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**COURSE TITLE; SYSTEMIC EMBRYOLOGY (ORGANOGENESIS)**

**COURSE CODE; ANAL206**

**DEPARTMENT; HUMAN ANATOMY**

**ASSIGNMENT TITLE; DEVELOPMENT OF THE LUNGS AND STOMACH**

QUESTION

Write short notes on the following

1. Development of the lungs
2. Rotation of the stomach and the formation of theo mental bursa
3. Development of the esophagus

Development of the lungs

Fetal and postnatal lung development depend on several key developmental processes; branching morphogenesis to promote branching of the lungs bud into the surrounding mesenchyme, static and cyclic stretching of the lung that assist in promoting sacculation, alveolarization to enhance the expansion of the gas exchange surface area, and vasculogenesis and angiogenesis to ensure that the development epithelial surface area is invested with both a gas- exchange and nourishing vascular supply

Branching morphogenesis

This is a fundamental mechanism of lungs development .Branching is mediated by the accelerated growth of epithelial cells along the stalk of a branching airway with concomitant growth arrest at the branch tip. This process requires extensive communication between epithelial cells and with adjacent mesenchyme as well as integration of microenviomental cues from the extracellular matrix. Classic tissue recombination experiments in which mesenchyme from proximal airways was transplanted to distal airways and vice versa indicate that the mesenchyme has an important inductive role in dictating the branching pattern and cell fate of the expanding epithelium

Composition **of human fetal lung fluid compared with other body fluids**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| component | Lung fluid  | Interstitial fluid  | plasma | Amniotic fluid |
| Sodium(mEq/L) | 150 | 147 | 150 | 113 |
| Potassium(mEq/L) | 6.3 | 4.8 | 4.8 | 7.6 |
| Chloride(mEq/L) | 157 | 107 | 107 | 87 |
| Bicarbonate (mEq/L) | 3 | 25 | 24 | 19 |
| pH | 6,27 | 7.31 | 7.34 | 7.02 |



Rotation of the stomach and the formation of the omental bursa

The stomach is located between the esophagus and small intestine .the longitudinal rotation of the stomach involves a 90 degree clockwise rotation resulting in the right side of the stomach becoming posterior oriented and left side of the stomach facing interiorly

The stomach subsequently rocks on its longitudinal axis causing the pylorus to shift to right and the cardiac orifice to shift to the left

During rotation

* The cranial end moves to the left and slightly the left and slightly downward
* The caudal end moves to the right and upward

After rotation

Stomach assumes its final position with its long axis running from above left to below right

During the rotation one side of the stomach grows faster than the other forming the greater and lesser curvatures of the stomach

Formation of the omental bursa

Begins as small isolated clefts in the dorsal mesogastrium that soon join to form single cavity. Rotation of the stomach pulls the dorsal mesogastrium to the left thus enlarging the cavity

The bursa expands transversely cranially and lies between the stomach and posterior abdominal wall

The superior part of the bursa is cut off as the diaphragm develops inferiorly it persists as the superior recess of the omental bursa

The inferior part grows within the 4-layered greater omentum forming the inferior recess of the omental bursa

The inferior recess later on closes down because of fusion of the layers of the greater omentum

**Development of the esophagus**

In early embryogenesis, the esophagus develops from the endodermal primitive gut tube. The ventral part of the embryo abuts the yolk sac. During the second week of embryological development, as the embryo grows, it begins to surround parts of the sac. The enveloped portions forms the basis for the adult gastrointestinal tract. The sac is surrounded by a network of viteline artery ,over time these arteries consolidate into the three main arteries that supply the developing gastrointestinal tract; the celiac artery, superior mesenteric artery and inferior mesenteric artey.The areas supplied by these artery are used to define the midgut,hindgut and foregut

The surrounded sac becomes the primitive gut. Section of this gut begin to differentiate into the organ of the gastrointestinal tract such as the esophagus, stomach and intestine. Thes esophagus develops as part of the foregut tube. The innervations of the esophagus develops from the pharyngeal arches