

USMLE-STEP-1^{Q&As}

United States Medical Licensing Step 1

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QUESTION 1

A number of children are hospitalized with bloody diarrhea and severe hematological abnormalities. A4year-old girl dies of kidney failure shortly after admittance. Epidemiological investigation establishes that all of the patients developed symptoms soon after consuming hamburgers from the same fast-food restaurant chain. Which of the following organisms is most likely to be responsible for the outbreak?

- A. C. jejuni
- B. non-01 serogroup of V. cholera
- C. O157:H7 serotype of E. coli
- D. S. typhimurium
- E. Shigella dysenteriae

Correct Answer: C

Section: Microbiology/Immunology The enterobacteriaceae are a large, heterogeneous group of gram-negative rods that normally inhabit the intestinal tract of humans and animals. The Escherichia genus (usual flora) can incidentally cause disease while Salmonella and Shigella genera are regularly pathogenic for humans. E. coli is the most common cause of urinary tract infection, but there are also several E. coli-associated diarrheal diseases that occur worldwide. Enterohemorrhagic E. coli (EHEC) produces verotoxin and is associated with hemorrhagic colitis and hemolytic uremic syndrome. E. coli serotype O157:H7 (choice C) is the most common strain for these disease presentations. Many outbreaks could be prevented by thoroughly cooking ground beef. EPEC is a strain that causes diarrhea in infants while ETEC is a common cause of traveler\\'s diarrhea. C. jejuni (choice A) can be responsible for a shigella-like illness that is self- limited. Milk or undercooked fowl are frequent vectors of this organism. Non- 01 serogroup of V. cholerae (choice B) only causes a cholera-like illness occasionally. Salmonella (choice D) enterocolitis can be caused by 1400 serotypes. Nausea, headache, vomiting, and profuse diarrhea with low-grade fever are common and resolve in 23 days. The natural habitat of shigellae (choice E) is limited to the intestinal tract of humans and other primates, where they produce bacillary dysentery.

QUESTION 2

On otoscopic examination, a patient is found to have a 2-cm mass protruding from a retraction pocket in his right tympanic membrane. The lesion is removed and determined to be a cystic mass lined by squamous epithelium containing desquamated cellular debris and a mononuclear infiltrate. Which of the following is the most likely cause of this lesion?

- A. barotraumas
- B. chronic otitis media
- C. exostosis formation in the external auditory canal
- D. squamous cell carcinoma of the external auditory canal
- E. tympanosclerosis

Correct Answer: B

Section: Pathology and Path physiology A cholesteatoma is a cystic lesion lined by squamous epithelium and containing



keratinaceous material. It is most probably formed by the protrusion of squamous epithelium from the middle ear canal through a perforation in the eardrum that was itself the result of chronic otitis media. Barotrauma (choice A) to the ear can be produced by sudden changes in atmospheric pressure compared to the relatively low middle ear pressure. This results in inflammation of the mucous membrane of the middle ear (serous otitis media). Exostosis formation in the external auditory canal (choice C) refers to the growth of a bony swelling that may occur with chronic exposure to cold water. Squamous cell carcinomas of the external auditory canal (choice D) are unusual and have a histological appearance similar to other squamous cell carcinomas (polygonal cells with prickles and pearls), which is quite different from the description given. Tympanosclerosis (choice E) of the tympanic membrane results from resolved acute otitis media producing acellular hyaline and calcific deposits in the tympanic membrane.

QUESTION 3

A 24-year-old woman presents with hypertension and hypokalemic metabolic alkalosis. Although these symptoms are normally indicative of hyperaldosteronism, this patient\\'s aldosterone levels are undetectable, and no other mineralocorticoid activity is found. A diagnosis of Liddle syndrome is made on the basis of the signs and symptoms and a family history. Liddle syndrome is caused by a genetic defect leading to excessive expression of the apical sodium channel in the principal cells of the cortical- collecting tubule and excess sodium transport in this part of the nephron. Which of the following agents is the best choice for treatment of the hypertension and hypokalemic metabolic alkalosis in this patient?

- A. amiloride
- B. fludrocortisones
- C. hydrochlorothiazide
- D. lisinopril
- E. spironolactone
- Correct Answer: A

QUESTION 4

Which of the following is an adaptive response to moving from sea level to higher elevation?

- A. bronchial relaxation
- B. decreased cardiac output
- C. decreased circulating levels of EPO
- D. decreased levels of 2,3-diphosphoglycerate (2,3-DPG) in erythrocytes
- E. hyperventilation
- Correct Answer: E



QUESTION 5

An infant admitted to the emergency room has been found to be suffering from ammonia intoxication, which was verified by measurement of an elevation of N + in the serum. Treatment of this infant

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with arginine results in a reduction serum N + and a lessening of the effects of the ammonia

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toxicity. The ability of arginine to render this effect stems from its role in the synthesis of an allosteric activator of the the urea cycle enzyme, carbamoylphosphate synthetase-I (CPS-I). Which of the following represents this potent allosteric effector of CPS-I?

- A. argininosuccinate
- B. bicarbonate ion
- C. fumarate
- D. N-acetylcysteine E. N-acetylglutamate

Correct Answer: E

Section: Biochemistry CPS-I is absolutely dependent on the allosteric effector N-acetylglutamate for its activity. This allosteric effector is synthesized by the enzymeN-acetylglutamate synthetase, which is activated by the urea cycle amino acid arginine. None of the other compunds (choices A, B, C, and D) have any effect on CPS-I activity.

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