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United States Medical Licensing Step 1

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QUESTION 1

A 2-day-old male infant has not passed any meconium and is now developing signs of obstruction. Examination of the colon would reveal which of the following abnormalities?

A. absence of parasympathetic ganglion cells in the submucosal and myenteric plexus

B. absence of the nerve fibers that innervate the wall

C. atrophy of the mucosal lining of the wall

D. hypertrophy of the muscle coat of the wall

E. presence of multiple small polyps along the mucosal surface

Correct Answer: A

Section: Pathology and Path physiology Hirschsprung disease is caused by the congenital absence of parasympathetic ganglion cells in the submucosal and myenteric plexus. This presents clinically soon after birth as an inability to pass stool and abdominal distention. The diagnosis is usually confirmed by a full-thickness colon biopsy showing disorganized, nonmyelinated nerve fibers replacing the missing ganglion cells. In Hirschsprung disease, the ganglion cells, not the nerve fibers (choice B), are missing. Muscular hypertrophy (choice D) and atrophy (choice C) are not specific diagnostic findings with Hirschsprung disease. Mucosal polyp development (choice E) is not associated with Hirschsprung disease.

QUESTION 2

Regarding the axon of the second-order neuron in the pathway for conscious awareness of fine, discriminative touch and vibratory sensation from the upper limb, which of the following is correct?

A. ascends the brainstem in the medial lemniscus

B. decussates in the ventral white commissure of the spinal cord

C. has its cell body in the nucleus gracilis

D. is found in the dorsal funiculus of the spinal cord

E. terminates in the nucleus cuneatus

Correct Answer: A

Section: Anatomy The sensations of discriminative touch and vibration are transmitted through the medial lemniscus. Pain and temperature pathways decussate in the ventral white commisssure (choice B). The nucleus gracilis (choice C) contains neurons that process sensory signals from the lower extremity. The second-order fibers carrying discriminative touch and vibration from the upper limb originate from neurons in the nucleus cuneatus (choice E). First order fibers are found in the dorsal funiculus (choice D).

QUESTION 3

Amother has brought her 3-month-old baby to the pediatrician and indicates that the infant is lethargic and has poor

suckling and seems uninterested in eating. In addition, the mother notes that the baby\\'s diapers often smell like burnt sugar. This infant likely has a defect in which of the following enzymes?

A. branched-chain alpha-keto acid dehydrogenase

B. cystathionine synthase

C. glycine cleavage complex (GCC)

D. homogentisate oxidase

E. phenylalanine hydroxylase

Correct Answer: A

QUESTION 4

Secretion of pulmonary surfactant is a function of which of the following?

A. alveolar dust cells

B. endothelial cells of capillaries in the alveolar septum

C. small granule cells

D. type I pneumocytes (squamous alveolar cells)

E. type II pneumocytes (greater alveolar cells)

Correct Answer: E

Section: Anatomy All the listed cell types are components of the respiratory system. Type II pneumocytes are the source of pulmonary surfactant. Alveolar dust cells (choice A) are macrophages. Endothelial cells (choice B) and type I pneumocytes (choice D) are components of the blood-air barrier. Small granule cells (choice C), which are members of the diffuse neuroendocrine system, function in paracrine and endocrine signaling.

QUESTION 5

Which of the following psychotropic drugs must be monitored for hematotoxic effects?

A. buspirone

B. clozapine

C. haloperidol

D. lithium carbonate

E. mirtazapine

Correct Answer: B

Section: Pharmacology Clozapine causes agranulocytosis in a small but consistent fraction of patients; monitoring is mandatory. Buspirone (choice A) is an antianxiety agent with minimal sedative action. Haloperidol (choice C) is an older, highly potent antipsychotic drug used in schizophrenia. Lithium carbonate (choice D) is an important antimanic drug. It apparently acts by interfering with inositol phosphate cycling and second messenger synthesis in neurons. Mirtazapine (choice E) is a third-generation antidepressant related to antihistaminics and has significant sedative action.