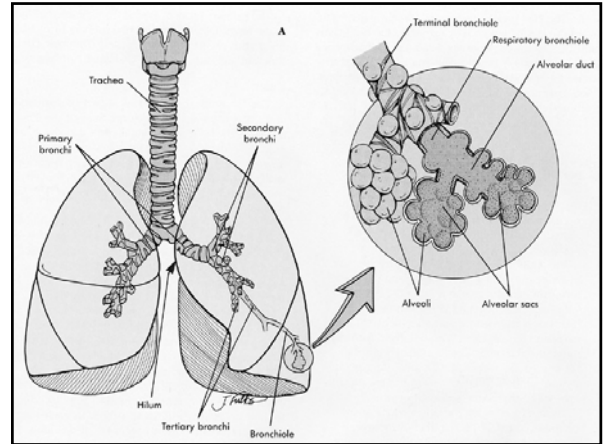


Respiratory System

Tubular branching system - controlled by inductive interactions between the mesoderm and the endoderm. Control is in the mesoderm

Adult anatomy

- Trachea
- Primary Bronchi
- Secondary Bronchi
- Tertiary Bronchi
- Bronchiole
- Terminal Bronchiole
- Alveolar Duct
- Alveolar Sac



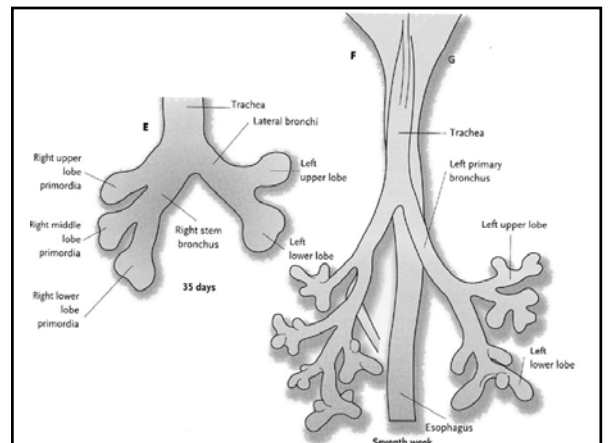
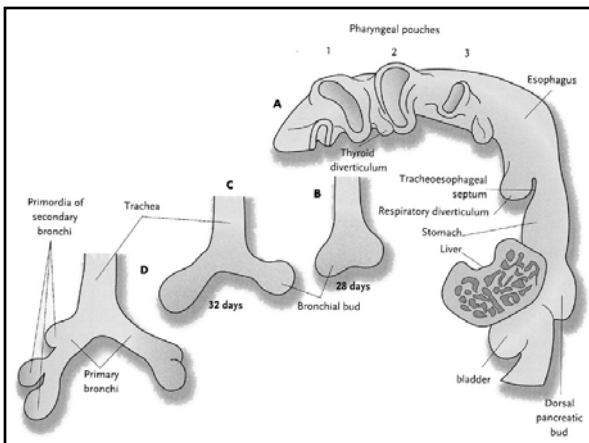
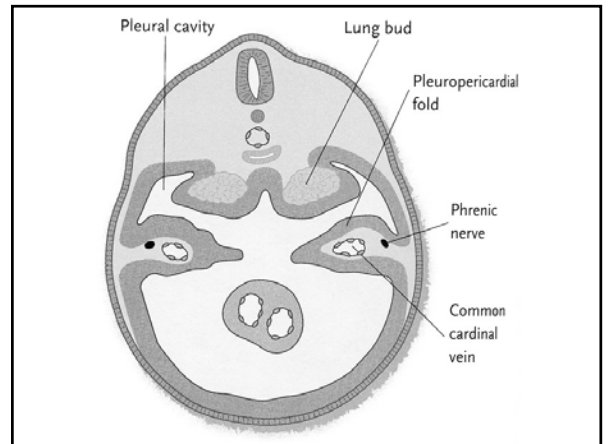
Embryonic Period

Until week 7 – Formation of the trachea and bronchial tree

1st branching - Lung bud comes off ventrally from the foregut - called respiratory diverticulum. Growth is ventral and caudal.

2nd branching - bifurcation to left and right primary bronchial buds - trachea and larynx is formed.

3rd branching - asymmetric – Right and Left Primary Bronchi
 Right side - 3 secondary bronchial buds
 Left side - 2 secondary bronchial buds.
 Buds are primordia for lung lobes



Pseudoglandular Period (8-16 weeks)

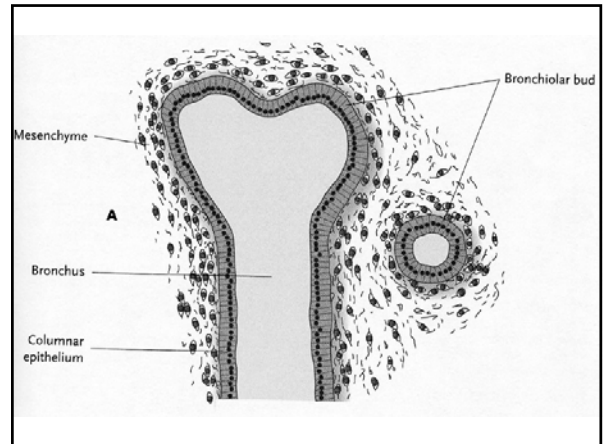
4th branching

right - 10 tertiary bronchi

left - 8 tertiary bronchi

14 more branchings to form the respiratory tree -
producing terminal bronchioles

Histologically resembling a gland



Canalicular Period (16-26 weeks)

Terminal bronchiole divides into 2 or more respiratory bronchioles

Surrounding mesoderm becomes highly vascularized

Completion of this period is required for survival of
premature infants

Terminal Sac Period (26 weeks - Birth)

Final branching of respiratory bronchioles associated with
dense network of capillaries - terminal sacs or primitive
alveoli.

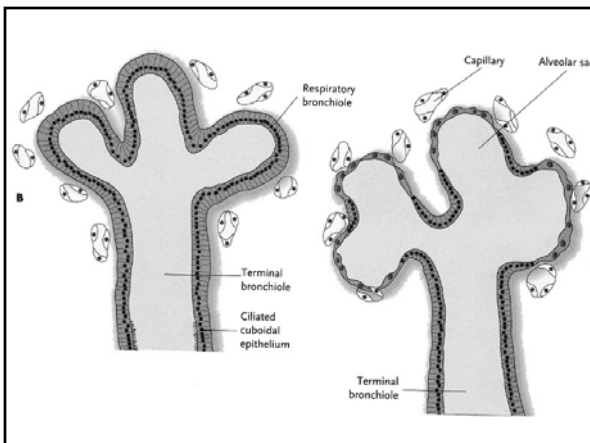
Differentiation of cells -

Type I alveolar cells - pneumocytes - gas exchange

Type II secretory alveolar cells - pulmonary surfactant
production

Differentiation continues until 8 years old.

Final 4 weeks - Alveolar period of lung development -
enhanced formation of alveoli



Alveolar Period (36 weeks to term)

Maturation of alveoli - thinning of epithelial lining of
terminal sac; increase in capillary network

Close association of epithelium with capillaries

Mature lung has 300-400 million terminal sacs.

Anomalies

Pulmonary agenesis - failure of lung bud or bronchial bud to branch or differentiate correctly. Abnormal number of lobes to complete absence of lung.

Pulmonary hypoplasia - reduced number of terminal air sacs - results from reduced volume of pleural cavity

Respiratory Distress Syndrome - Inadequate pulmonary surfactant results in infant death.

Pulmonary Surfactants are mixture of phospholipids and surfactant proteins that reduces surface tension of the alveolar lining - inhibiting alveolar collapse

Common Coelom / Mesentery

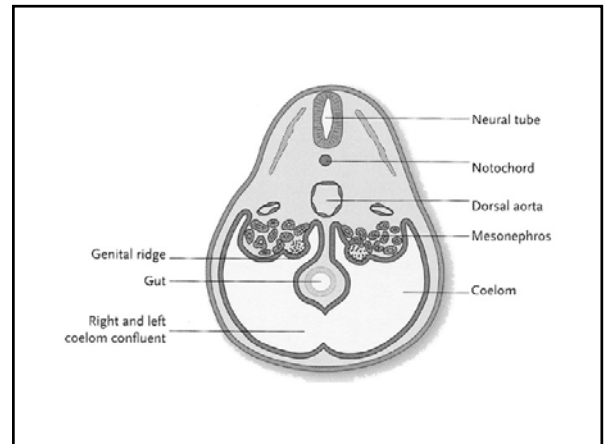
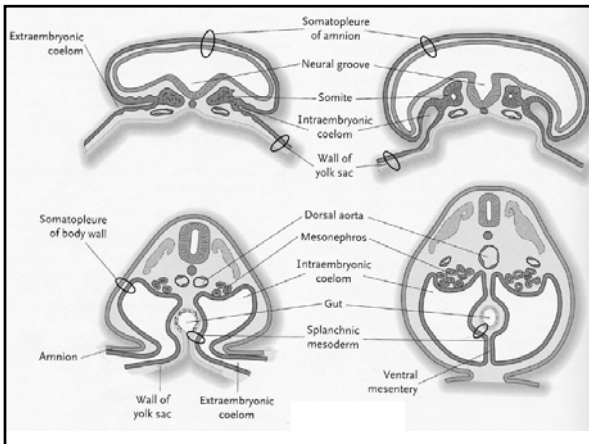
Somatic and Splanchnic Mesoderm line the common intraembryonic coelom

Dorsal and Ventral Mesenteries are derived from Splanchnic Mesoderm

Transient left and right components of the coelom

Ventral Mesentery mostly breaks down

Persist at level of stomach and liver - Ventral Mesogastrium and Falciform ligament of the liver

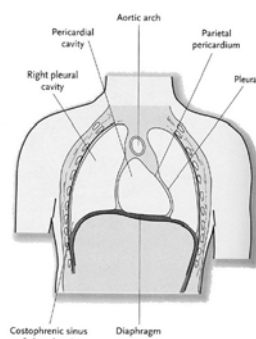


Diaphragm

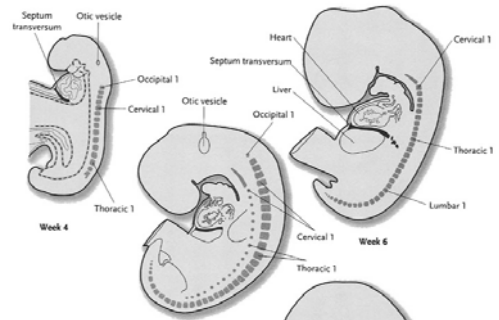
The Diaphragm separates the Common Coelom into thoracic and abdominal components

Abdominal cavity – peritoneal cavity

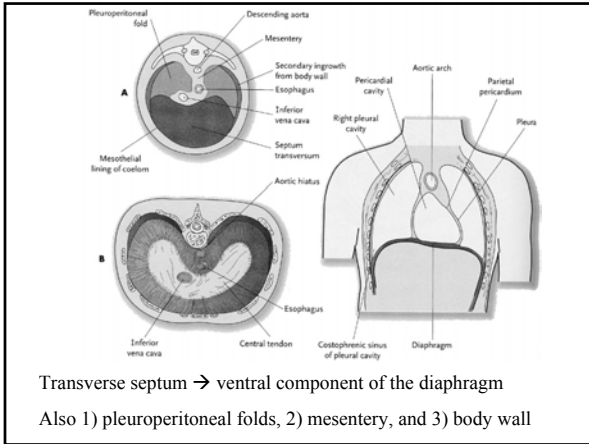
Thoracic component – pleural cavities and pericardial cavity



Transverse Septum



Develops as a shelf from the ventral body wall caudal to the heart



Pleural Cavities

Pleural canals lateral to the gut
 Initially contiguous with the pericardial and peritoneal cavities
 Pleuropericardial folds separate pericardial and pleural cavities
 Pleuroperitoneal folds separate pleural and peritoneal cavities

