

Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*

Developmental switches and gene regulatory networks in the most completely described animal, the nematode *C. elegans*

**Joel Rothman
UC Santa Barbara**

**Generating developmental diversity:
Symmetry breaking**

Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*

Asymmetric cell division

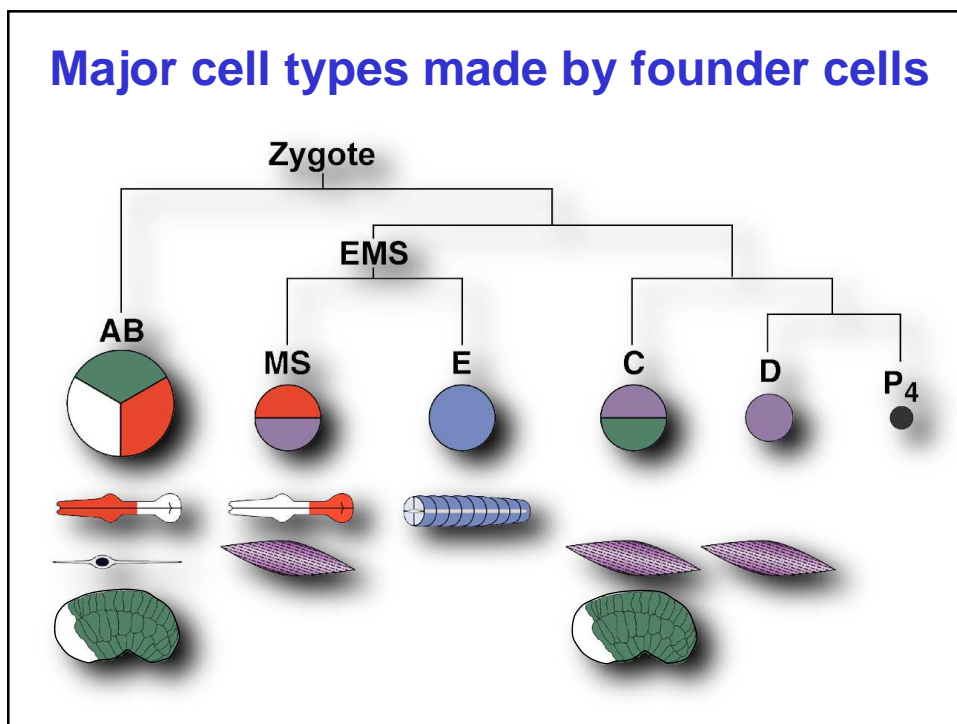
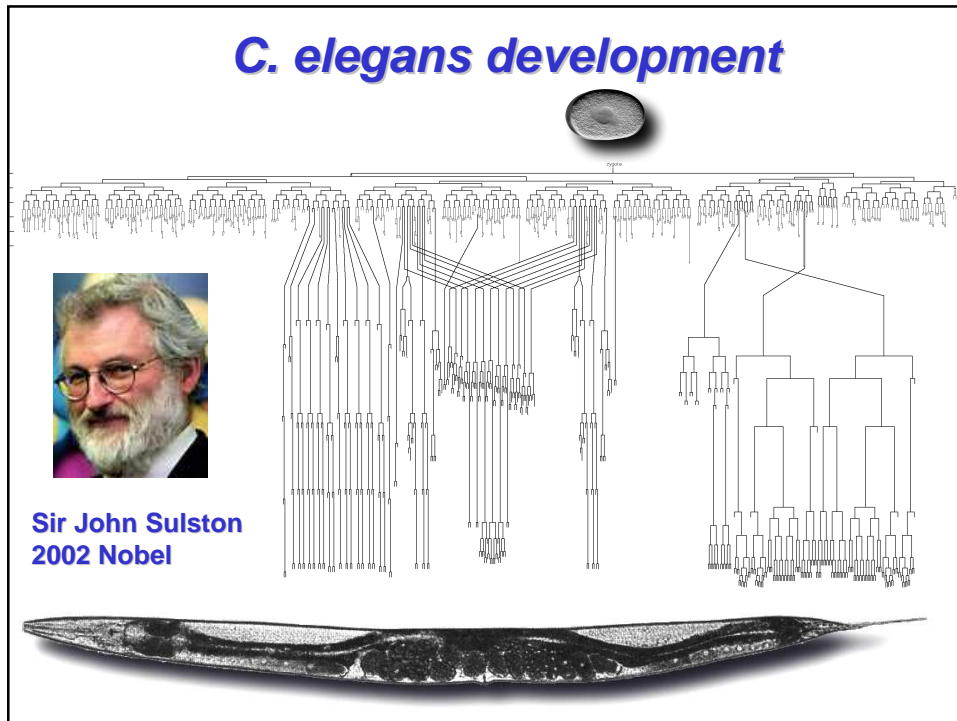


C. elegans

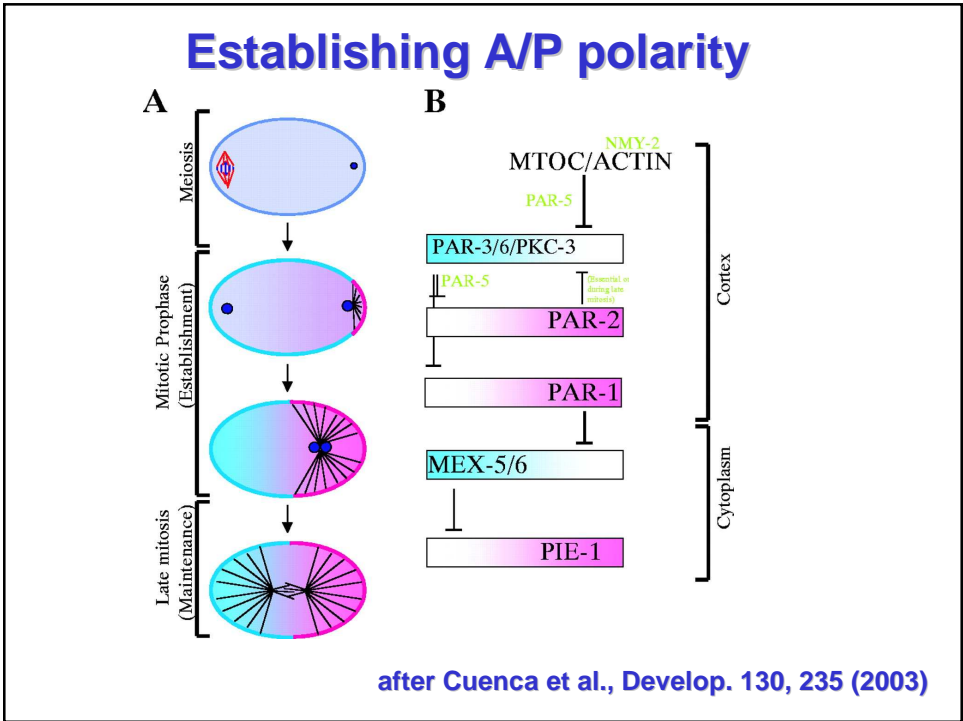
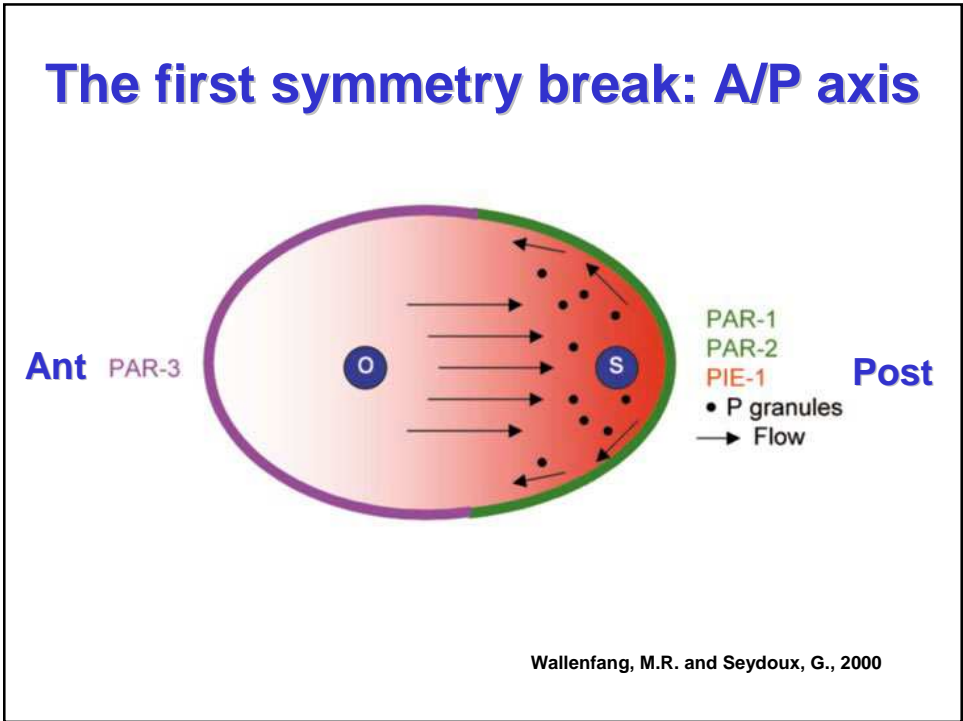


genetics
complete anatomy and development
complete genome (100,258,171 bp)
overnight gene "knockouts" (RNAi)
conserved genetic toolkit

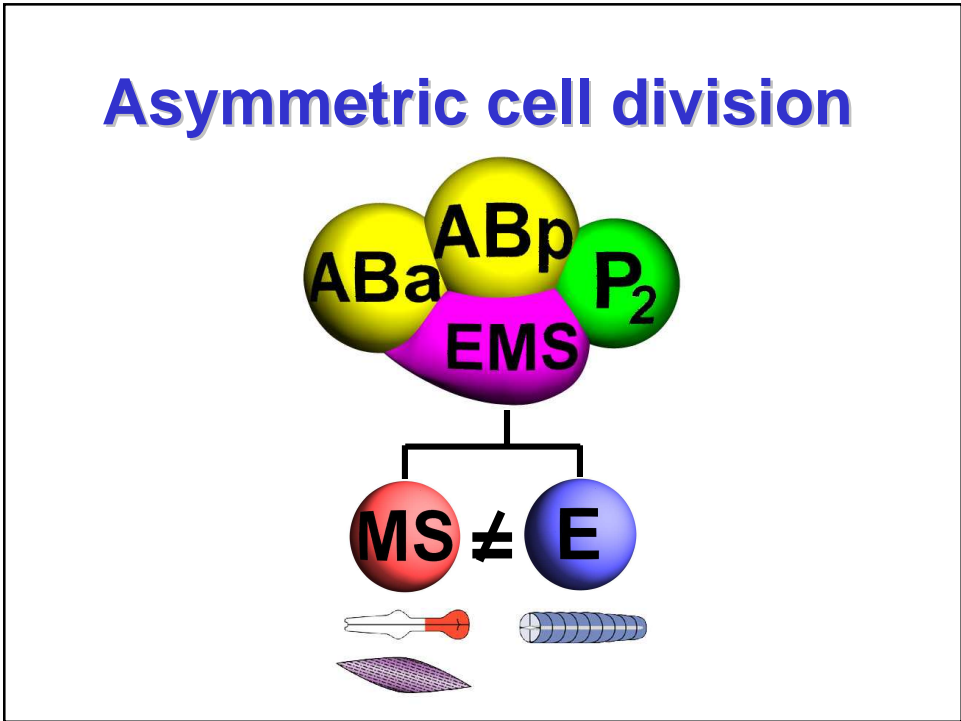
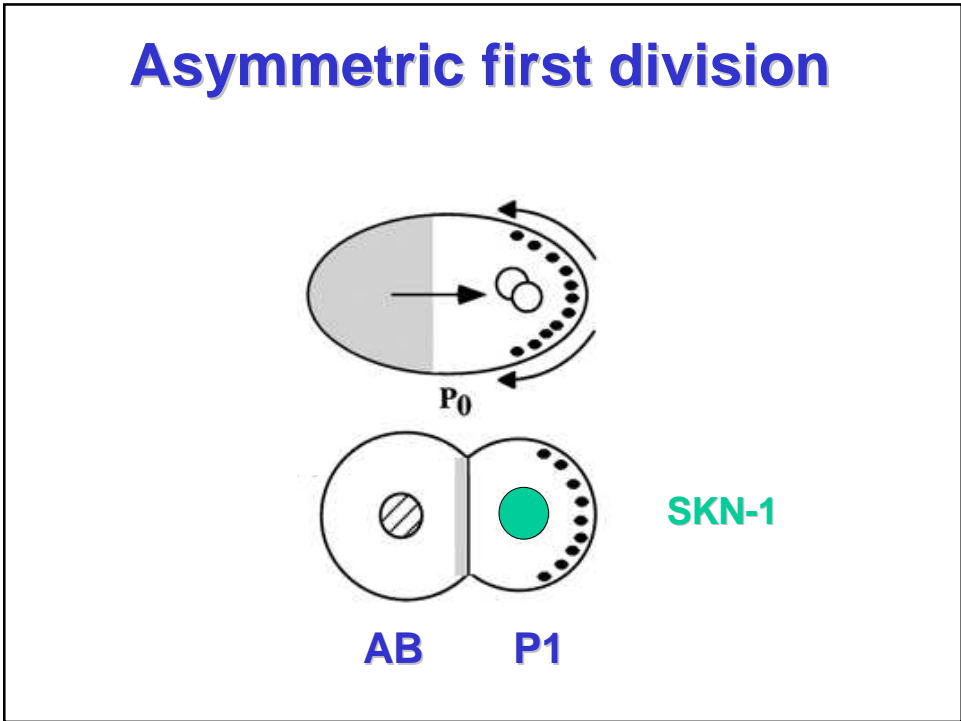
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



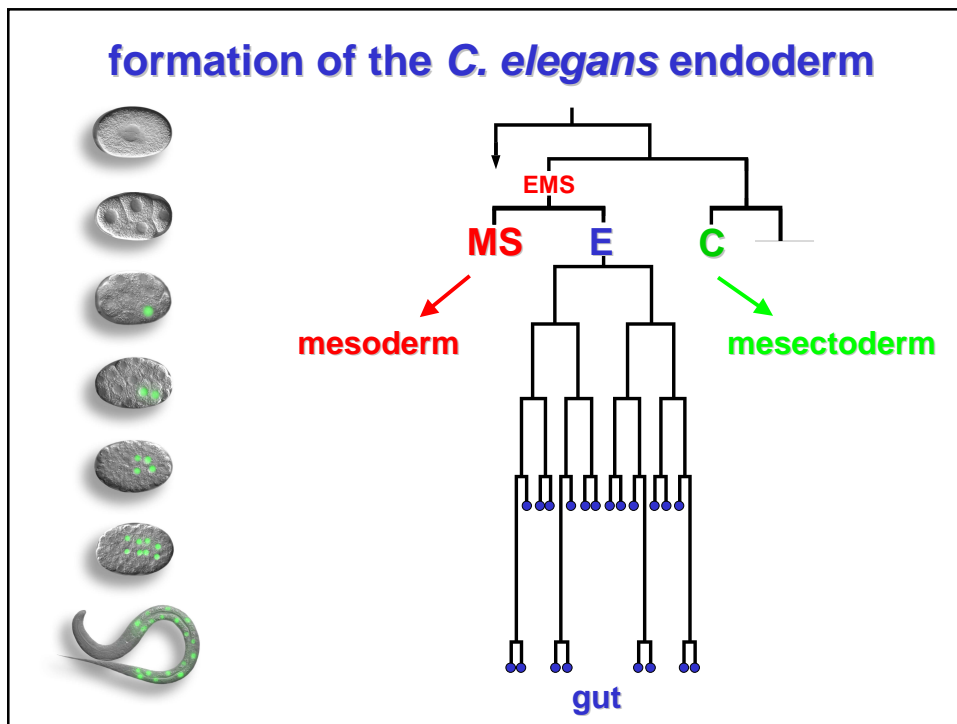
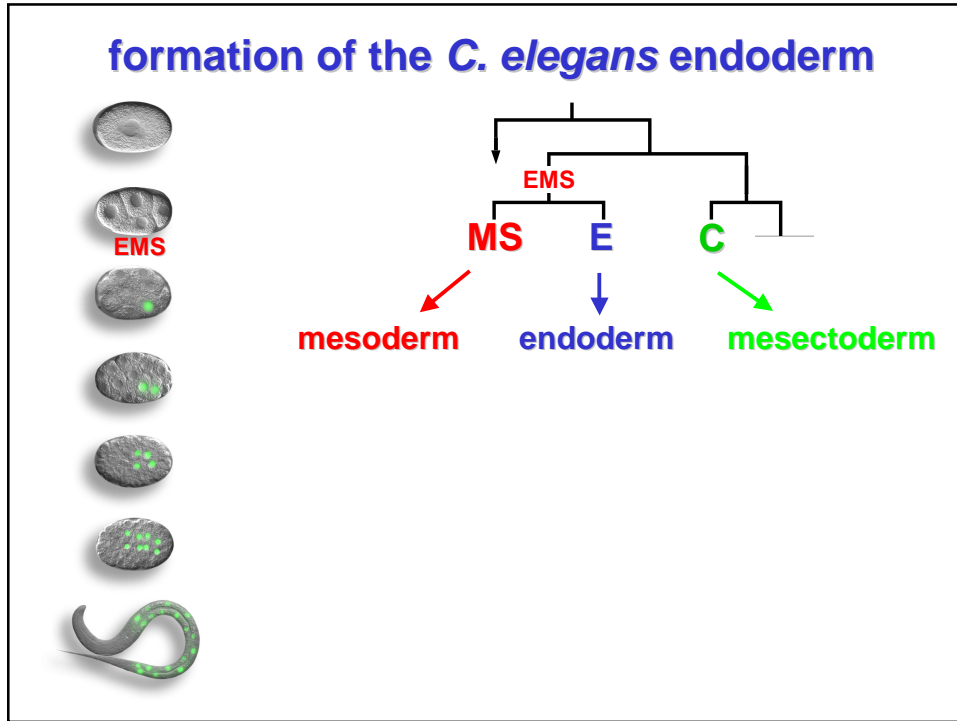
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



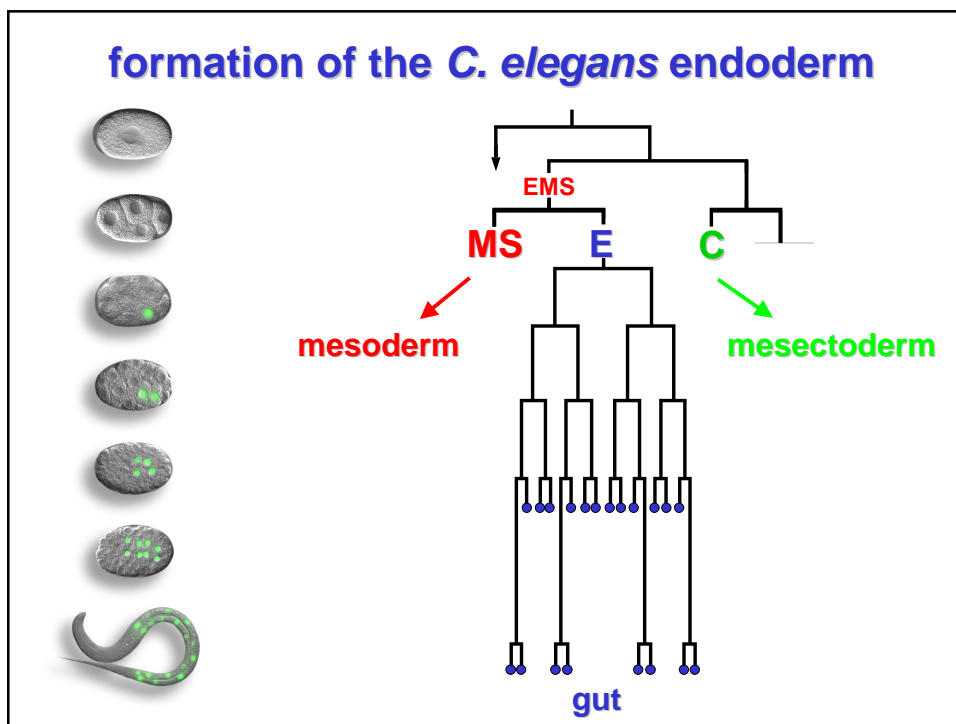
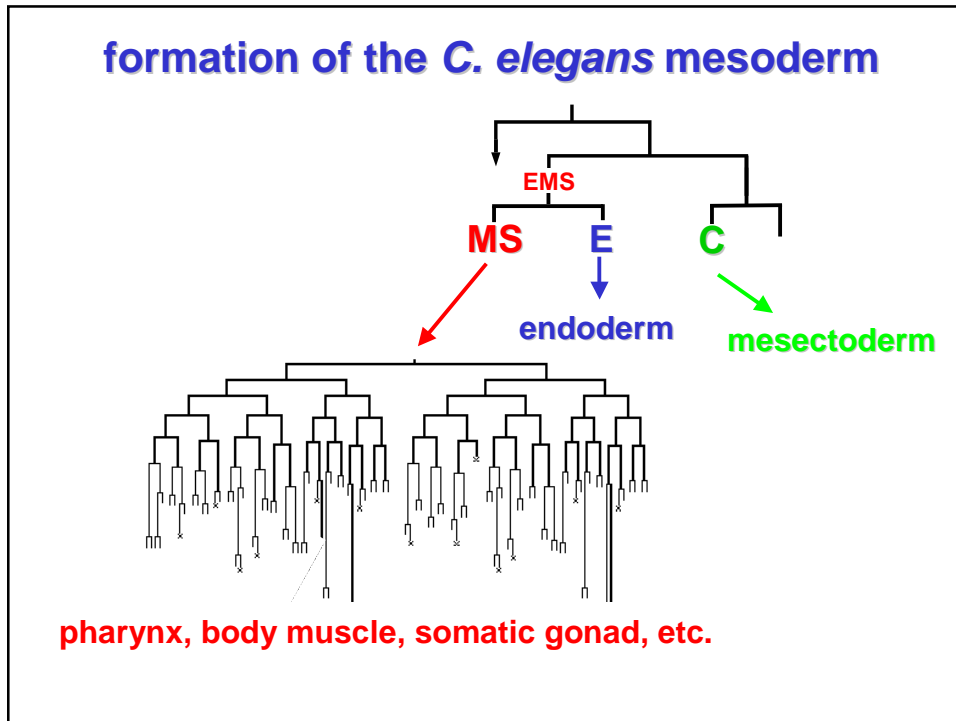
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



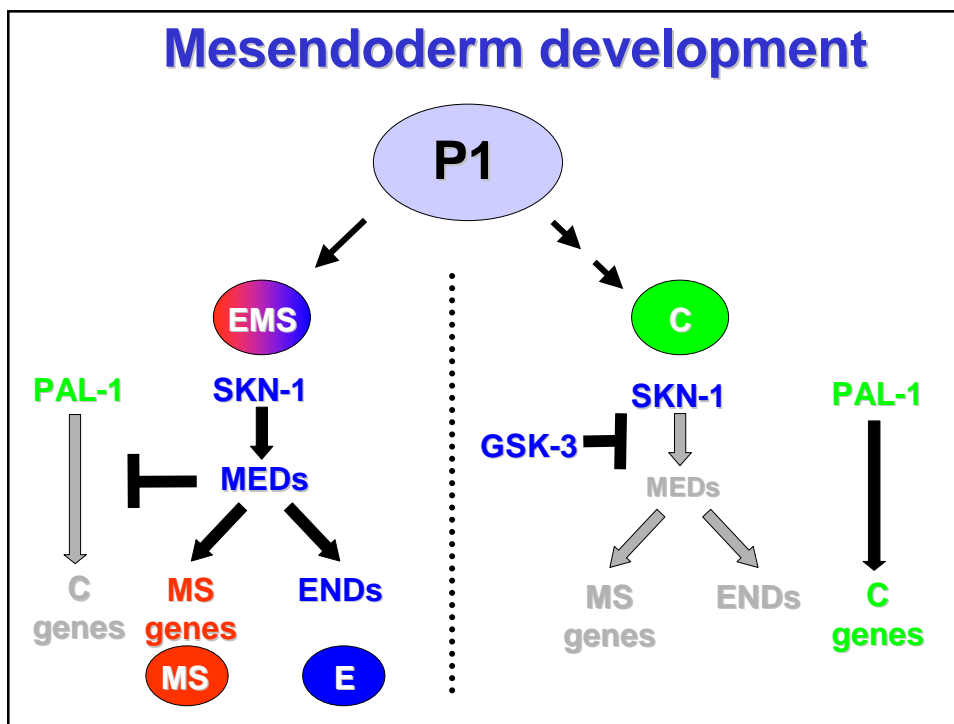
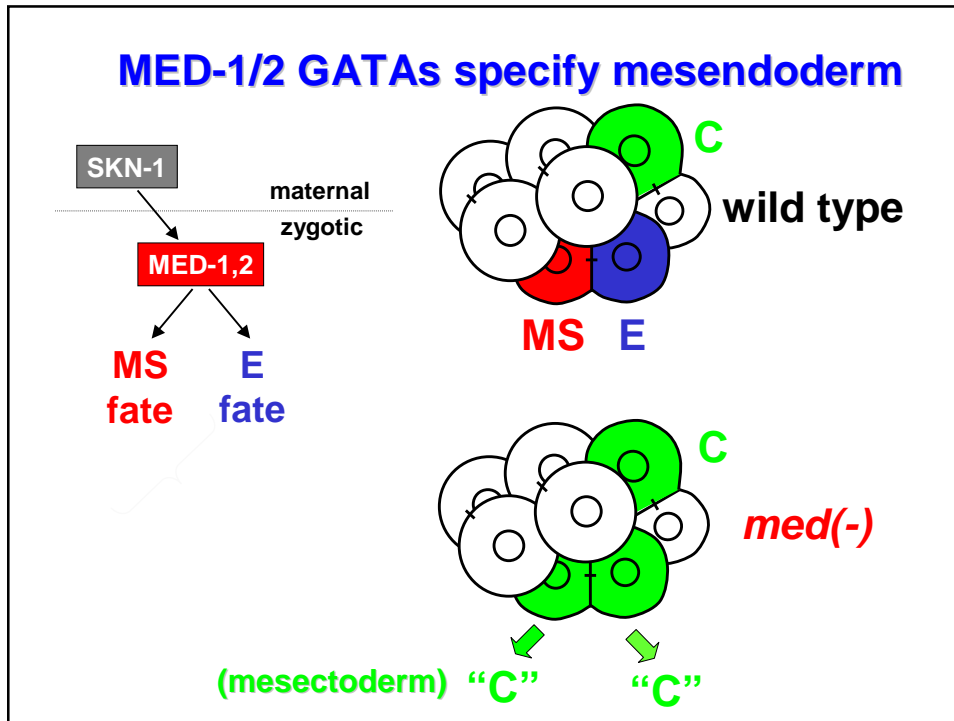
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



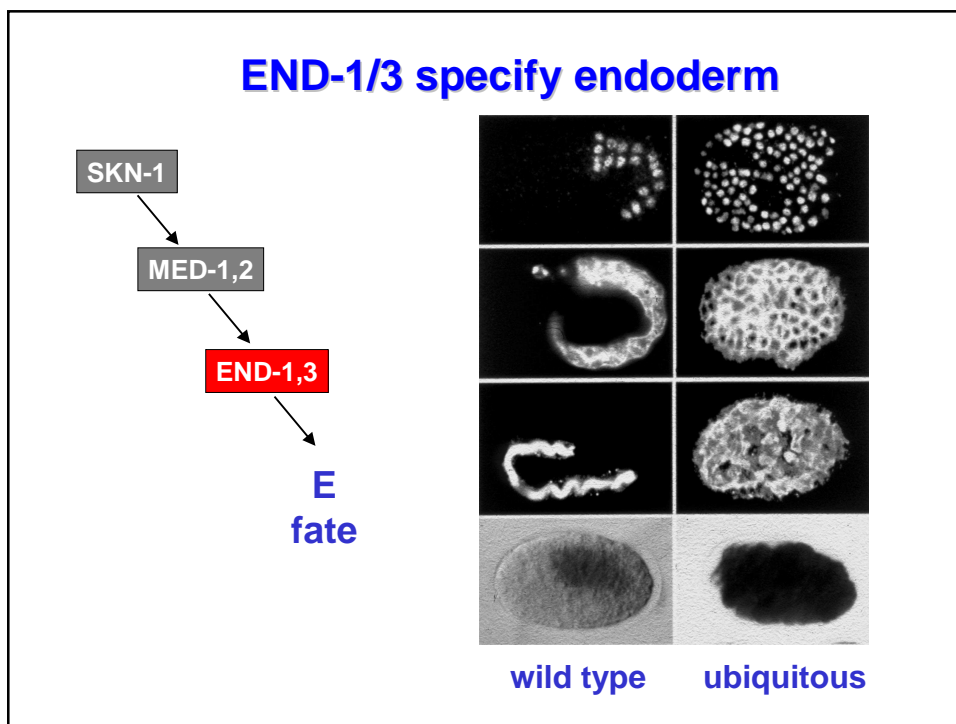
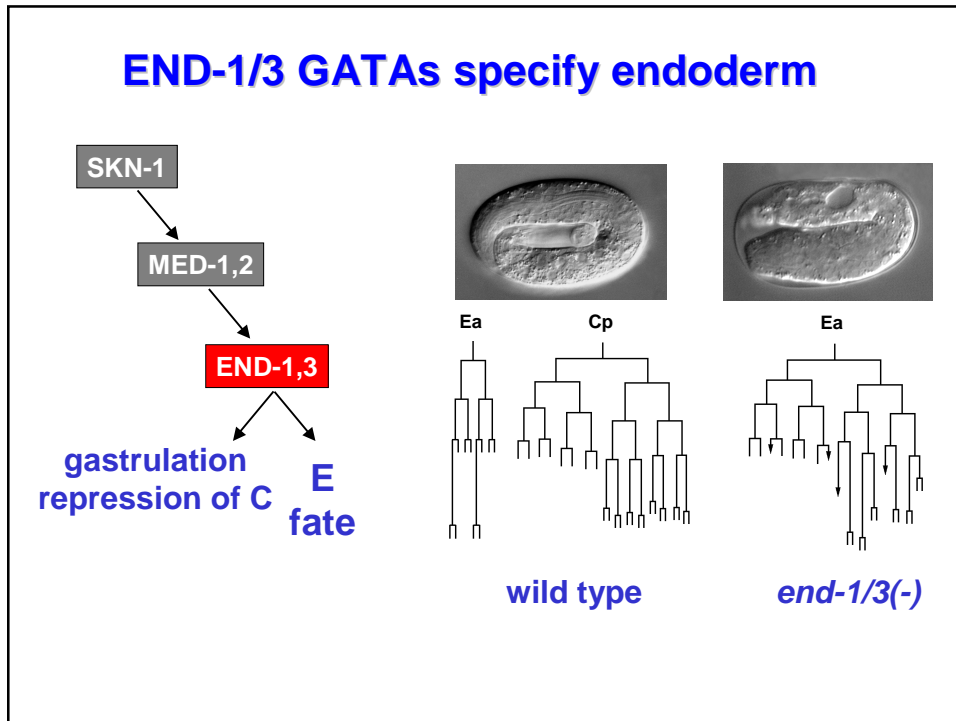
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. elegans*



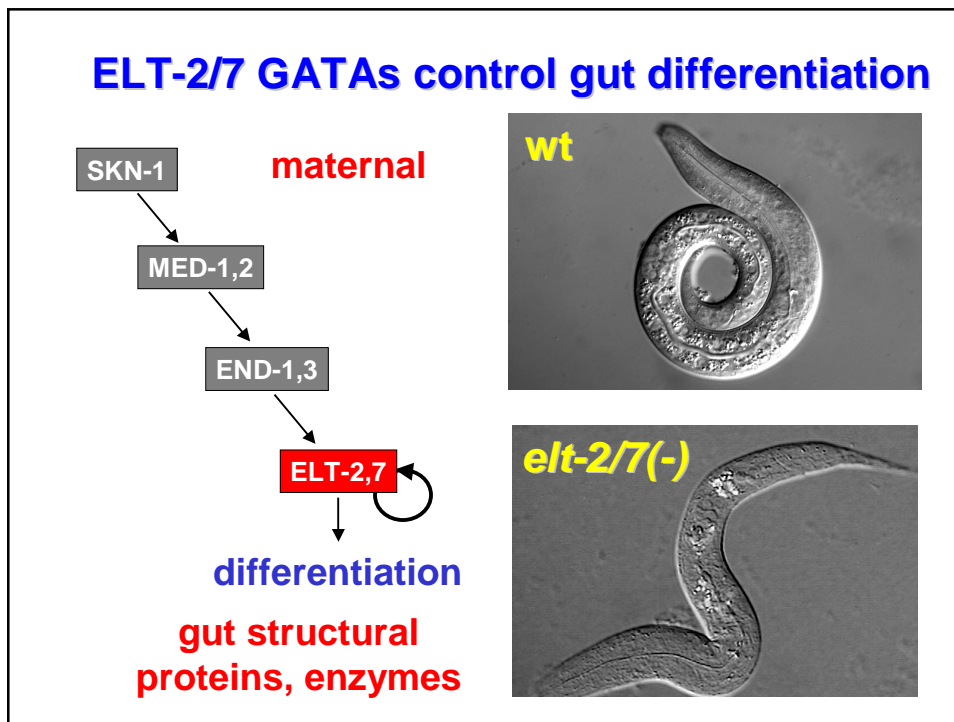
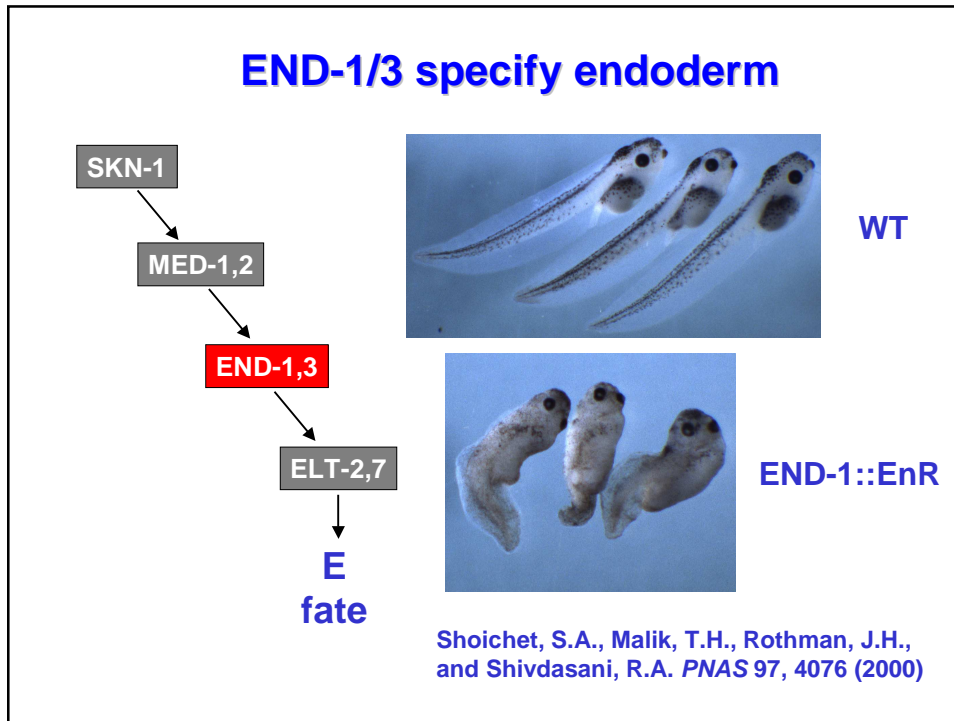
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



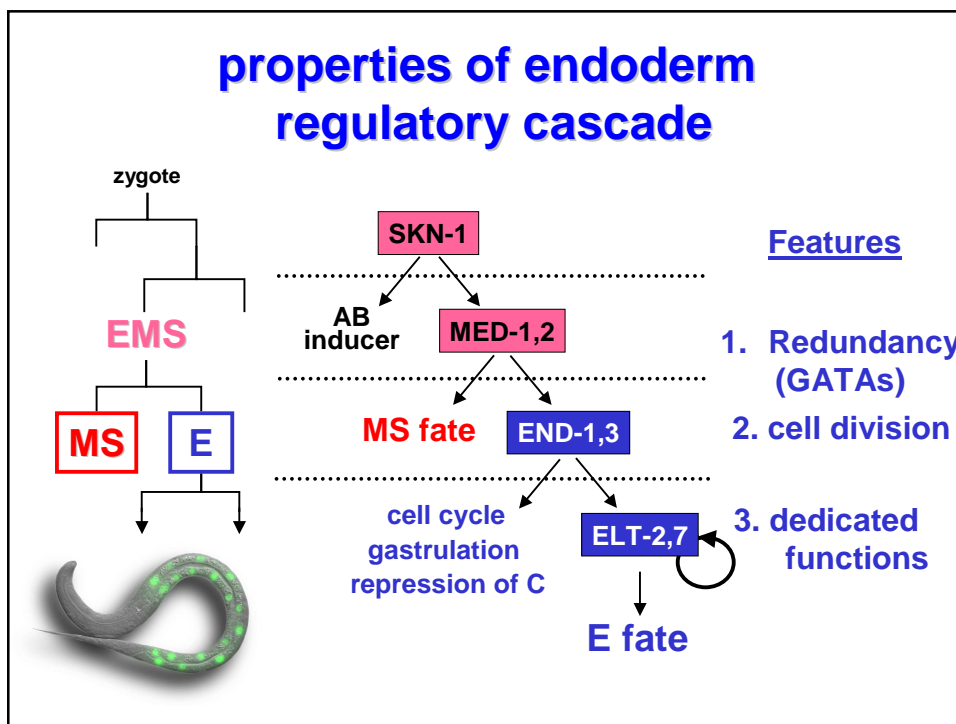
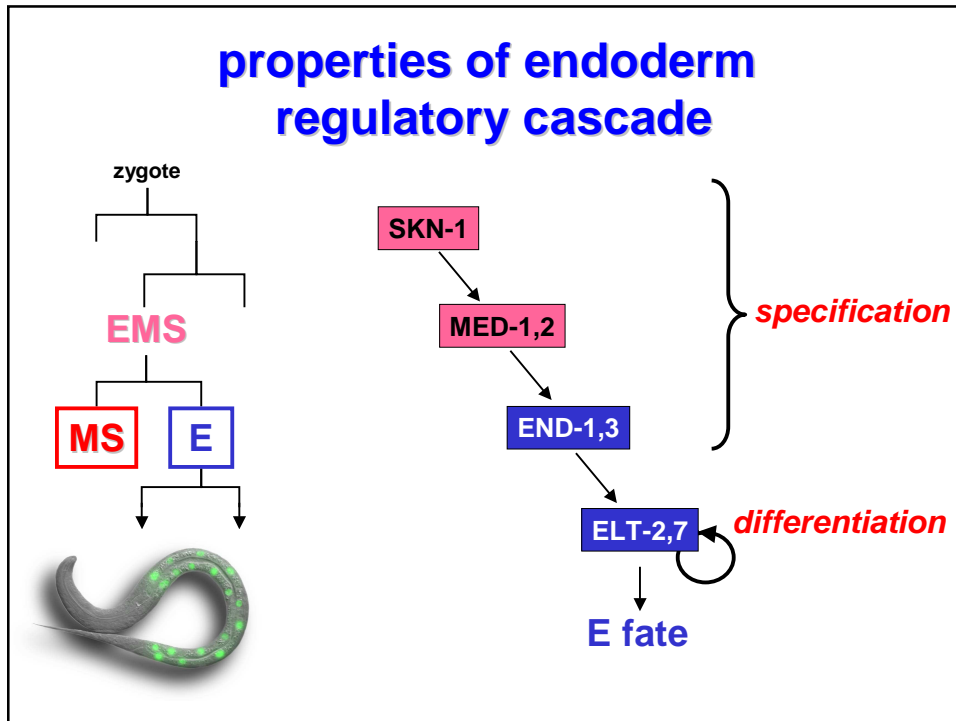
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



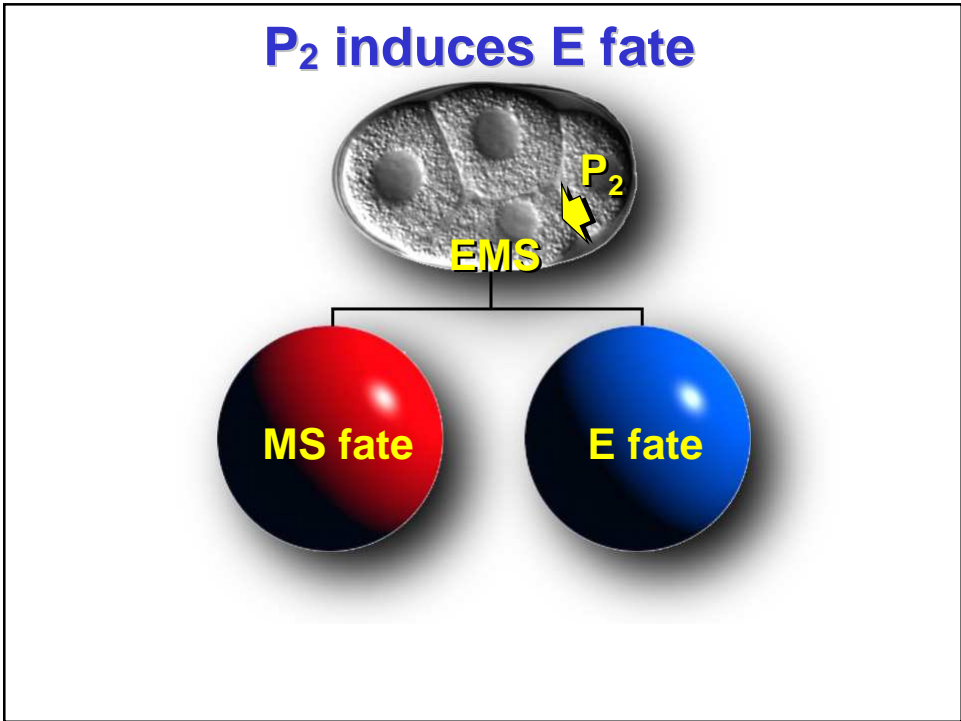
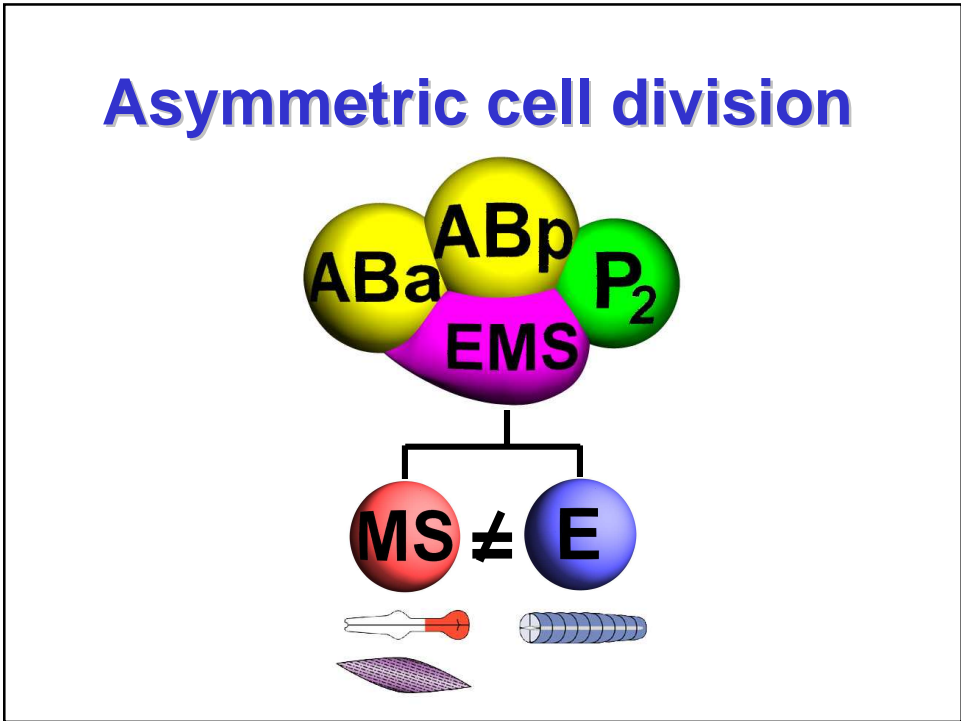
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



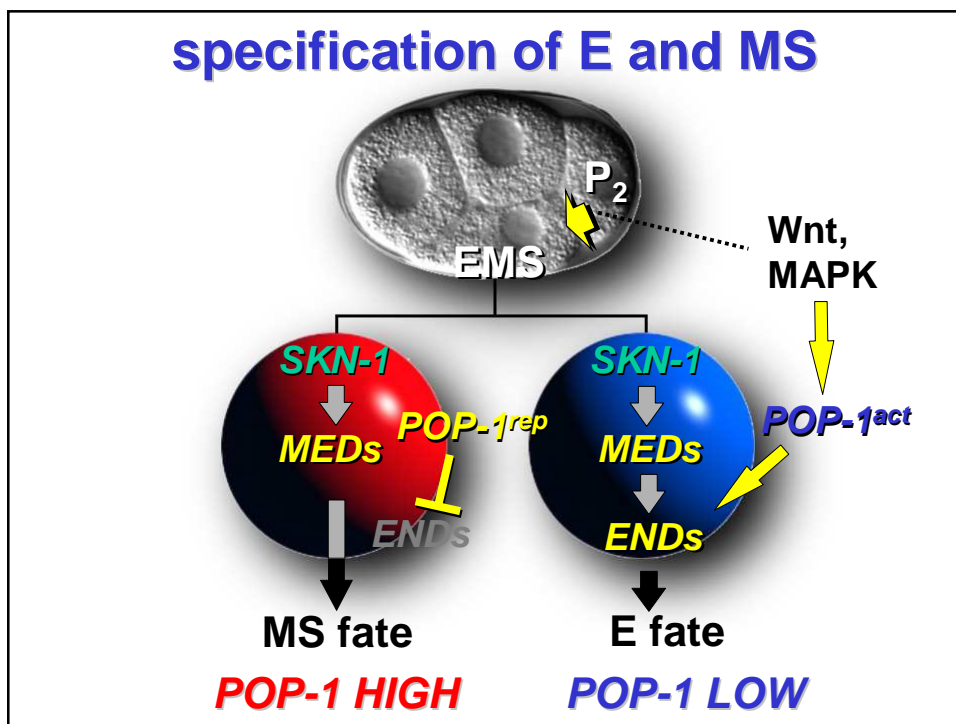
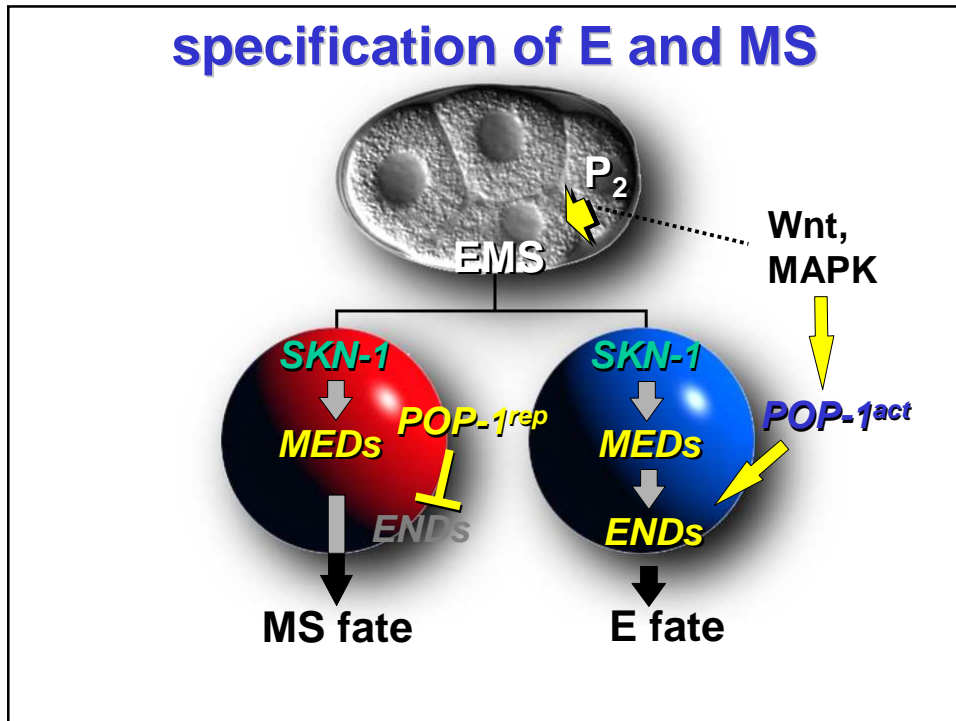
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



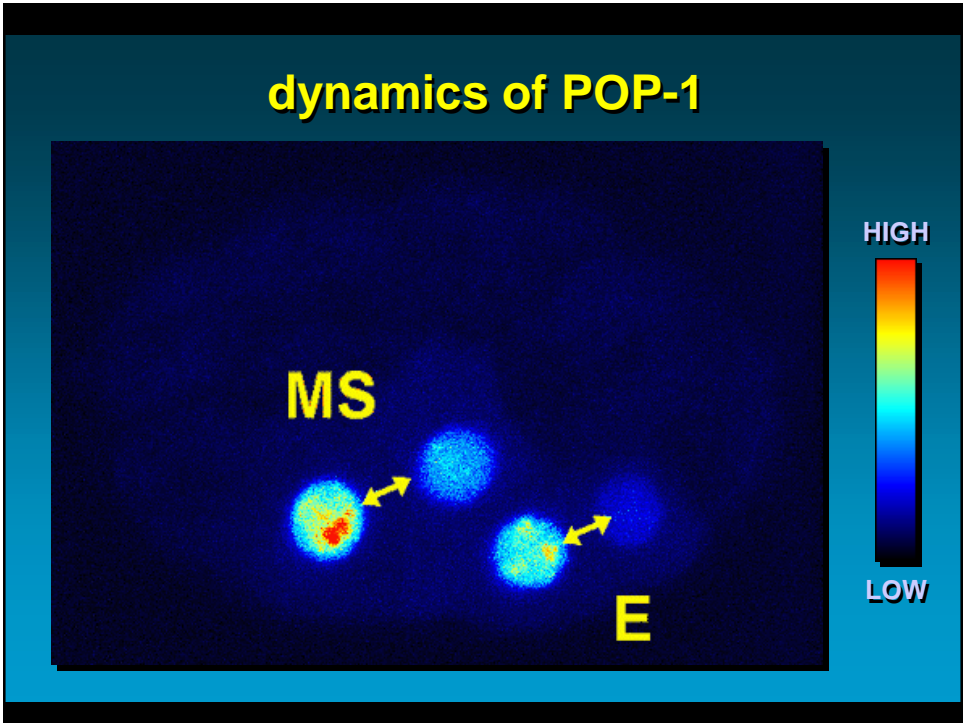
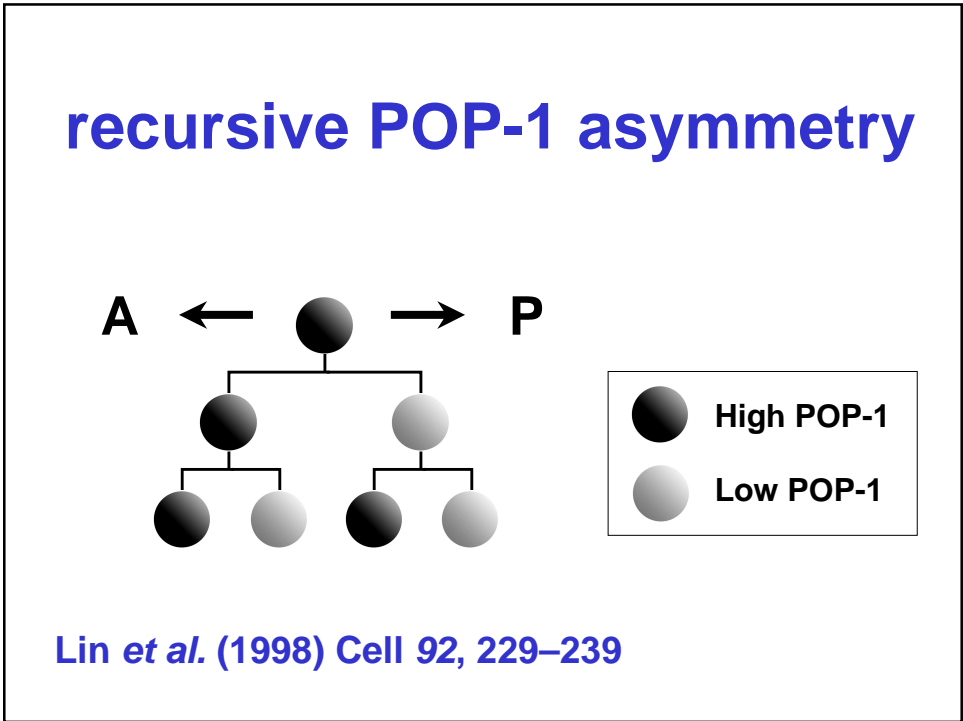
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



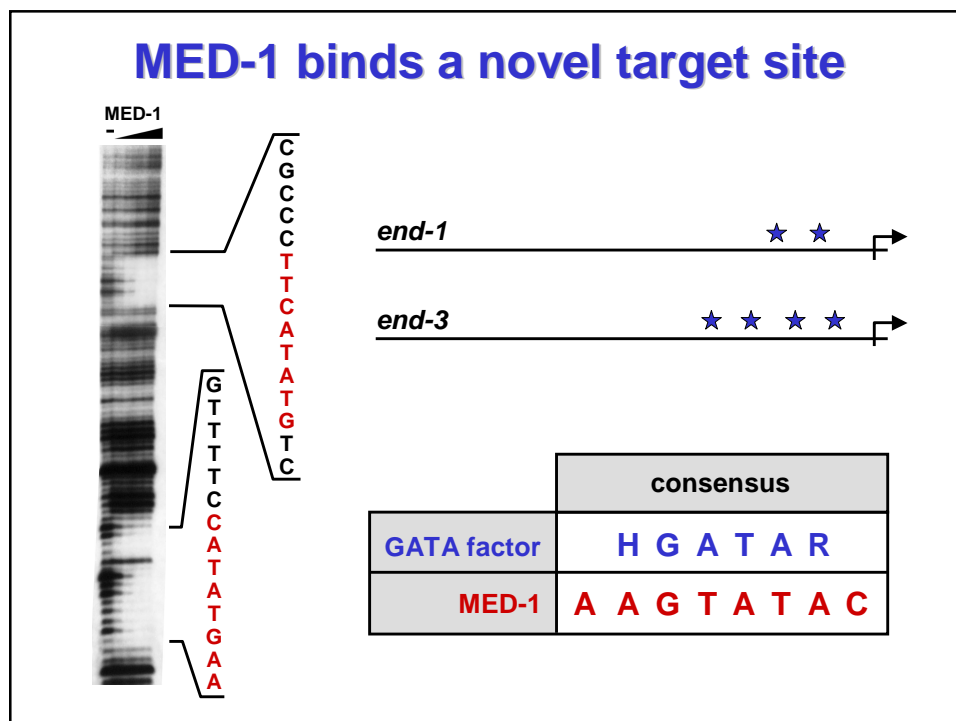
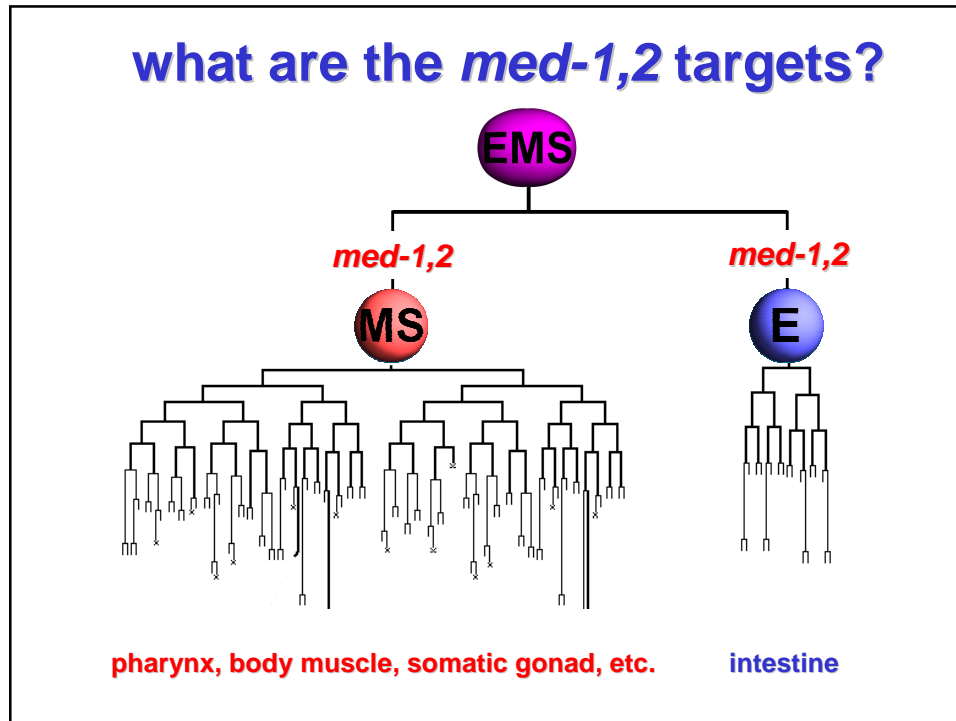
Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*

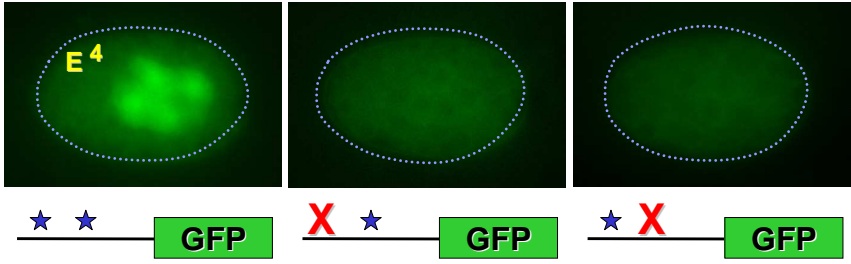


Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*

GTATA sites are required for *end-1* expression



The figure consists of three panels showing GFP expression in *C. elegans* embryos. The first panel shows a strong GFP signal in the E4 stage embryo. The second panel shows no GFP signal. The third panel shows no GFP signal. Below each panel is a schematic of the GFP construct. The first construct has two stars (representing GTATA sites) upstream of the GFP gene. The second construct has a red X (representing a mutation) and one star upstream of the GFP gene. The third construct has one star and a red X upstream of the GFP gene.

genomic search for MED targets

query with WormEnhancer:

[A A G T A T A C] N₂₅₋₁₀₀ [A A G T A T A C]

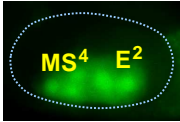

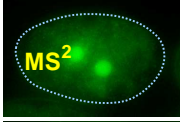

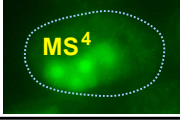

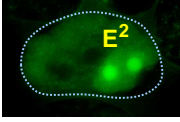

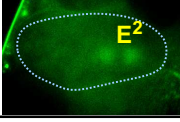

Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*

putative MED targets

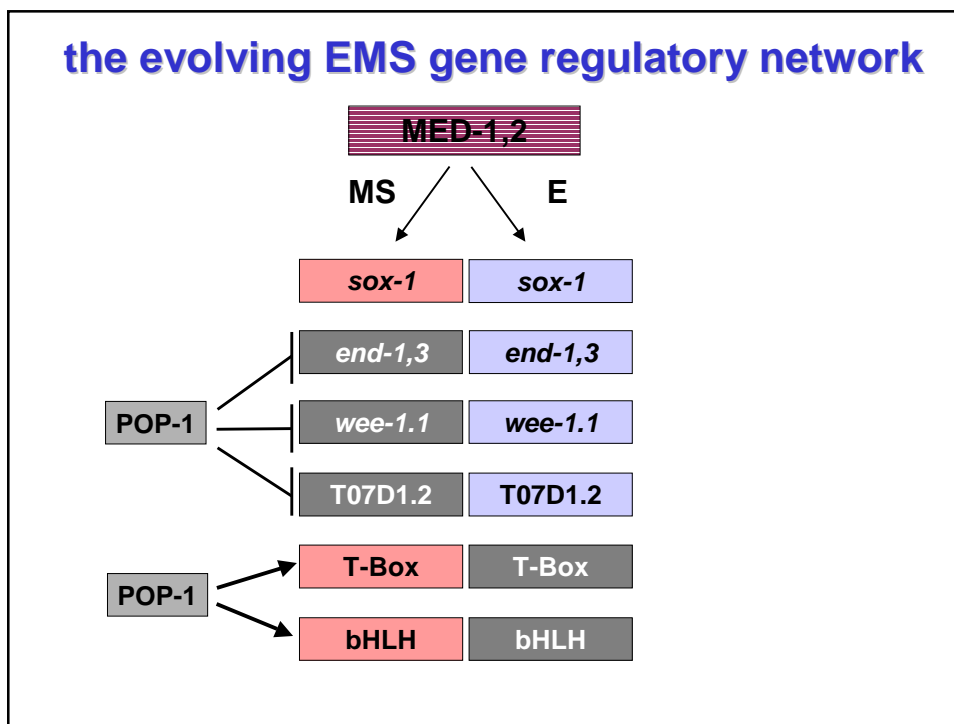
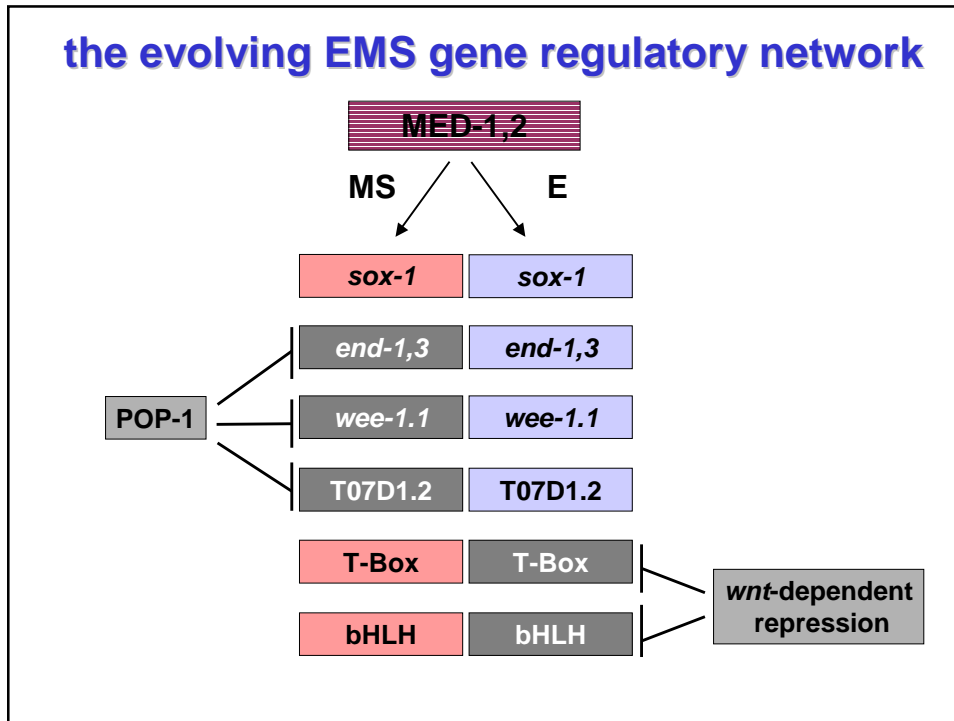
A A G T A T A C N₂₅₋₁₀₀ A A G T A T A C

gene	product	MED sites
F58E10.2	<i>end-1</i>	★ ★
F58E10.5	<i>end-3</i>	★ ★ ★ ★
F35H8.7	<i>wee-1.1</i>	★ ★ ★
<i>ceh-20/F31E3.2</i>	homeobox	★ ★
F58G4.4	LAG-2-like	★ ★
C32E12.5	Sox family (HMG)	★ ★ ★
ZK849.2	RCC1	★ ★
T07D1.2	unknown	★ ★
ZK177.10, ZK177.1	T-box/unknown	★ ★ ★ ★ ★ ★ ★ ★
T11A5.5	oxygen transport	★ ★ ★
C17C3.7, C17C3.10	bHLH (2)	★ ★
B0303.8, 9	unknown	★ ★ ★ ★

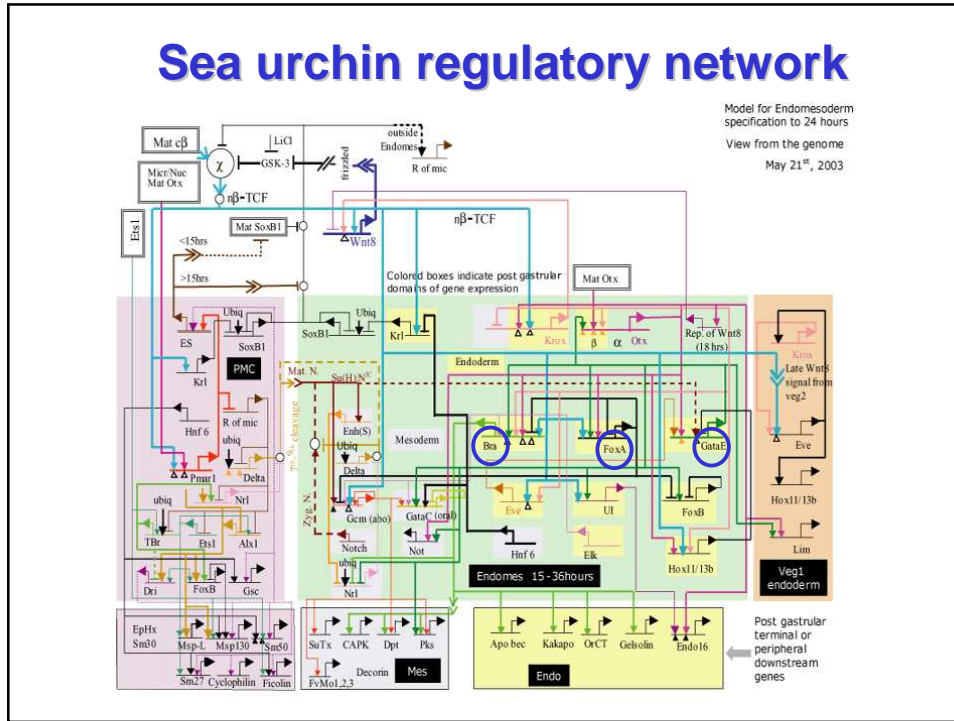
three classes of candidate MED targets

<i>sox-1::GFP</i>		
<i>hlh-25::GFP</i>		
<i>tbx-35::GFP</i>		
<i>wee-1.1::GFP</i>		
T07D1.2::GFP		

Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode *C. Elegans*



Developmental Switches and Gene Regulatory Networks in the Most Completely Described Animal, the Nematode C. Elegans

