Zeroing in on Chordata

Old 5 kingdom arrangement

Coelomates

- Echinodermata, Hemichordata, Chordata are all deuterostomes
  - “second opening becomes the mouth”

Some animal phyla

Deuterostomes
- Protostomes

Bilateral
Radial

Coelomates

Echinodermata
Hemichordata
Chordata

some echinoderms
hemichordata
Linking echinoderms and chordates

Deuterostomes have indeterminate development (as opposed to determinate)

- Blastomeres: Embryonic cells formed during embryonic cleavage soon after fertilization.

Arrangement of blastomeres

- **Spiral arrangement**
  - Protostomes (mollusks, annelids, arthropods)
  - Eight-cell stage
  - Spiral and determinate

- **Radial arrangement**
  - Deuterostomes (echinoderms, chordates)
  - Eight-cell stage
  - Radial and indeterminate

Making the gut tube

- **Blastula stage** - hollow ball of cells
Gastrulation

- Then blastula sinks in - indentation forms (blastopore)

Protostome
- anus
- blastopore
- mouth

Deuterostome
- mouth
- blastopore
- anus

Making coelum

- Protostome
  - coelum forms in mesoderm

- Deuterostome
  - coelum buds off from developing gut

Chordates have the following structures at some time in their life cycle.

1. Dorsal hollow nerve cord
2. Notochord
3. Pharyngeal slits or pouches
4. Post-anal tail
5. Endostyle/thyroid gland
Notochord
Flexible, dorsal to coelom - ventral to nerve cord.
Chief body support in early chordates.

Notochord
It helps to organize later development
Notochord is mostly replaced by vertebral column in vertebrates.

• In mammals, a remnant of notochord remains in intervertebral disks (nucleus pulposus).
  shorter size at old age
  herniated disk
Dorsal hollow nerve cord

- Formed by an invagination of ectoderm

X-section through dorsal portion of embryo

Pharyngeal slits

Slits are not present in all chordates, they may instead be pouches present during development

Branchial or pharyngeal region

Post anal tail

1. Area caudal to the anus, not containing coelom.

2. Used for locomotion in fish; various functions in tetrapods; may be lost.