

Walsh: Perinatal and Pediatric Respiratory Care, 3rd Edition

Chapter 1: Fetal Lung Development

Test Bank

MULTIPLE CHOICE

1. Which of the following phases of human lung development occurs from 17 to 26 weeks of gestation, and is characterized by the formation of a capillary network around airway passages?
- A. Pseudoglandular
 - B. Saccular
 - C. Alveolar
 - D. Canalicular

ANS: D

	Feedback
A.	Incorrect response: The pseudoglandular stage occurs from day 52 and extends to week 16 of gestation, and features extensive subdivision of the airway system, as well as the development of the conducting airway system ending with the terminal bronchioles.
B.	Incorrect response: The saccular stage of development takes place during weeks 29 to 36 of gestation, and is characterized by the development of sacs that later become alveoli. During the saccular phase, a tremendous increase in the potential gas-exchanging surface area occurs.
C.	Incorrect response: The distinction between the saccular stage and the alveolar stage is arbitrary. The alveolar stage stretches from 39 weeks of gestation to term. This stage is represented by the establishment of alveoli.
D.	Correct response: The canalicular stage extends from about 17 to 26 weeks of gestation. Vascular channels, or capillaries, appear and approximate the air passages, forming a capillary network around them.

OBJ: Recall

NOT: The stage that has not been mentioned here is the embryonal stage, occurring from day 16 to day 52, during which time the trachea and major bronchi form.

2. Regarding postnatal lung growth, by approximately what age do most of the alveoli that will be present in the lungs for life develop?
- A. 6 months
 - B. 1 year
 - C. 1.5 years
 - D. 2 years

ANS: C

	Feedback
A.	Incorrect response: See explanation C.
B.	Incorrect response: See explanation C.
C.	Correct response: Most of the postnatal formation of alveoli in the infant occurs over the first 1.5 years of life.
D.	Incorrect response: See explanation C.

OBJ: Recall

3. Which of the following mechanisms appear to explain why oligohydramnios is associated with lung hypoplasia?
- I. Abnormal carbohydrate metabolism
 - II. Mechanical restriction of the chest wall
 - III. Interference with fetal breathing
 - IV. Failure to produce fetal lung liquid
- A. I and III only
 - B. II and III only
 - C. I, II, and IV only
 - D. II, III, and IV only

ANS: D

	Feedback
A.	Incorrect response: Leprechaunism, associated with abnormal carbohydrate metabolism, results in dysmorphic lungs with a decreased number of terminal bronchioles, dilated alveolar ducts and saccules, and enlarged airspaces.
B.	Incorrect response: See explanation D.
C.	Incorrect response: See explanation D.
D.	Correct response: Oligohydramnios, reduced amniotic fluid for an extended period, with or without renal anomalies, is associated with lung hypoplasia. Possible mechanisms responsible for the association between reduced amniotic fluid and lung hypoplasia include mechanical restriction of the chest wall, interference with fetal breathing, and failure to produce fetal lung liquid.

OBJ: Recall

4. What is the purpose of the material secreted by the type II pneumocyte?
- A. To increase the gas exchange surface area
 - B. To reduce surface tension
 - C. To maintain lung elasticity
 - D. To preserve the volume of the amniotic fluid

ANS: B

	Feedback
A.	Incorrect response: See explanation B.

B.	Correct response: The alveolar epithelial lining is composed of type I and II pneumocytes. The type I pneumocytes are squamous cells serving as a thin, gas-permeable membrane and account for more than 97% of the alveolar surface area. The cuboidal-appearing type II pneumocyte is the pulmonary surfactant-producing cell. Pulmonary surfactant reduces the surface tension of the alveolar lining layer at the air-liquid interface. In addition, type II pneumocytes are involved with surfactant storage, secretion, and reuptake.
C.	Incorrect response: See explanation B.
D.	Incorrect response: See explanation B.

OBJ: Recall

5. Which of the following vascular networks is the major source of fetal lung liquid?

- A. Pulmonary circulation
- B. Pulmonary lymphatics
- C. Systemic circulation
- D. Bronchial circulation

ANS: A

	Feedback
A.	Correct response: The pulmonary circulation is the major source of fetal lung liquid. The balance between the production and drainage of this liquid has an important effect on lung development. During fetal breathing, a small but steady movement of fluid leaving the trachea occurs. The net movement of fluid from the lungs has been measured as occurring at about 15 ml/hour and was about five times higher during periods of fetal breathing than during apnea.
B.	Incorrect response: See explanation A.
C.	Incorrect response: See explanation A.
D.	Incorrect response: See explanation A.

OBJ: Recall