

*Biology 223*

*Human Anatomy and Physiology*

*Week 1; Lecture 1; Monday*

*Dr. Stuart S. Sumida*

# Introduction

## Cells and Tissues

## Humans as Vertebrates

## Early Development of Humans

# **Humans as Vertebrates**

- Phylum - Chordata
- Dorsal hollow nerve cord
- Notochord
- Gill slits
- Postanal Tail

Neural crest tissue as the defining vertebrate feature.

# **Cells and Tissues**

## **Cell structure**

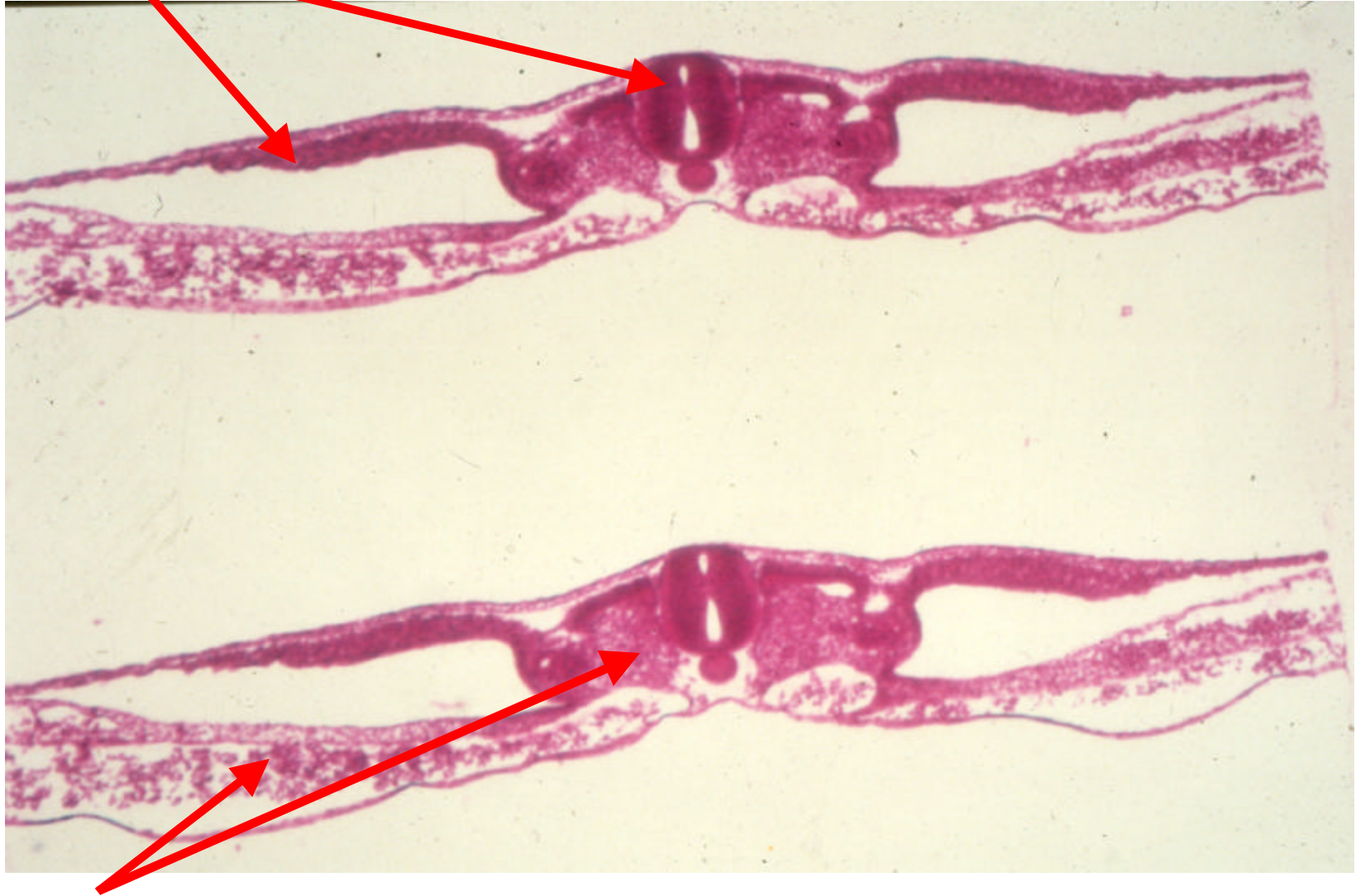
## **Cell association patterns**

- Epithelial pattern
- Mesenchymal pattern

## **Tissues**

- Epithelial tissue - functions of exchange and functions of certain sensory reception.
- Connective tissue
- Muscle & nervous tissue

Epithelial tissue



Mesenchymal Tissue

# **Anatomical Terminology (know the differences)**

- Bipedal and orthograde
- Dorsal and ventral
- Medial and lateral
- Cranial and caudal
- anterior and posterior
- inferior and superior
- proximal and distal
- deep and superficial

# Historical and Developmental Perspectives

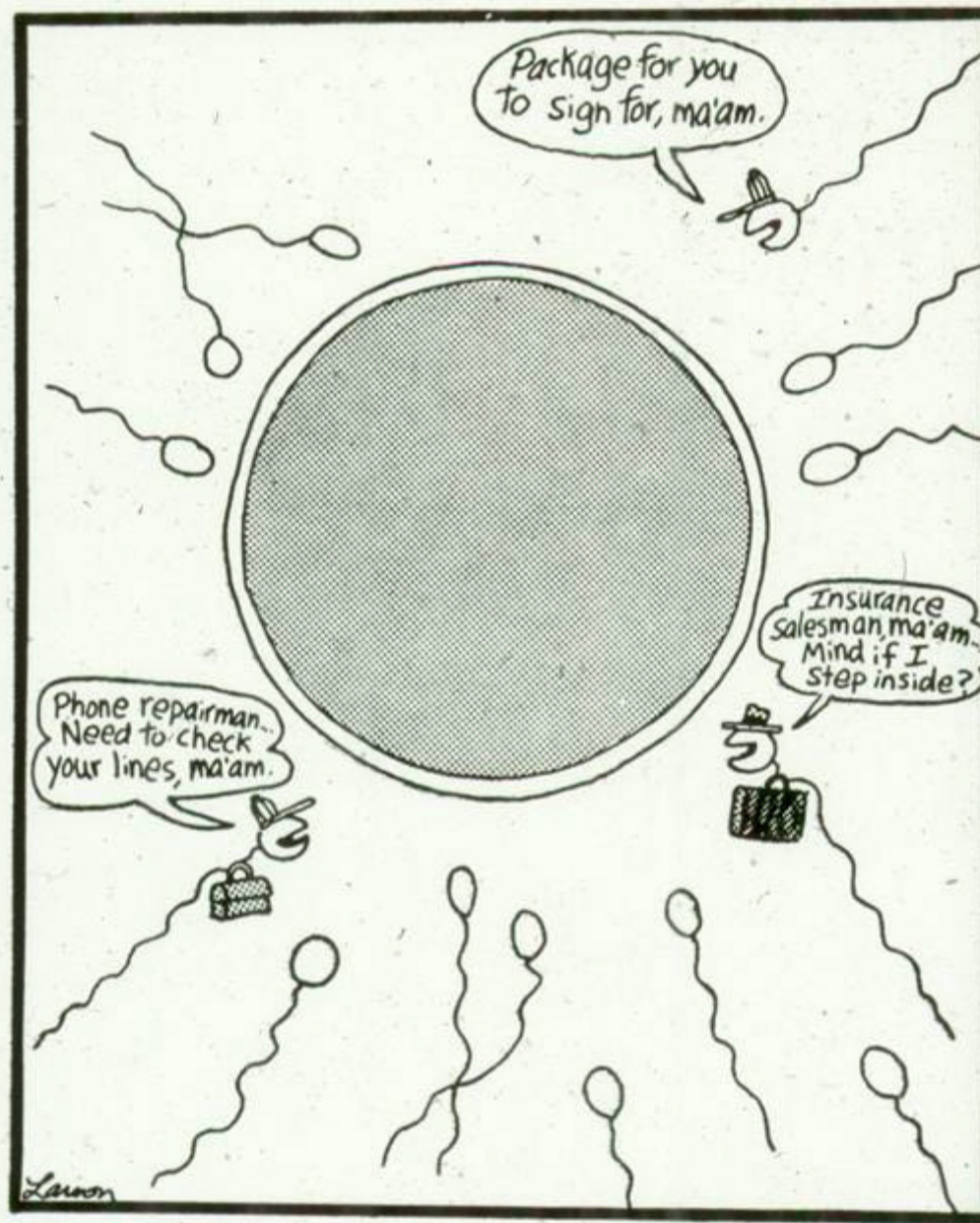
- Ontogeny
- Early embryological development

Cross-section of the body

Chordate features – dorsal hollow nerve cord, notochord, gut tube, certain blood vessels, muscle blocks, and coelom.

# Early Development of the Humans

- The egg
- *macrolecithal* versus *microlicethal* (know the difference)



How the human egg is often deceived.



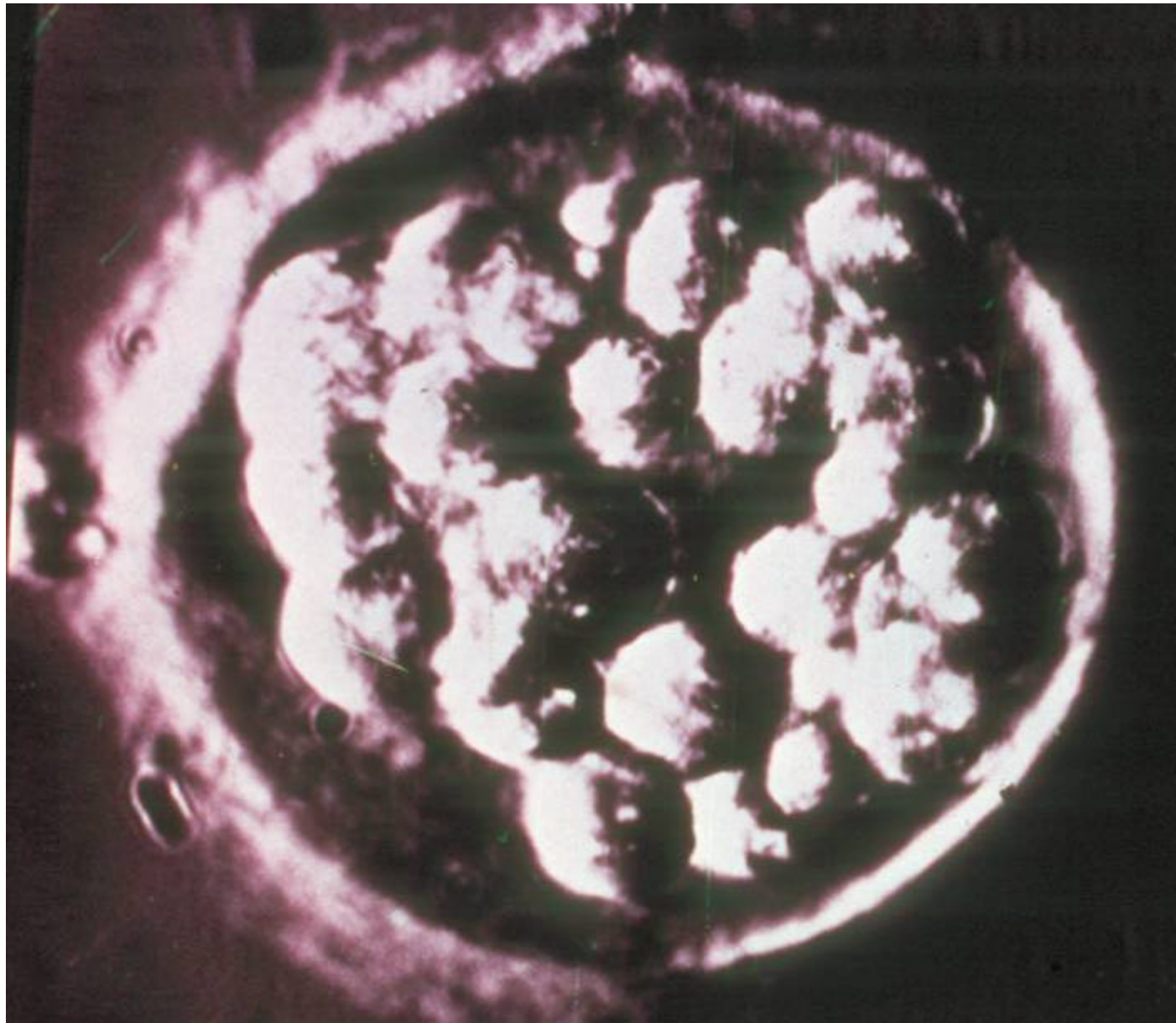
## Early stages

- Zygote
- Morula
- Blastocyst - inner cell mass, trophoblast

## Amniotic cavity

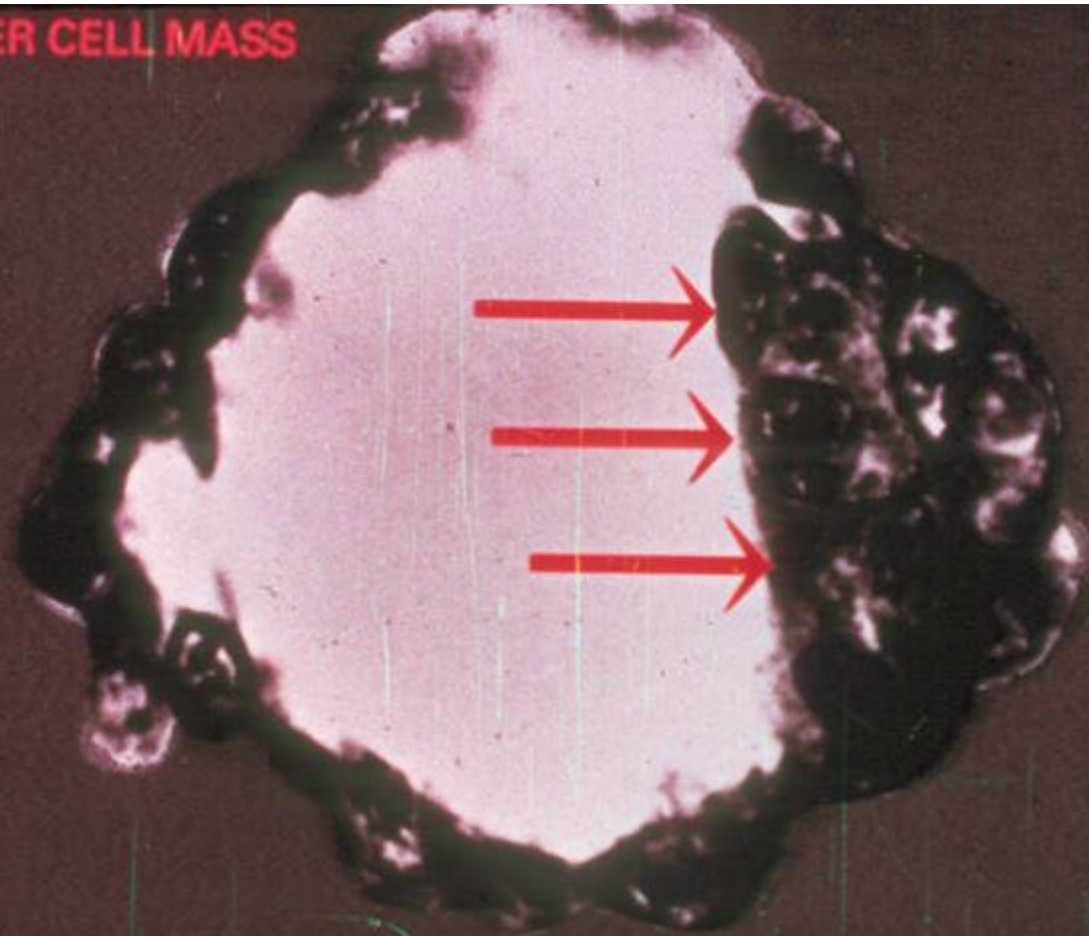
## Bilaminar embryo

## Notochord - first discrete structure



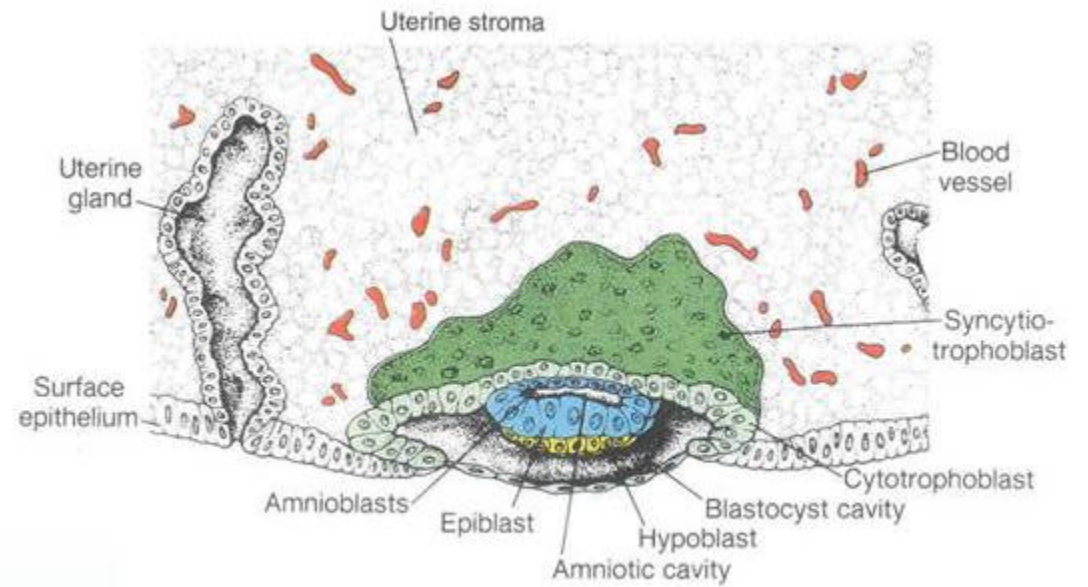
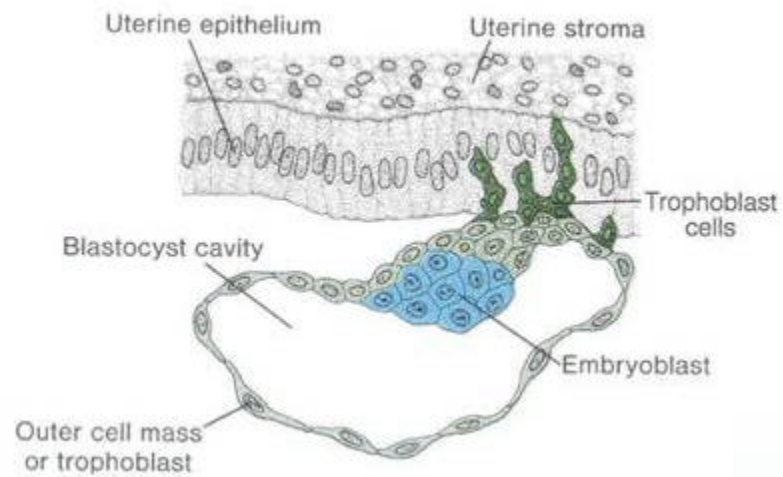
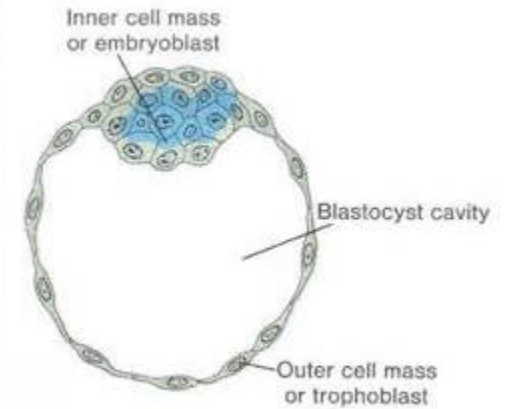
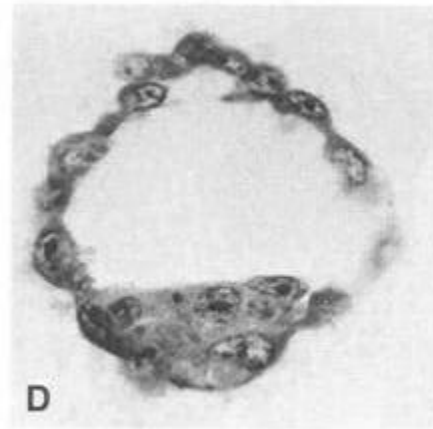
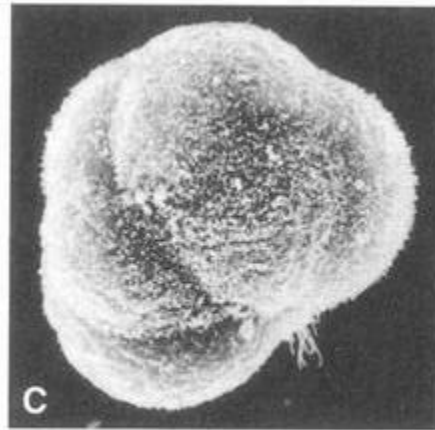
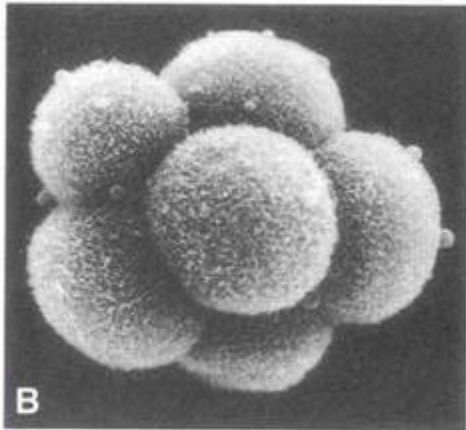
Morula

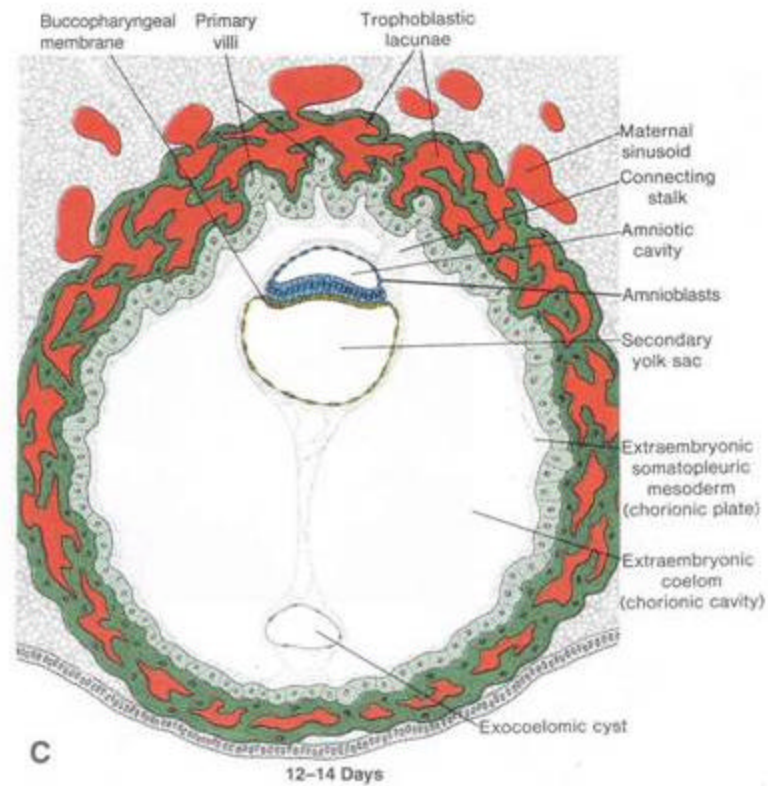
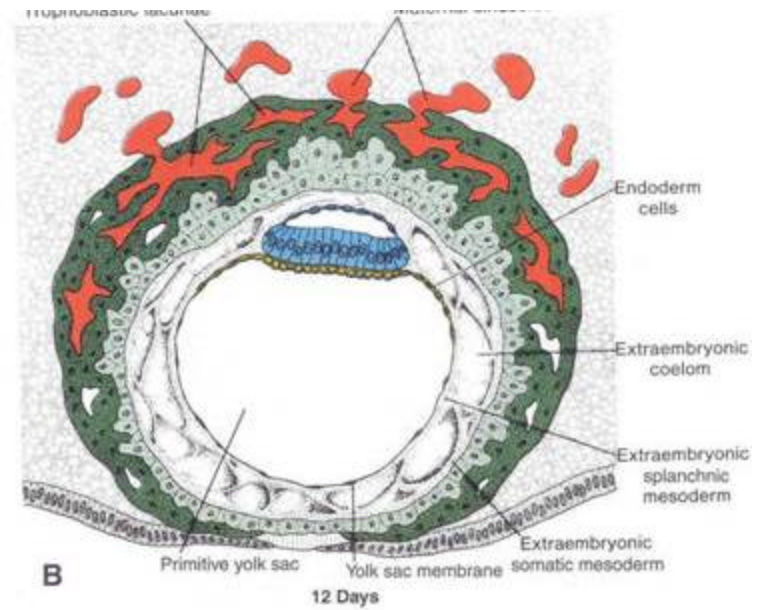
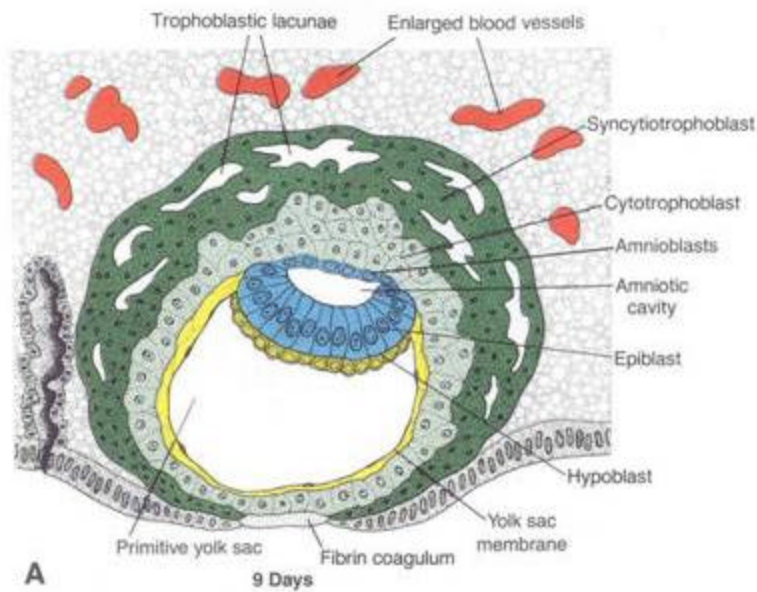
**INNER CELL MASS**



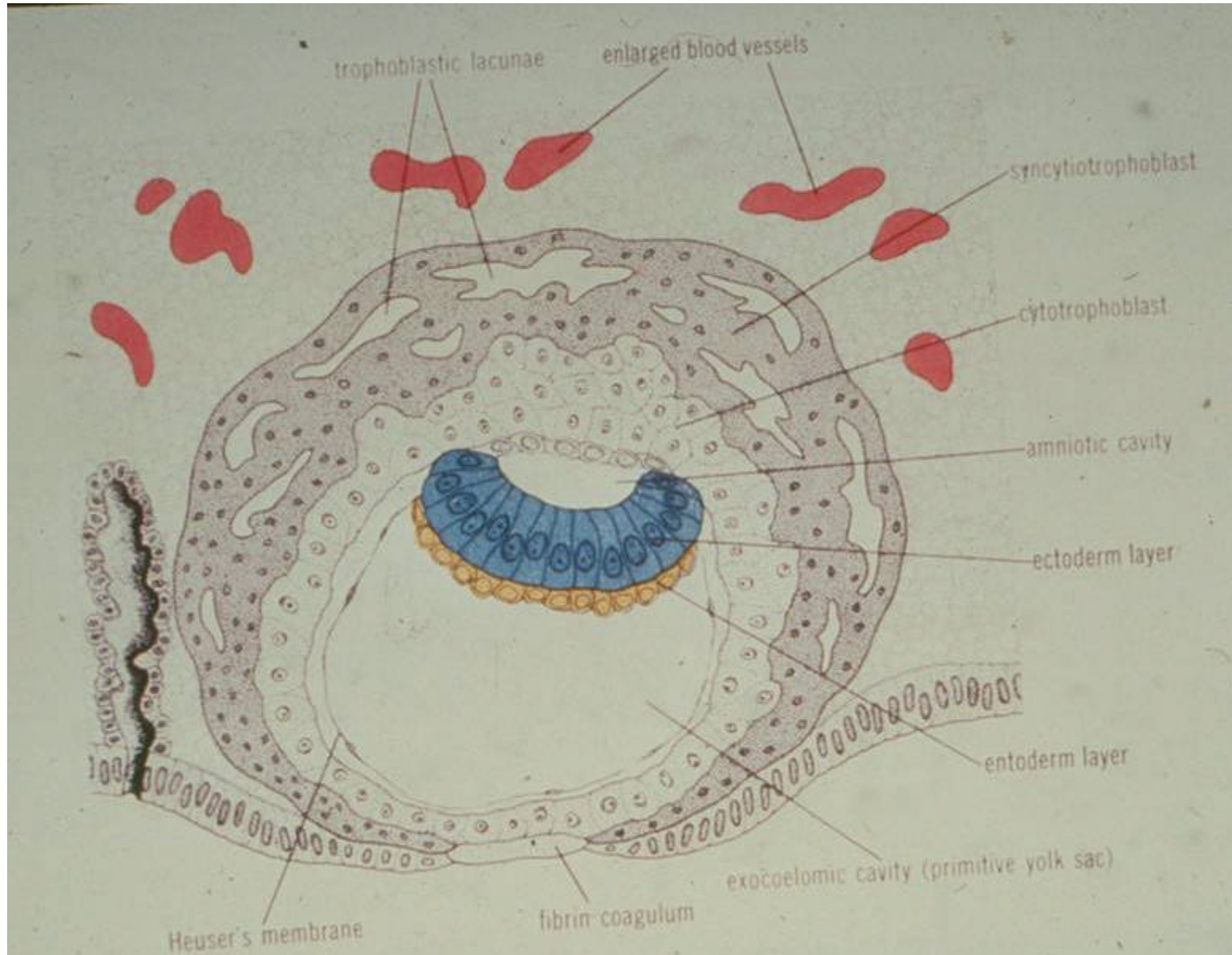
**THE GROUP OF LARGE CELLS CALLED THE "INNER  
CELL MASS" WILL FORM THE EMBRYO.**





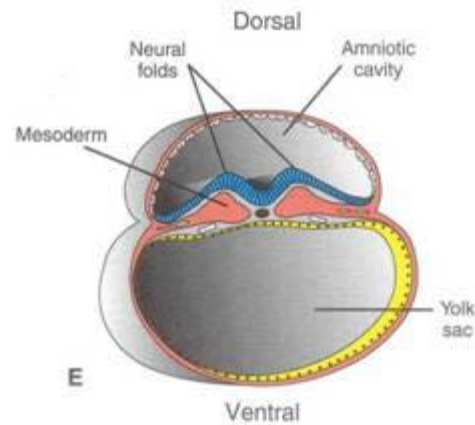
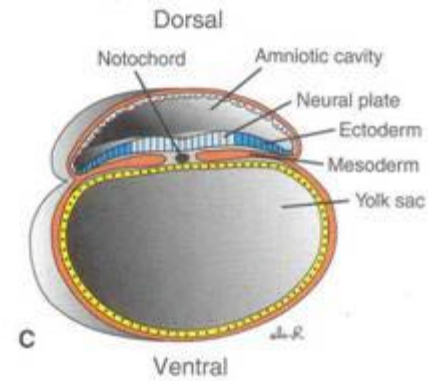
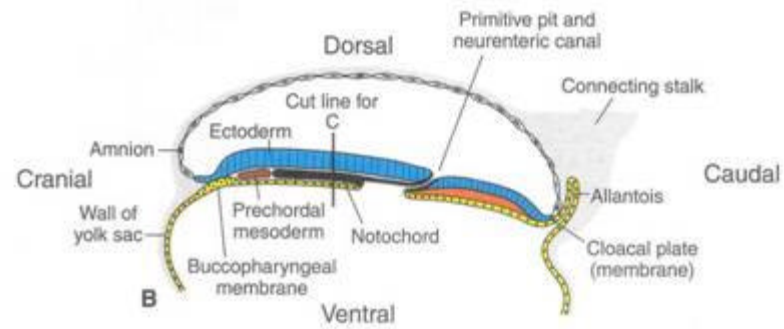
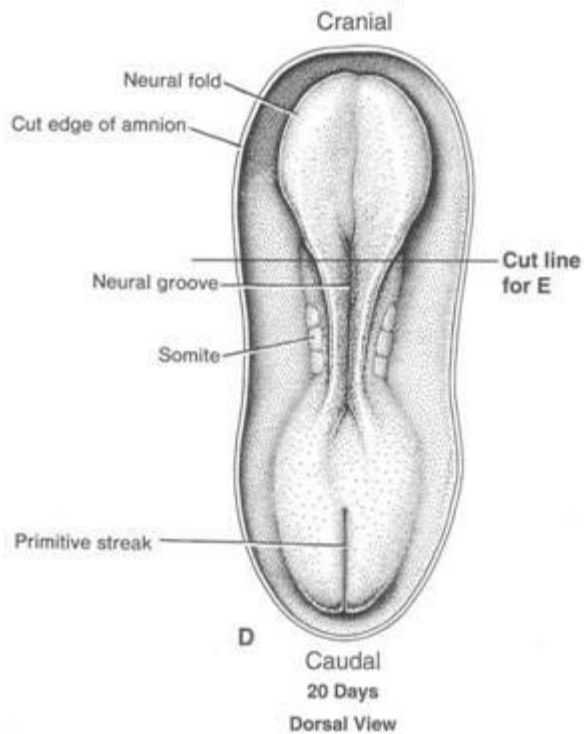
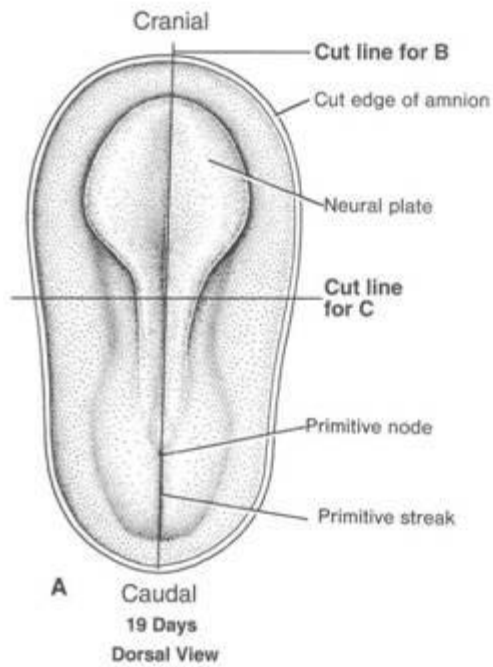




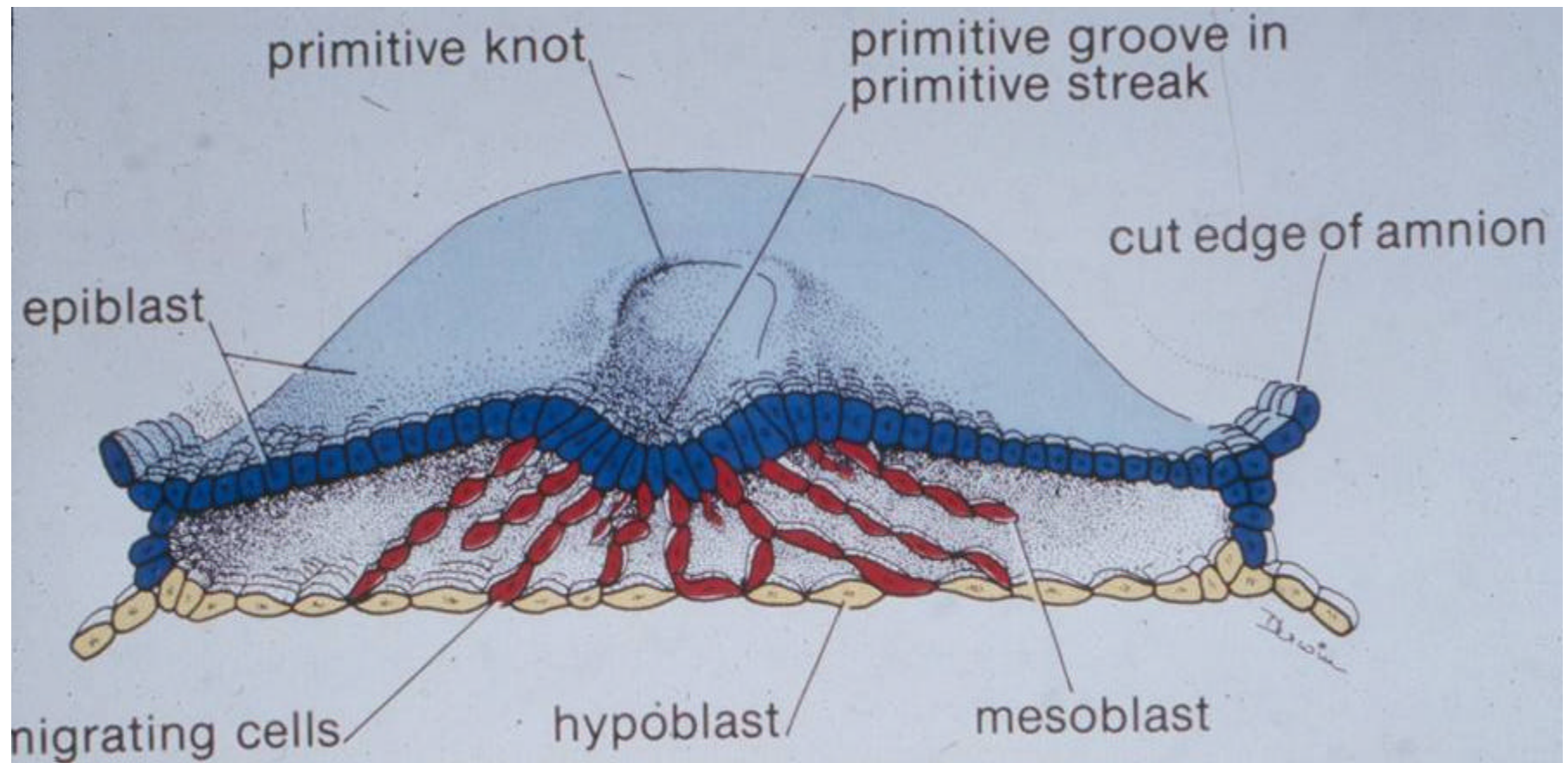


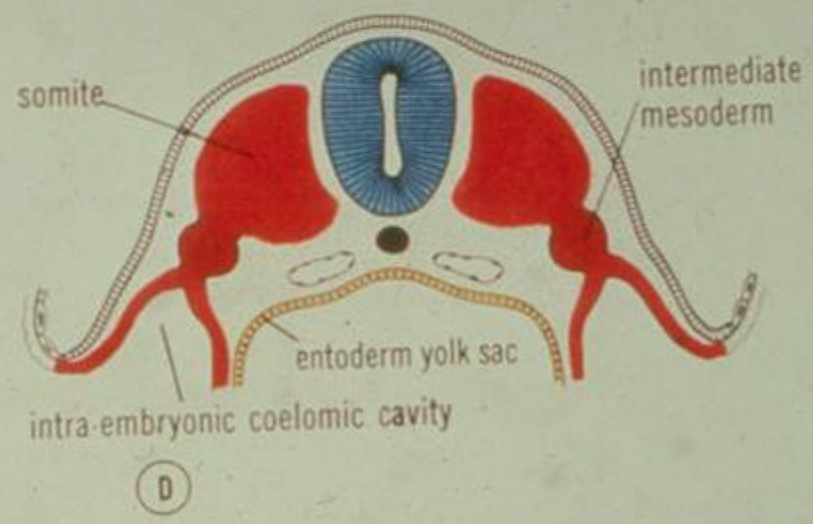
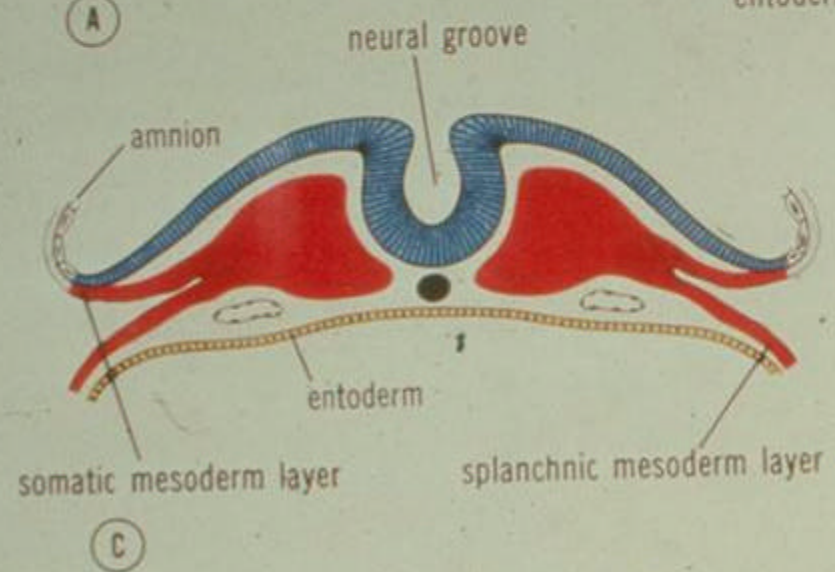
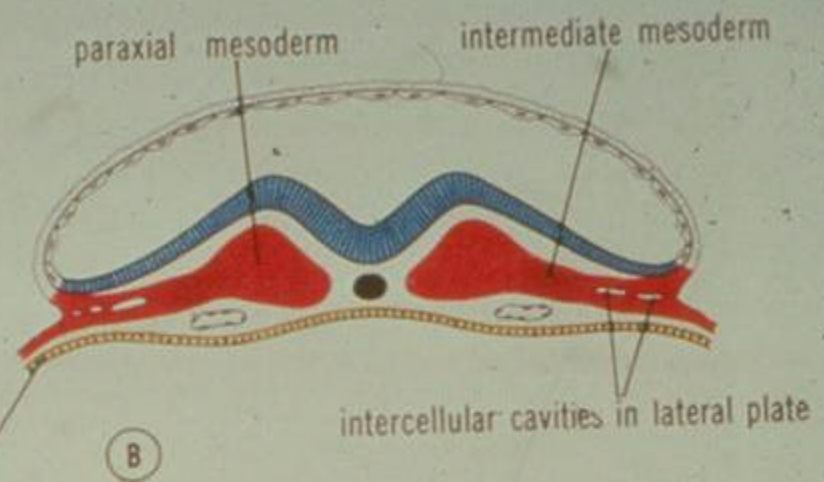
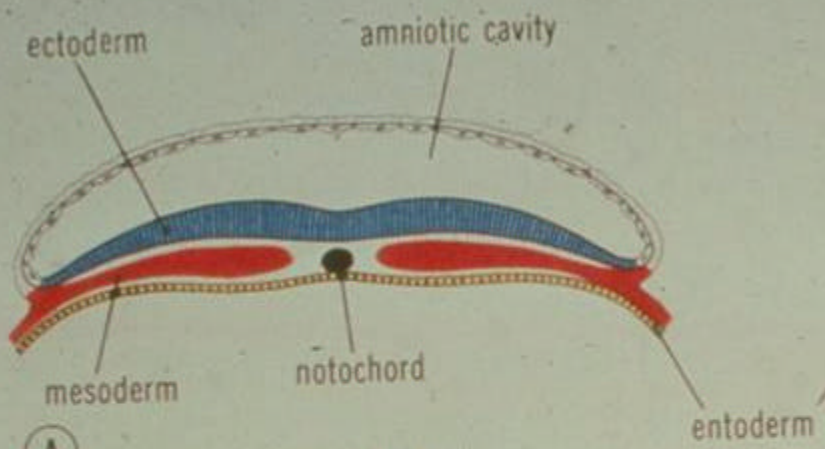
# Germ layers

- Ectoderm
- Mesoderm
- Endoderm



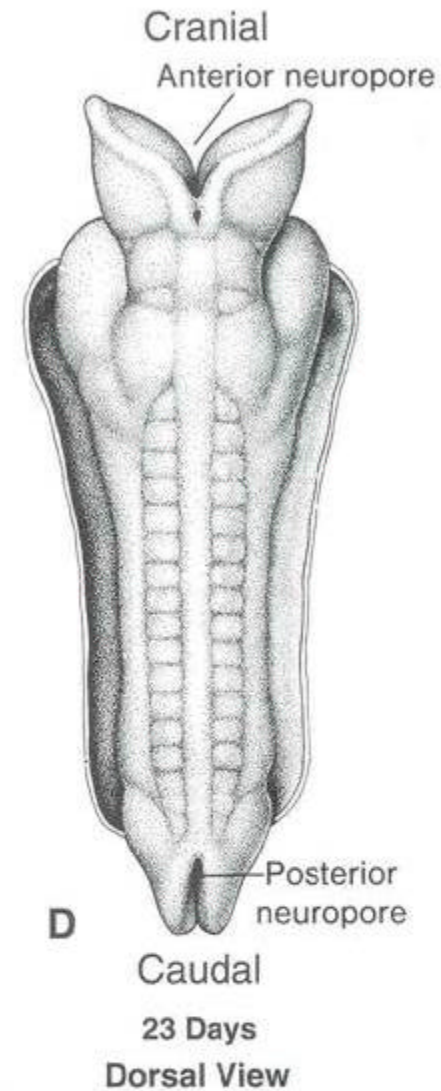
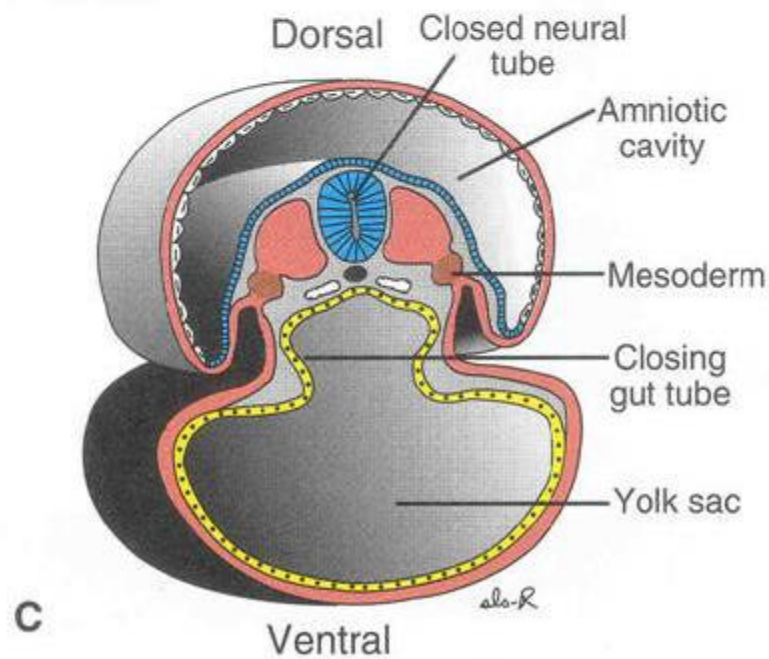
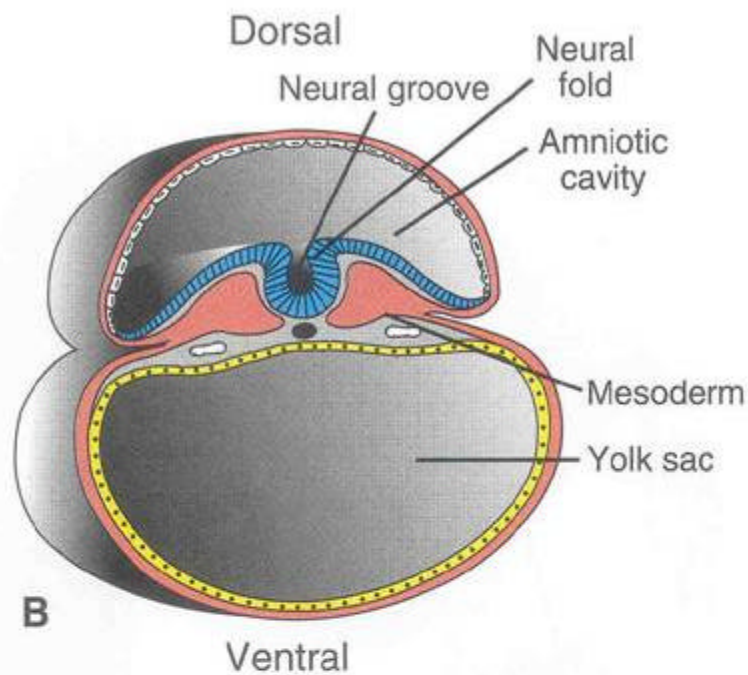
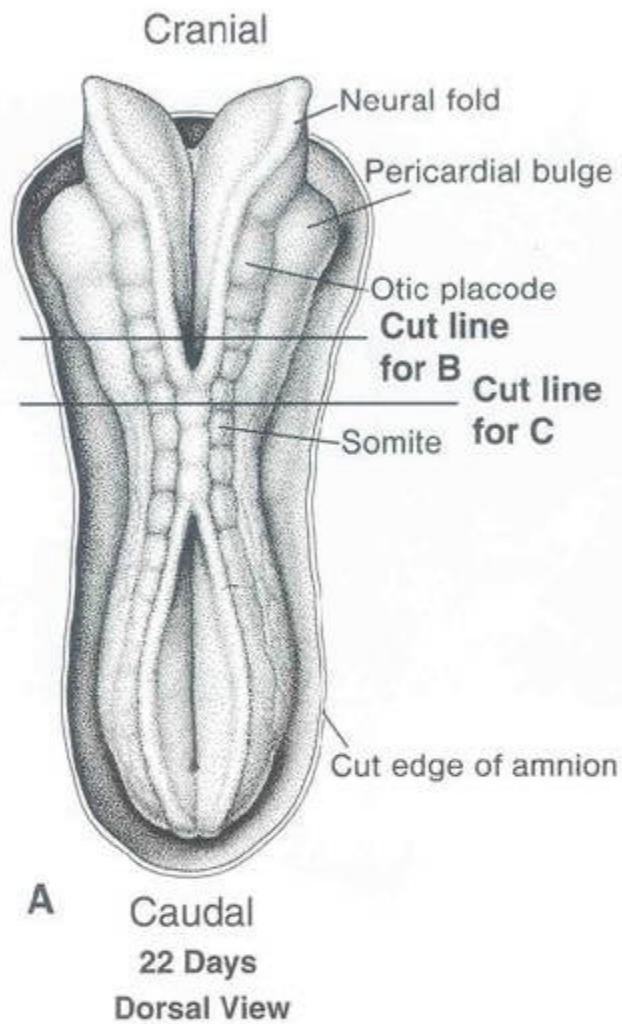












# **Review:**

## **Historical and Developmental Perspectives**

Ontogeny

Early embryological development

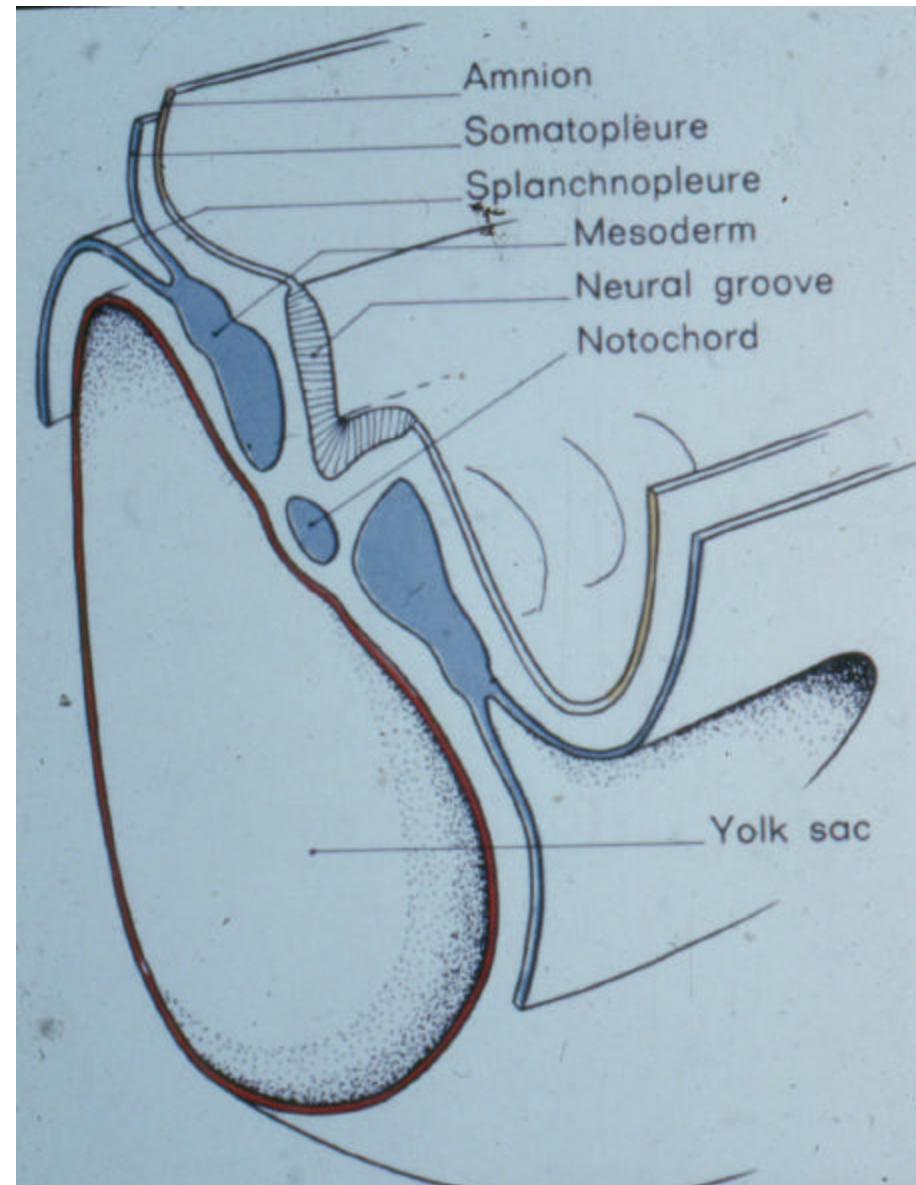
Cross-section of the body

Chordate features – dorsal hollow nerve cord, notochord, gut tube, certain blood vessels, muscle blocks, and coelom.



Concurrent events:

Neural folds to  
Neural Groove



# Mesodermal structures

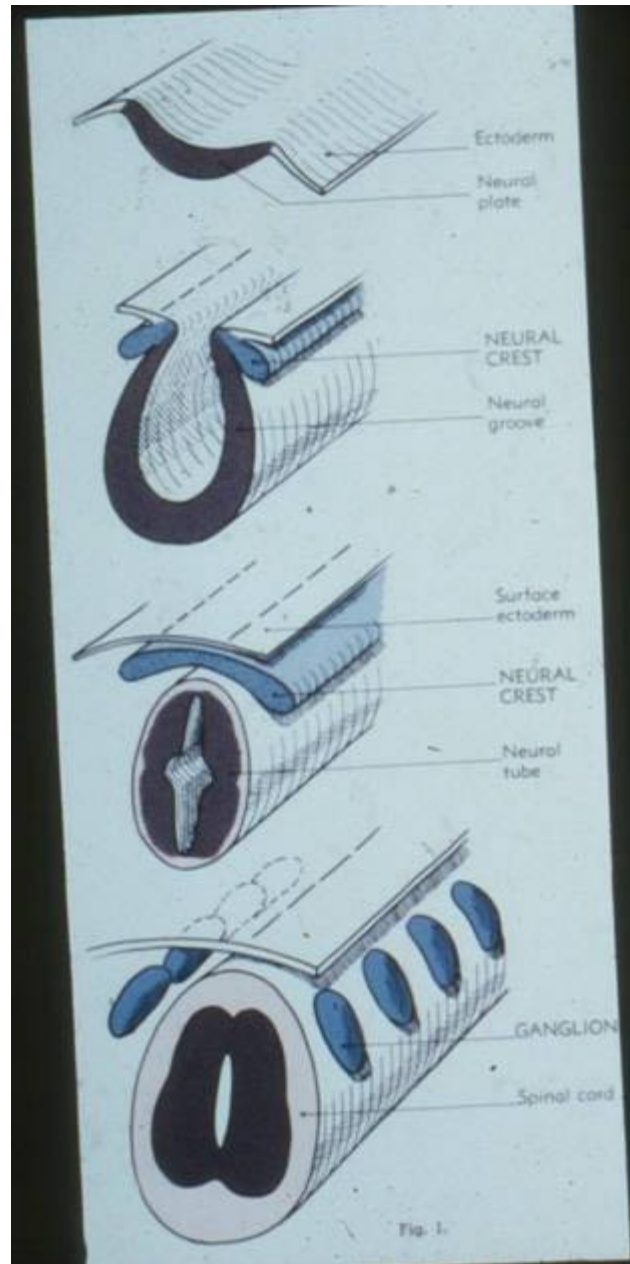
- Paraxial mesoderm
- Lateral mesoderm
- Intermediate mesoderm
- Somites
  - Segmental structures - how many in the head, neck, thorax, abdomen, pelvis, and in what remains of the tail. What is the total number of segments in the body?

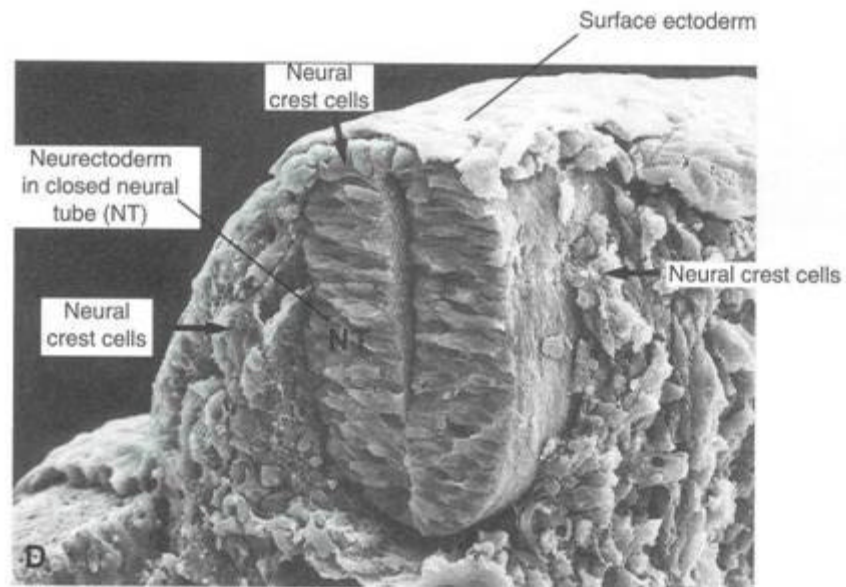
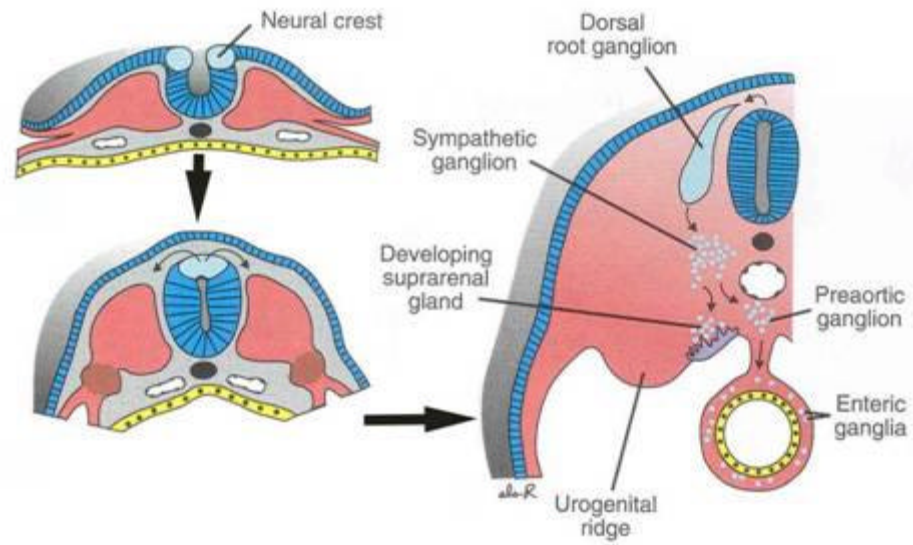
# **Early Development Continued:**

- Dorsal hollow nerve tube
- Neural crest
- Further differentiation of the mesoderm



# Neural Crest Development

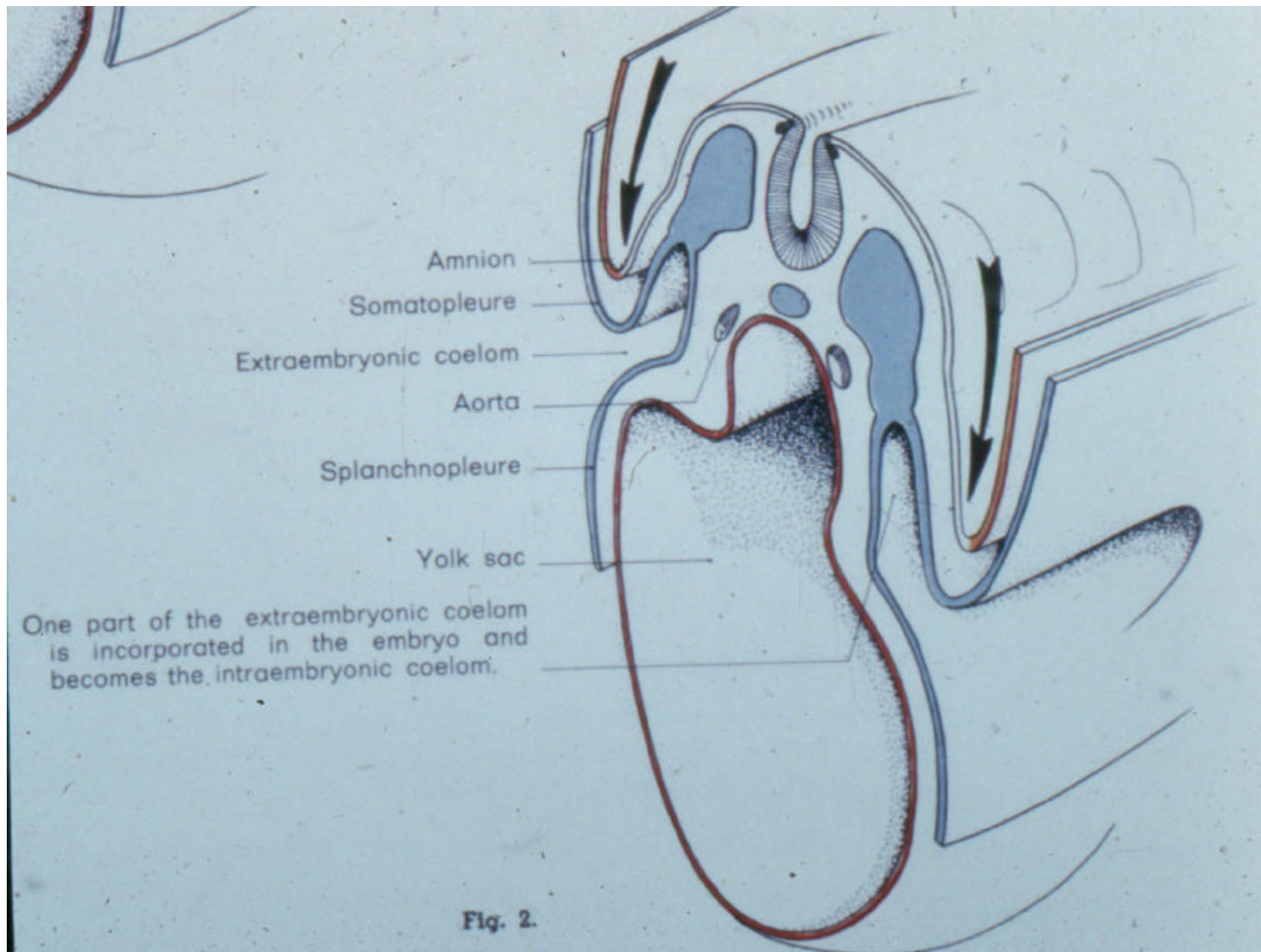




23 Days

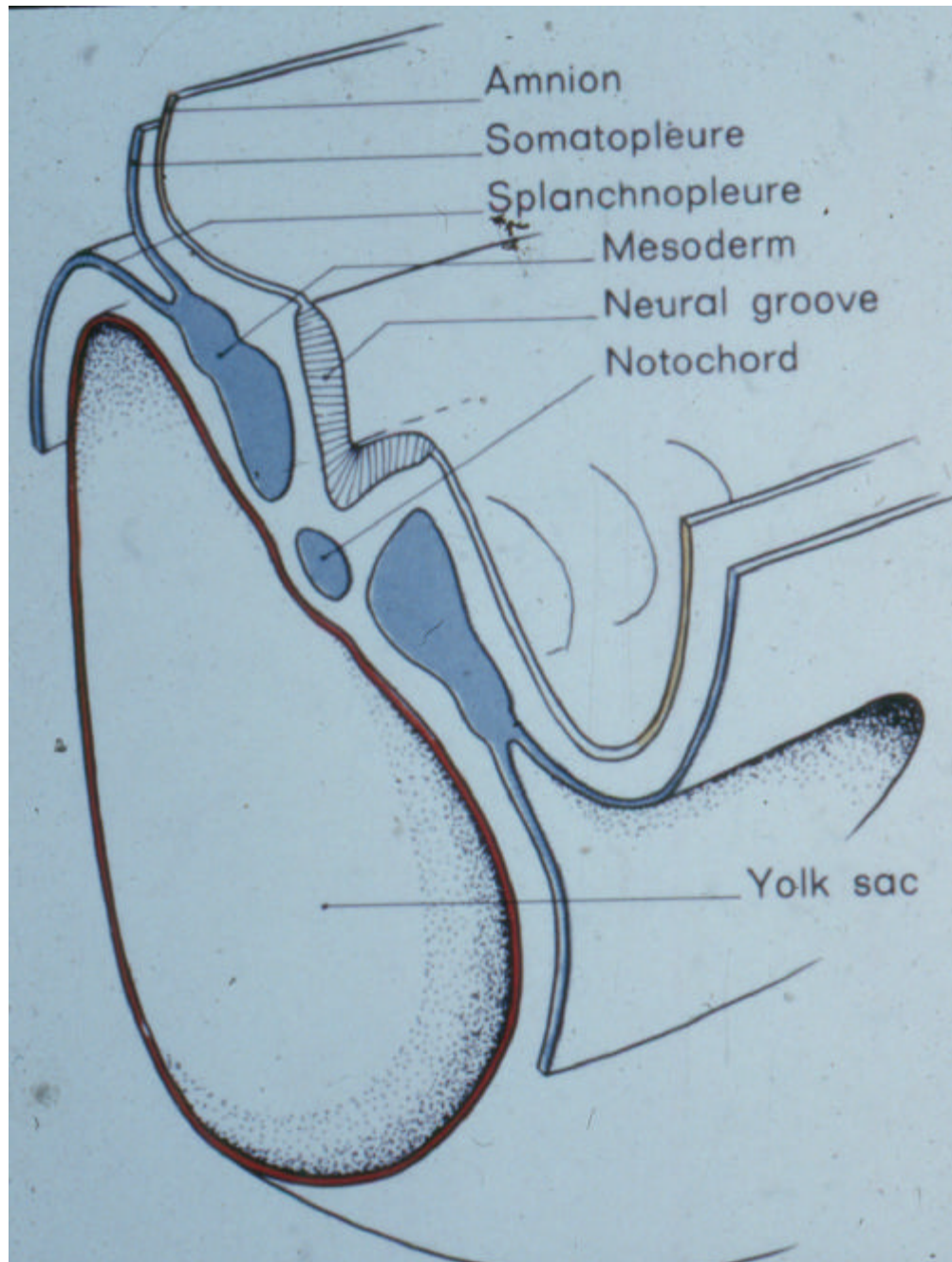
# Structures Visible in the Basic Cross-Section of the Body (Embryo or Adult!)

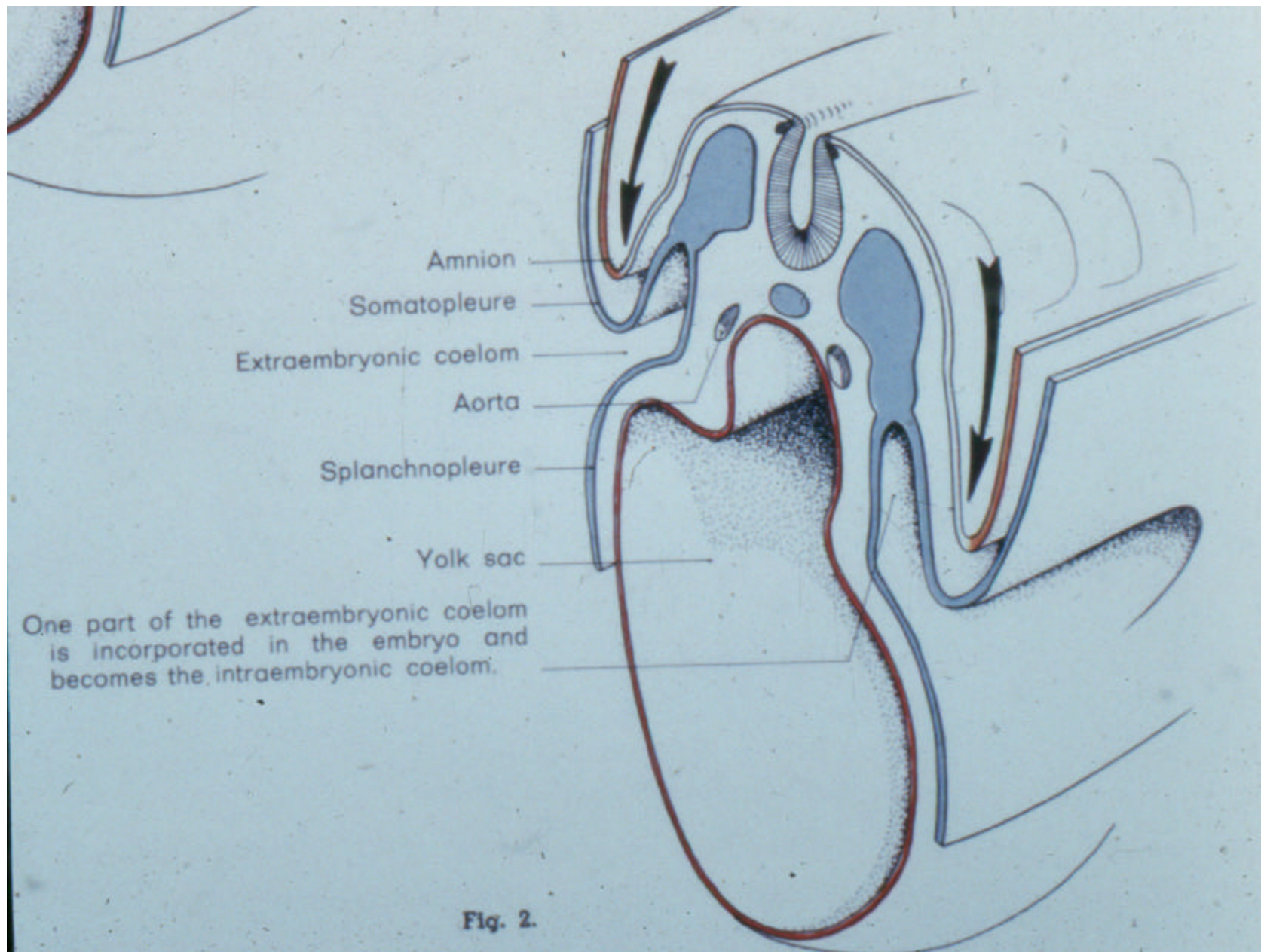
- Coelom
- Somatopleure
- Splanchnopleure
- Parietal Peritoneum
- Visceral Peritoneum
- Dorsal mesentery
- Ventral mesentery



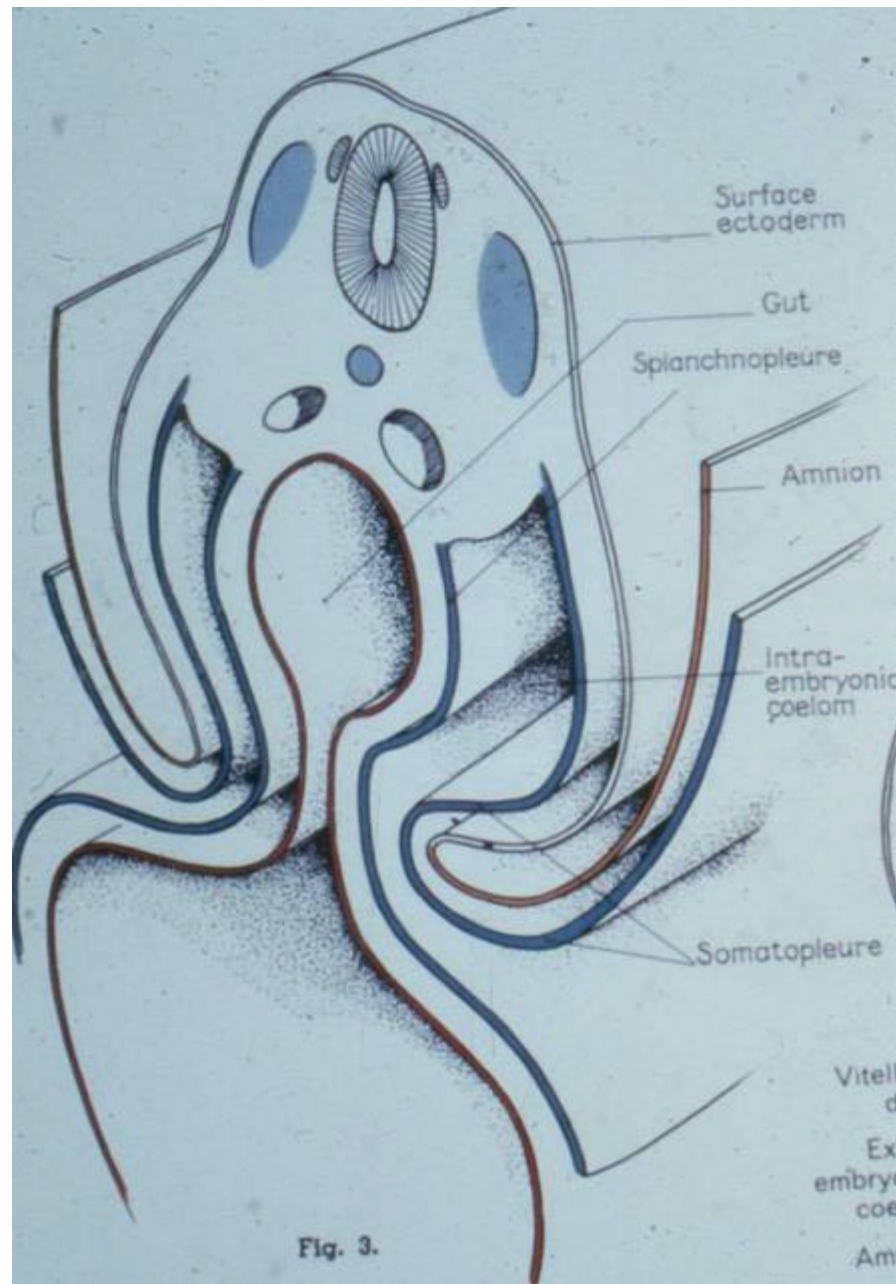




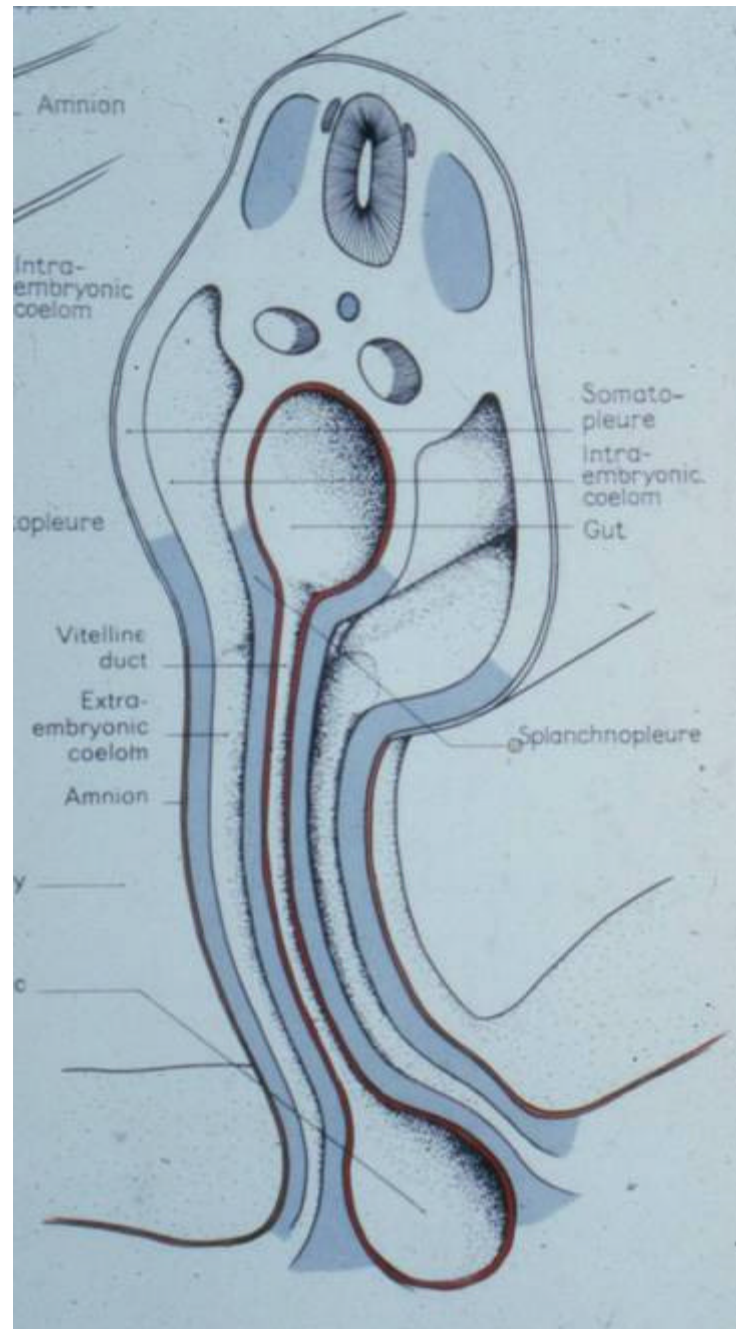




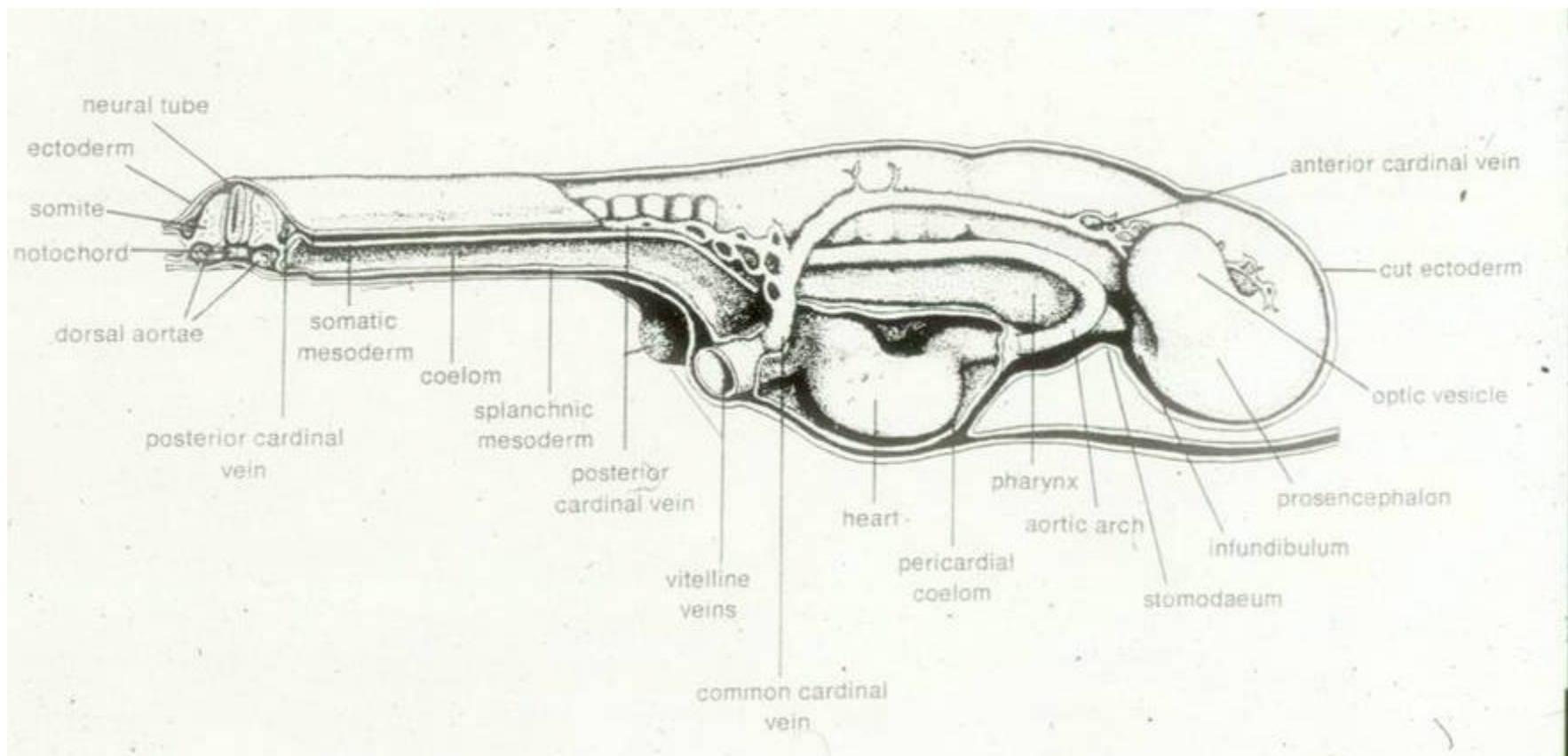




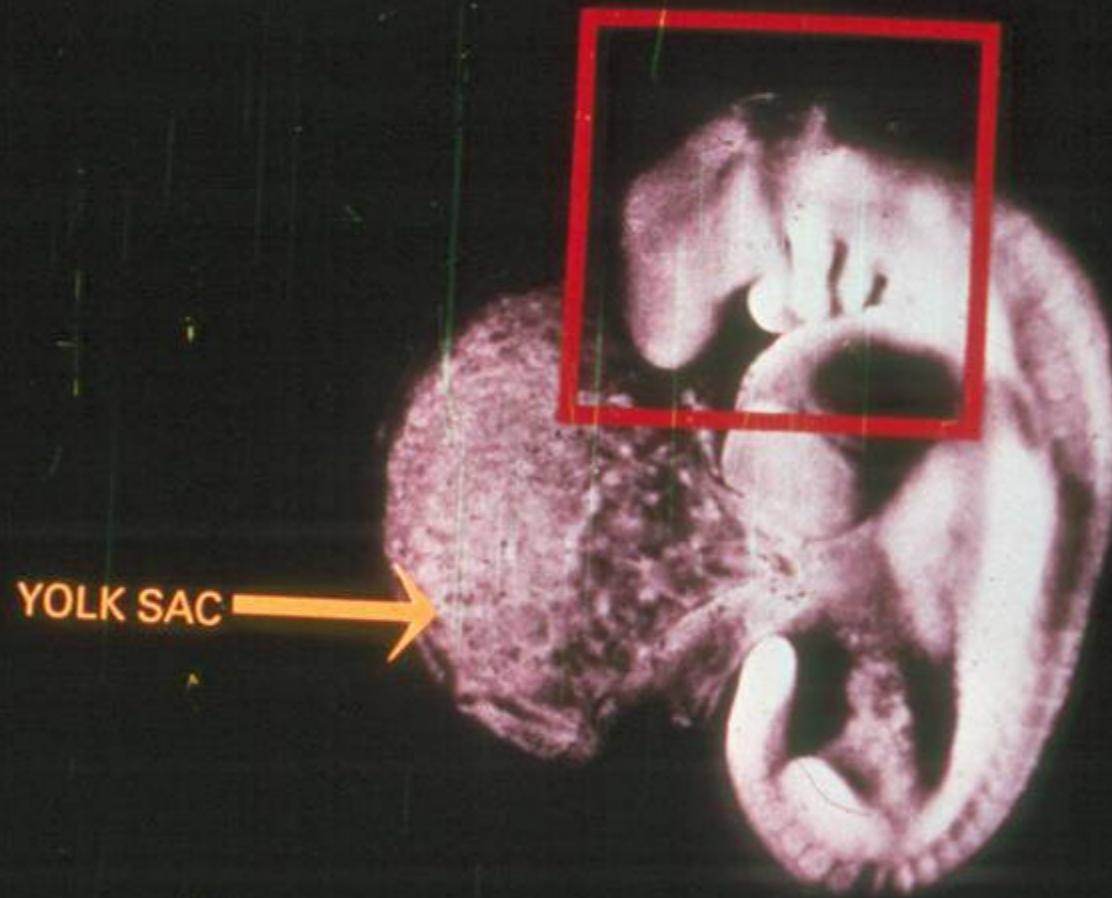




# Trans-segmental structures versus Segmental structures



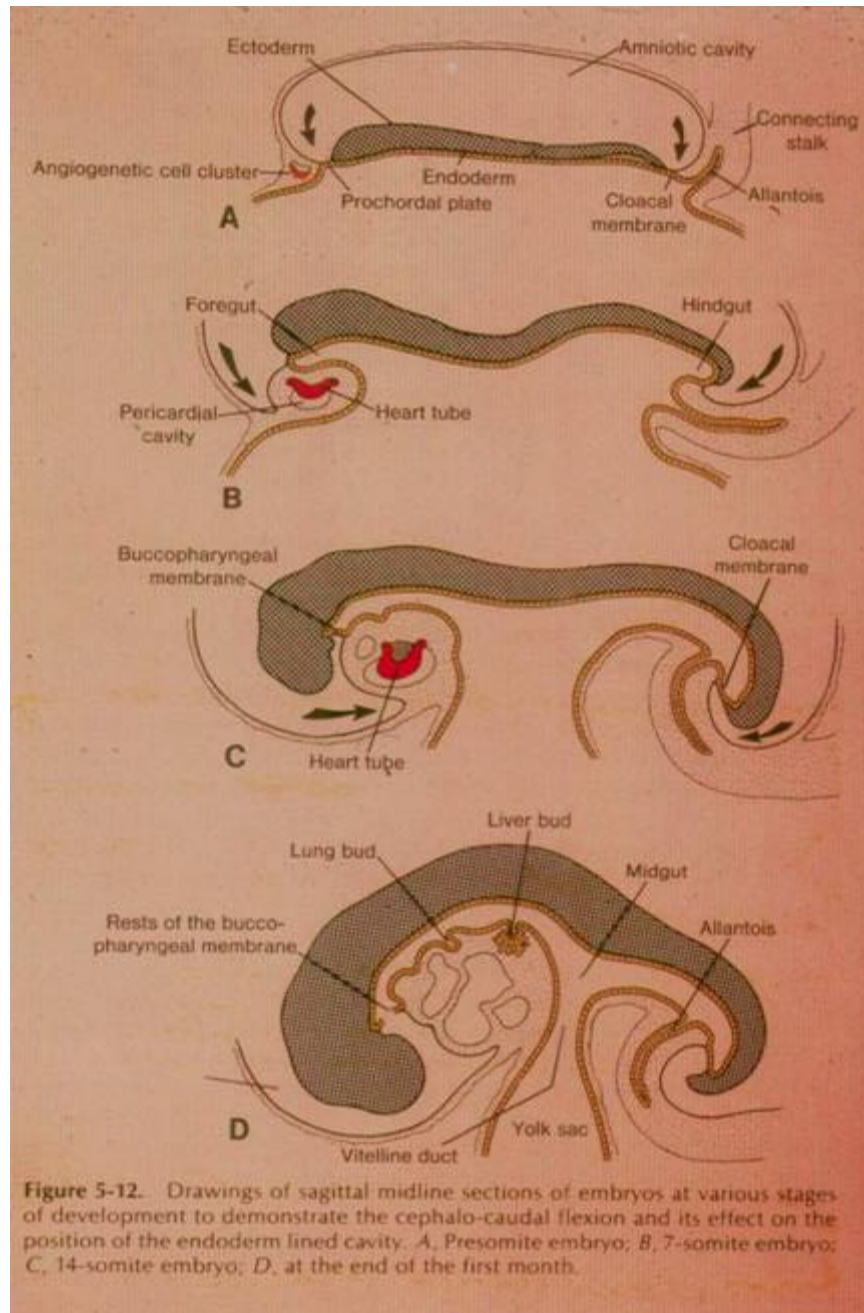
28-DAY-OLD EMBRYO. CHORION AND AMNION REMOVED.  
SIDE OF RED SQUARE = 1/16 INCH.



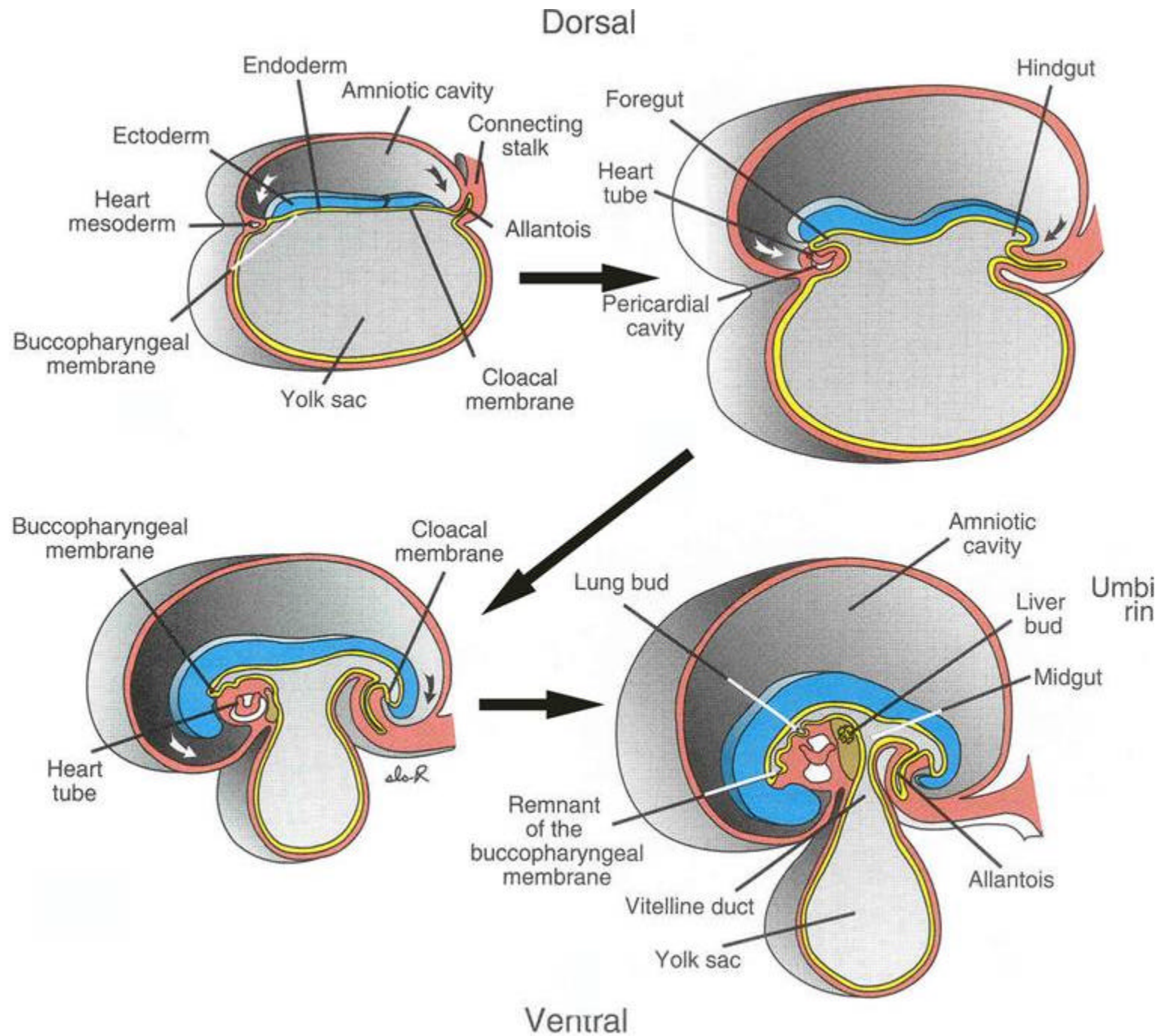
Gill slits / Gill pouches

# Further endodermal development:

- Lateral folds
- Oropharyngeal membrane
- Embryonic foregut
- Embryonic hindgut

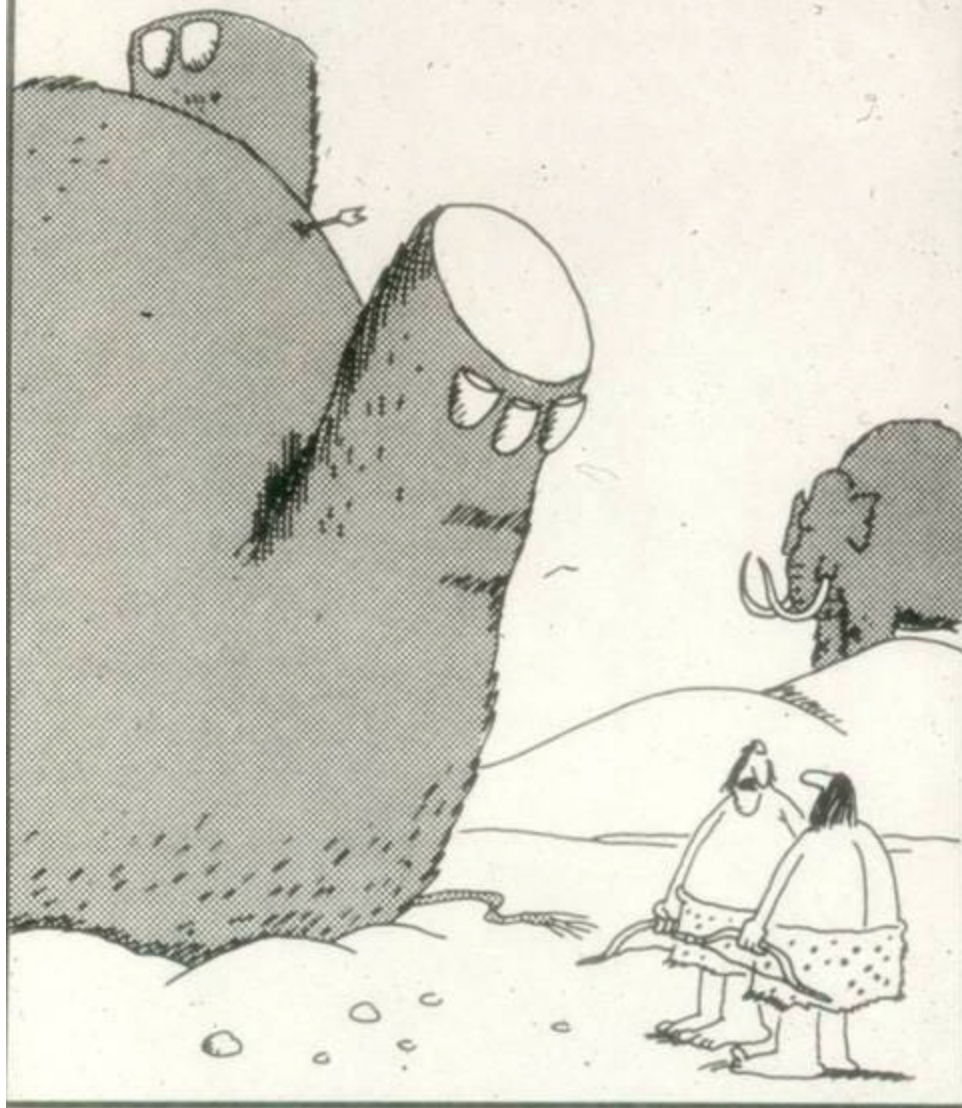






1986

Larson



"Maybe we should write that spot down."