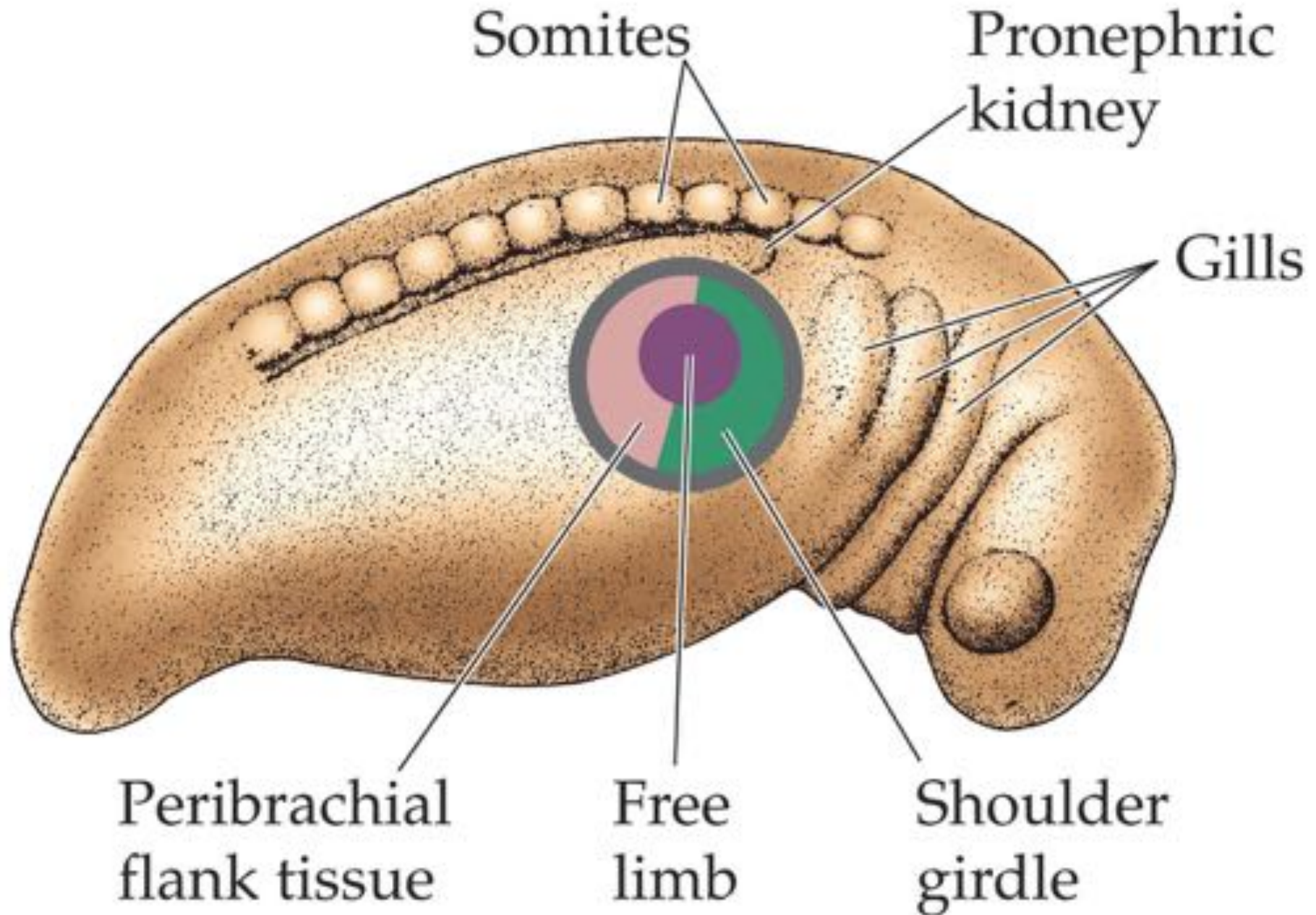


Proliferation of mesenchymal cells from the somatic region of the lateral plate mesoderm causes the limb bud in the amphibian embryo to bulge outward

(B)



myf5 (developing muscle) cells in purple

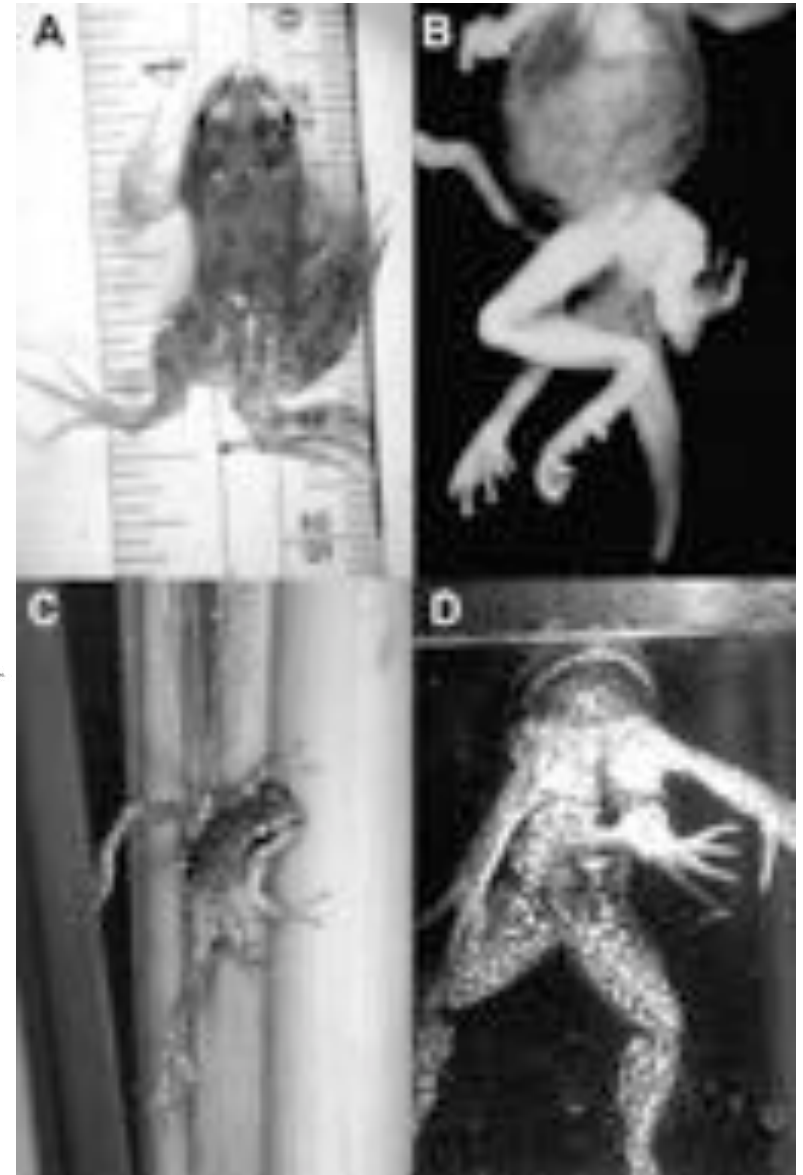


A multilimbed *Hyla regilla* and other frogs are the result of ???



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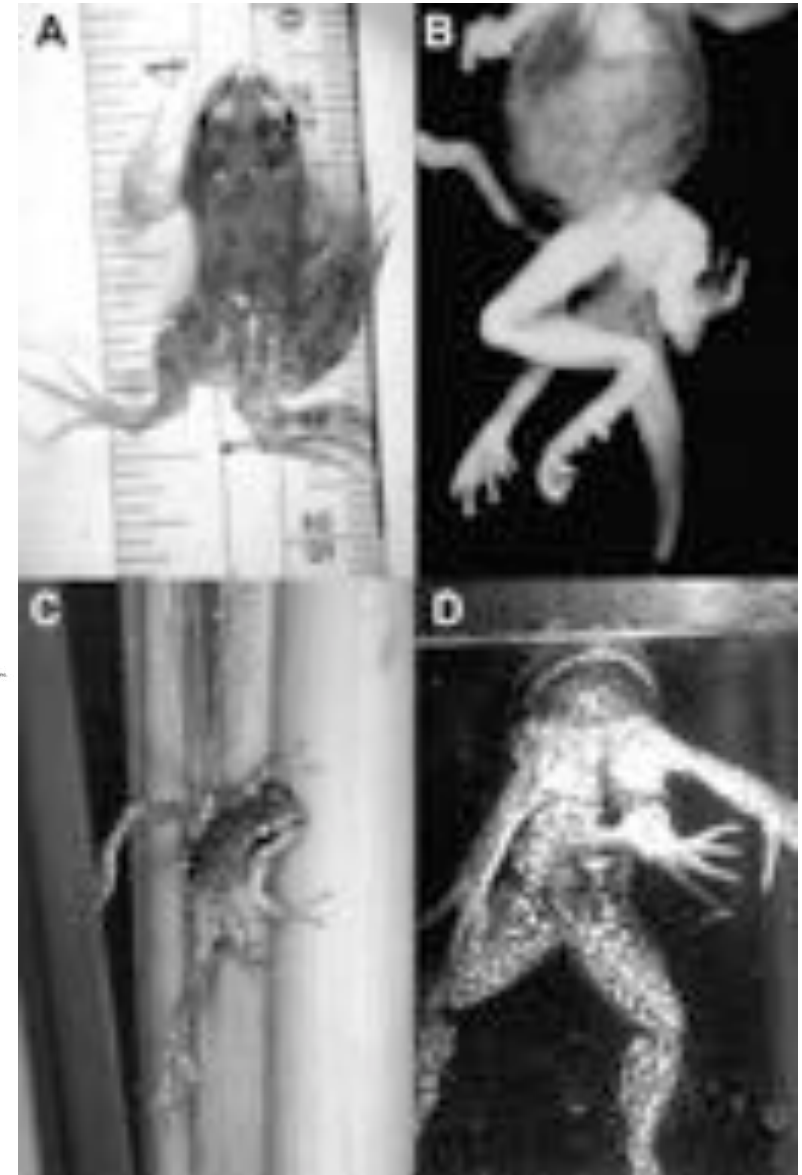
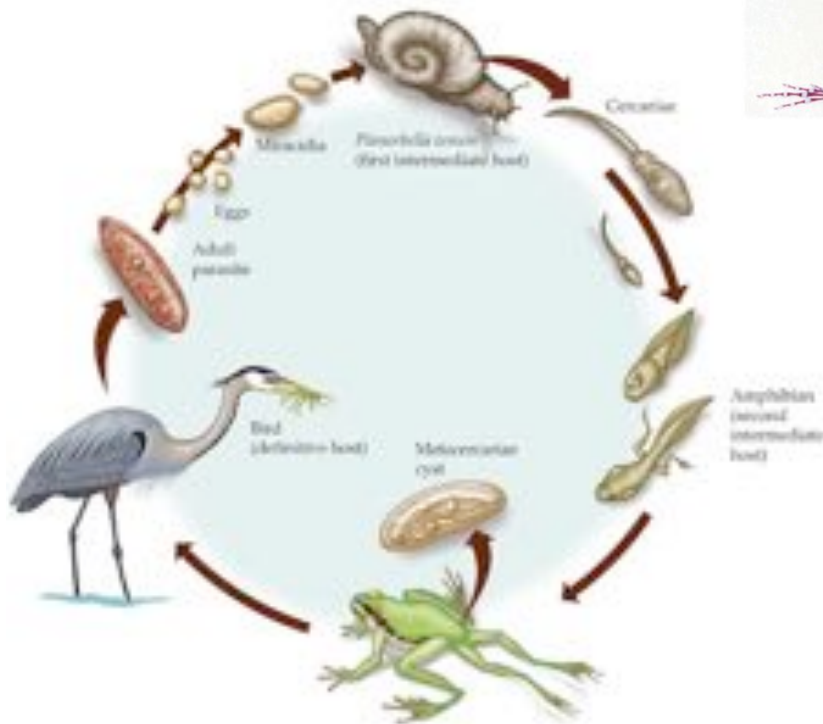
?



A multilimbed *Hyla regilla* is the result of infestation of the tadpole-stage developing limb buds by trematode cysts



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Highlight work by John Saunders (Vade Mecum 3)



Dr. Saunders' Physiology Lab at Marquette in the early 1950's. Dr. Saunders is in the middle with the pipe.



Dr. John Saunders at Marquette University in the 1960's.



Lab work!