Walsh: Perinatal and Pediatric Respiratory Care, 3rd Edition

Chapter 2: Fetal Gas Exchange and Circulation

Test Bank

MULTIPLE CHOICE

1. What is the function of Wharton's jelly inside the umbilical cord?
   A. To help provide nutrition to the fetus
   B. To prevent the vessels inside the cord from kinking
   C. To help protect the fetus
   D. To regulate the temperature between the fetus and the mother

   ANS: B

	Feedback
A.	Incorrect response: See explanation B.
B.	Correct response: The umbilical cord connects the placenta to the fetus with two smaller arteries, and one large vein. As the cord grows, the vessels tend to spiral. Wharton's jelly, a gelatinous substance inside the umbilical cord, helps protect the vessels and prevents the cord from kinking.
C.	Incorrect response: See explanation B.
D.	Incorrect response: See explanation B.

   OBJ: Recall

2. During the third gestational week, which of the following organs is the first to form?
   A. Heart
   B. Brain
   C. Lungs
   D. Kidneys

   ANS: A

	Feedback
A.	Correct response: During the third gestational week, the heart is the first organ to form during fetal development. By 8 weeks of gestation, the normal fetal heart is fully functional, complete with all chambers, valves, and major vessels.
B.	Incorrect response: See explanation A.
C.	Incorrect response: See explanation A.
D.	Incorrect response: See explanation A.

   OBJ: Recall

3. What is the approximate fetal heart rate by the sixth week of gestation?

A. 120 beats/minute
B. 95 beats/minute
C. 80 beats/minute
D. 60 beats/minute

ANS: B

	Feedback
A.	Incorrect response: See explanation B.
B.	Correct response: By week 6 of fetal development, a fetal heart rate of about 95 beats/minute becomes discernable and increases by approximately 4 beats/day until heart development is complete.
C.	Incorrect response: See explanation B.
D.	Incorrect response: See explanation B.

OBJ: Recall

4. Which of the following anatomic structures constitute fetal shunts?
I. Foramen ovale
II. Sinus venosus
III. Ductus venosus
IV. Ductus arteriosus
A. I, II, and III only
B. I, III, and IV only
C. I, II, and IV only
D. II, III, and IV only

ANS: B

	Feedback
A.	Incorrect response: See explanation B.
B.	Correct response: Figure 2-6 illustrates the three fetal shunts. They include (1) the foramen ovale, the opening between the right atrium and the left atrium, which enables oxygenated blood to flow to the left side of the fetal heart; (2) the ductus venosus, which appears continuous with the umbilical vein and shunts 30% to 50% of oxygen-rich blood around the liver; and (3) the ductus arteriosus, which allows most of the pulmonary arterial blood flow to bypass the nonfunctioning fetal lungs and enter the aorta.
C.	Incorrect response: See explanation B.
D.	Incorrect response: See explanation B.

REF: see Figure 2-6 OBJ: Recall

5. Which of the following events causes cessation of right-to-left shunt through the foramen ovale?
A. Increased levels of PaO_2 in the blood of the neonate

B. Decreased levels of $PaCO_2$ in the blood of the newborn
C. Increased systemic vascular resistance
D. Removal of the placenta, causing lowered blood volume returning to the right side of the fetal heart

ANS: C

	Feedback
A.	Incorrect response: See explanation C.
B.	Incorrect response: See explanation C.
C.	Correct response: Once pulmonary vascular resistance decreases and the cord is clamped, pressure on the right side of the heart decreases and pressure on the left side of the heart increases. In other words, pulmonary vascular resistance decreases, and systemic vascular resistance increases. Because the foramen ovale flap enables blood to flow only from right to left, it closes when pressure in the left atrium becomes greater than that in the right atrium. Closing of the foramen ovale facilitates the increase of blood flow to the lungs during the transitional period, and is necessary to maintain normal extrauterine circulation.
D.	Incorrect response: See explanation C.

OBJ: Recall