Concluding lecture 10-11-2012

Strategies for Patterning

- ubiquitous receptor, localized activation of ligand (dorsal/ventral system, terminal system)
- localized RNA (anterior/posterior)
- translational inhibition (posterior)
- morphogen gradients (d/v, a/p)
- mutual repression (segmentation)
- cell-cell signaling (segment polarity)
- chromatin remodeling (Hox genes)

Some major players in human disease

- Wg: Wnt/β-catenin/APC (oncogenes)
- Dpp: TGF- β (oncogene)
- Dorsal: rel/NFκB/TLR/IL-1 (immune response)
- Ras (oncogene)
- HH/ptc/smo/gli (cancer, birth defects)
- Runt (hematapoesis, leukemias)
- Hox cluster (various birth defects)

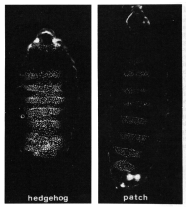
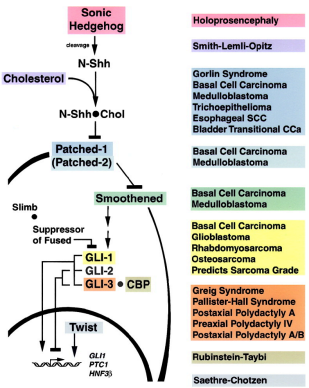


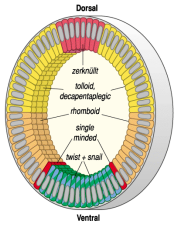
Table 1 Loci affecting segmentation in *Drosophila*

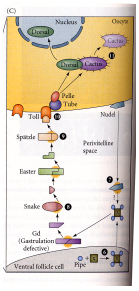
Locus	Map position*	No. of alleles†
cubitus interruptus^{D} (ci^{D})	4-0	(2)
wingless (*wg*)	2-30	6
gooseberry (*gsb*)	2-104	1
hedgehog (*hh*)	3-90	2
fused (*fu*)‡	1-59.5	(9)
patch (*ptc*)	2-55	8



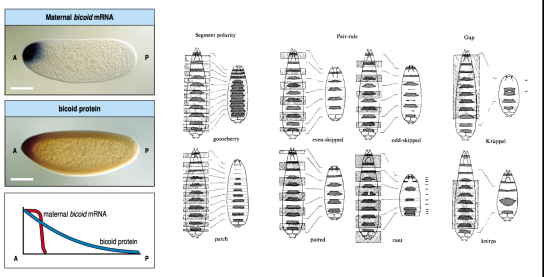
We've now seen:

Dorsal-Ventral Patterning:

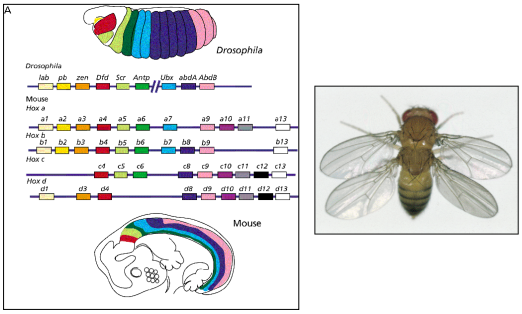




Anterior-Posterior patterning and Segmentation:

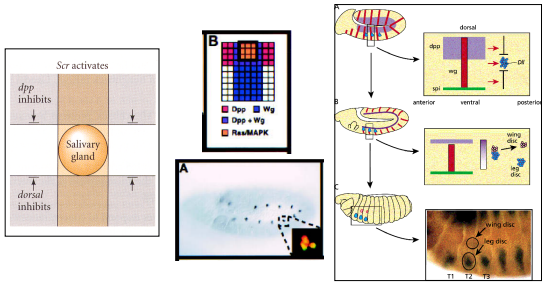


Segment Identity specification:

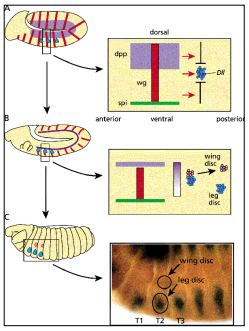


What does this mean for organogenesis?

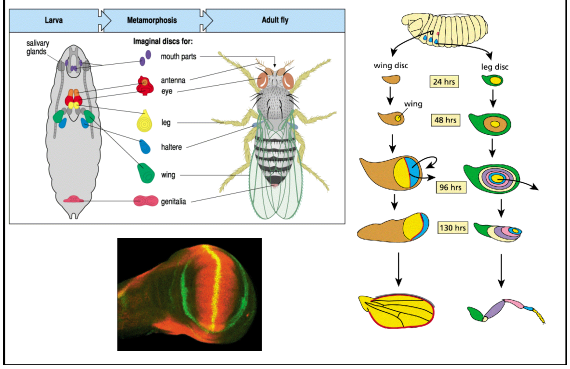
- These early axial patterning and segmentation events set up a coordinate grid on which organs are built

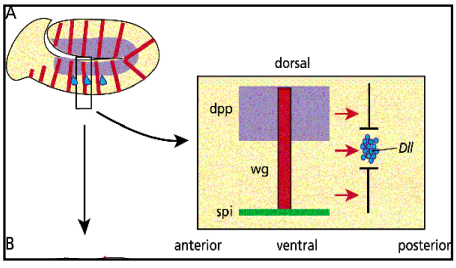


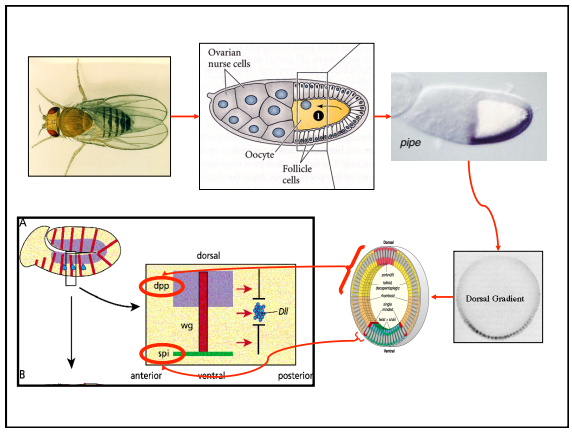
Let's look at wing and leg imaginal disc formation:

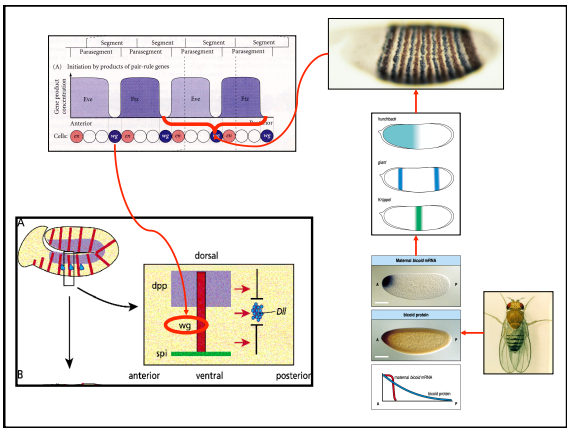


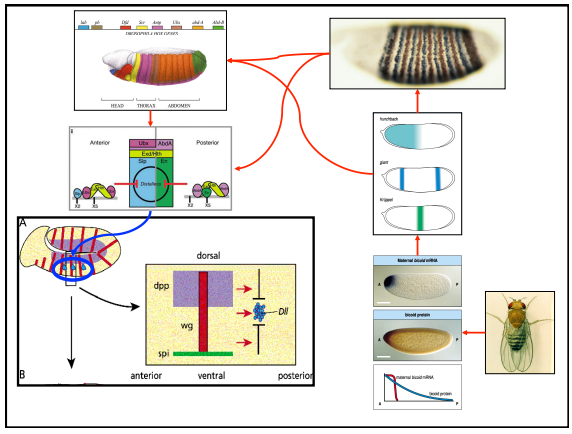
Imaginal Discs



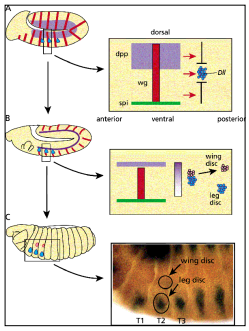


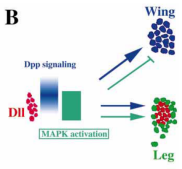




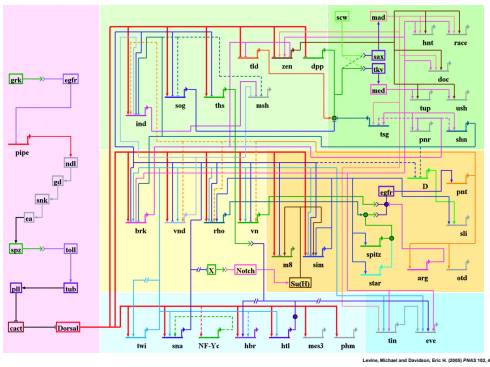


wing and leg imaginal disc formation: 2nd phase





Here's a partial view of the Dorsal-Ventral network:



Muscial Interlude

Regulatin' Genes

(http://www.youtube.com/watch?v=9k_oKK4Teco&feature=youtu.be)