**7.72/7.22 Vertebrate Development I!: A/P axis 9.21.05**

**Important structures (redux)**

Ectoderm
- Dorsal: neural tube anterior >> posterior
  - Forebrain
  - Midbrain
  - Hindbrain
  - Spinal cord (trunk)
    (tail)
- Ventral: epidermis

Mesoderm
- Dorsal:
- Axial mesoderm: notochord
- Paraxial mesoderm: somites
- Intermediate mesoderm: kidney
- Lateral mesoderm: limbs
- Ventral mesoderm: blood

- Anterior:
- Head mesoderm/prechordal plate
- Posterior:
- notochord, somites, lateral and ventral (remember that this is a D/V array of organs)

Endoderm:
- Anterior:
- Pharynx
- Oesophagus
- Stomach
- Small intestine
- Large intestine

- Pancreas (left)
- Spleen (left)
- Liver (right larger)
- Lung

**Dorsoventral axis**

Think about superimposition of different processes
Dorsal determination + germ layer determination >> rough division >> refinement
**β-catenin (Wnt pathway) (D) + BMPs (V) + germ layers = D/V cell types**

**Germ layer determination**
Animal pole

Vegetal pole

Morphogen

VegT

Nodal

Activin

BMP

Signaling systems

Downstream target genes

Competence

Potency

**Anteroposterior axis**

1. what is the A/P axis?
2. the organizer, signaling center that refines D/V, establishes A/P
3. other regions that establish A/P
4. when is A/P established?
5. A/P and D/V in different organisms: frog, fish, chicken, mouse.

The A/P axis
What is this?

When does it start to form?

How do we know this?

How does it start to form?

What is an inducing center? (Also called an organizer)

Speman organizer

Equivalent tissues in other vertebrates

Head versus trunk versus tail organizer

Retinoic acid

Wnt

Fgf

BMP

Primitive streak

Node

Epiblast

Hypoblast