

USMLE Step 1

1. A 2-year-old male patient develops progressive generalized weakness and muscle atrophy. The impairment first began with the muscles of the hips, and then progressed to the pelvic area, thigh, and shoulder muscles. The patient is diagnosed with Duchenne's muscular dystrophy, a congenital disorder where the protein dystrophin is deficient. Which of the following describes the role of dystrophin in muscle tissue?

A. anchors actin to the sarcolemma

B. endows the myosin filaments with elastic recoil properties

C. extends from Z disk to Zdisk, forming a supportive network

D. inhibits the binding of myosin to actin

E. protects desmin filaments from stressinduced damage

Answer(s): A

2. The third week of development is characterized by the appearance of the branchial apparatus, the embryonic primordium from which head and neck structures will be derived. The apparatus consists of five branchial arches, numbered 1, 2, 3, 4 and 6. Second arch anomalies represent 95% of all branchial anomalies and are classified into four types with types IIII being the most common. The anomalies manifest as cysts or fistulae in the lateral neck, located anterior and deep to the sternocleidomastoid muscle. Which of the following structures develop from the second branchial arch?

A. anterior digastric muscle

B. posterior cricoarytenoideus muscle

C. posterior digastric muscle

D. stylopharyngeus muscle

E. superior constrictor muscle

Answer(s): C

3. A 10-year boy is examined because his parents noticed that "his eyes never seem to look in the right direction." On examination, the left eye of the child is unable to move laterally (abduction) and when asked to look toward the nose (adduction), the eyeball retracts into the socket and the eye opening narrows. Sometimes, the eye also moves superiorly. The child is diagnosed with Duane syndrome, a congenital ocular motility disorder characterized by limited abduction of the affected eye. This is due to absence of the abducens (fifth cranial) nerve with aberrant innervation by the oculomotor (third cranial) nerve. Which of the following muscles is normally innervated by the abducens nerve?

A. inferior oblique

B. lateral rectus

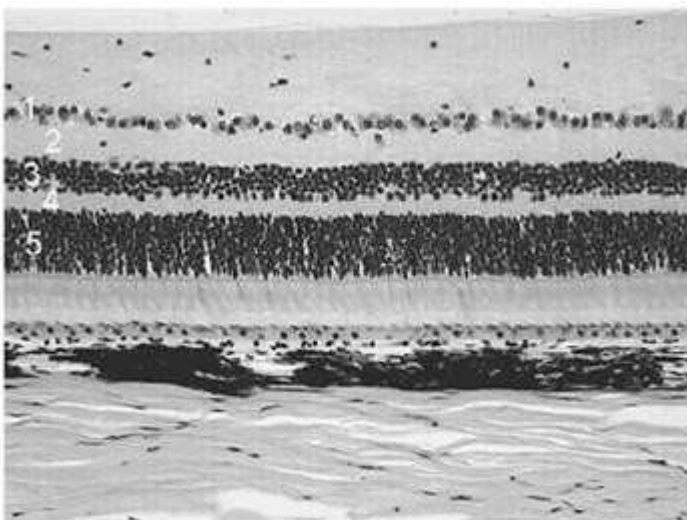
C. medial rectus

D. superior oblique

E. superior rectus

Answer(s): B

4. Retinitis pigmentosa is a hereditary disorder, which affects the photoreceptors (the rods and the cones) in the retina. These photoreceptors are located in which of the numbered layers in Figure below



A. 1

B. 2

C. 3

D. 4

E. 5

Answer(s): E

5. The structure indicated by arrow 1 in Fig. 1-2 is which of the following vessels?

A. brachiocephalic artery

B. left brachiocephalic vein

C. left common carotid artery

D. right brachiocephalic vein

E. superior vena cava

Answer(s): D

6. A 4-month-old male infant is brought to the clinic because of excessive noisy respiration. On examination, the infant is within the normal range of growth, appears healthy, and does not show respiratory distress. Phonation is normal, along with head and neck examination findings. However, the child displays stridor (highpitched breathing sound) on inspiration, accentuated in the supine position. The parents report that the same stridor is heard during feeding or when the child is agitated. The attending physician places the child in the prone position and the stridor is relieved. To confirm, she holds the child in a neck extended position, which also relieves the stridor. An endoscopic laryngeal examination reveals bulky arytenoids cartilages and the diagnosis of laryngomalacia is established. During development, the arytenoids cartilages arise from which of the following?

A. first pharyngeal arch

B. second pharyngeal arch

C. third pharyngeal arch

D. fifth pharyngeal arch

E. sixth pharyngeal arch

Answer(s): E

7. A newborn infant suffers from cyanotic heart disease caused by transposition of the great arteries (TGA). In this situation, the aorta arises from which of the following structures?

A. ductus arteriosus

B. left atrium

C. left ventricle

D. right atrium

E. right ventricle

Answer(s): E

8. About 75% of the blood supply of the spinal cord is derived from the anterior spinal artery. This artery arises from which of the following?

A. artery of Adamkiewicz

B. basilar artery

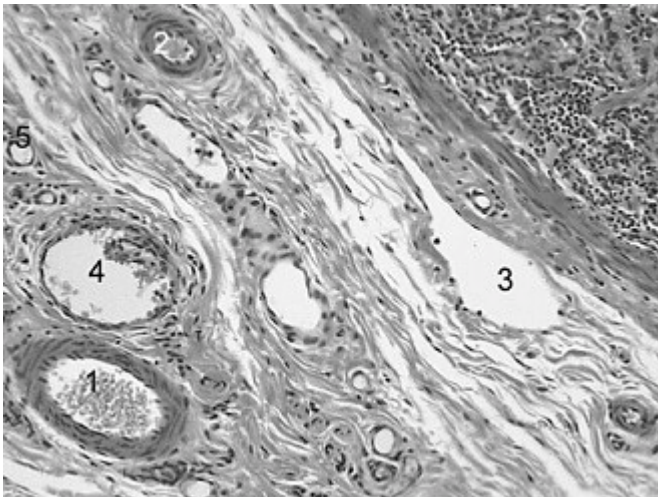
C. internal carotid artery

D. posterior inferior cerebellar artery

E. vertebral artery

Answer(s): E

9. Clinical edema results when lymphatic vessels are blocked or when the volume of extracellular fluid exceeds the drainage capacity of the lymphatic vessels. Which of the following numbered structures in following figure is a lymphatic vessel?



A. 1

B. 2

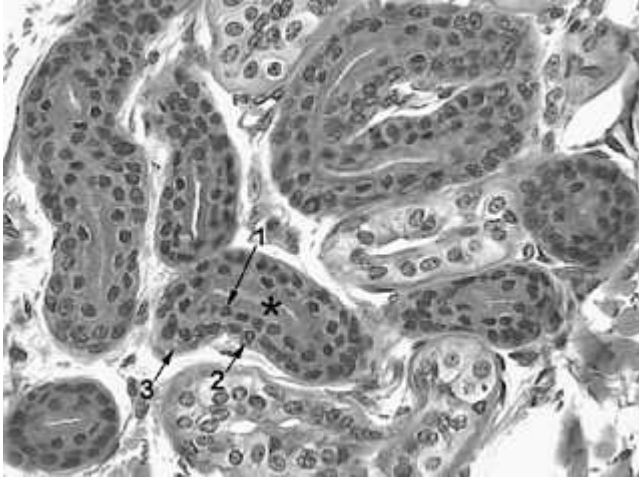
C. 3

D. 4

E. 5

Answer(s): C

10. The histological structure marked by the asterisk in Fig. 1-4 is which of the following structures from the integumentary system?



A. apocrine sweat gland

B. dermal papilla

C. eccrine sweat gland

D. hair follicle

E. sebaceous gland

Answer(s): C

11. Occlusion of which of the following vessels affects the entire dorsolateral part of the rostral medulla (level of the restiform body) and produces the lateral medullary (Wallenberg) syndrome?

A. anterior inferior cerebellar artery

B. anterior spinal artery

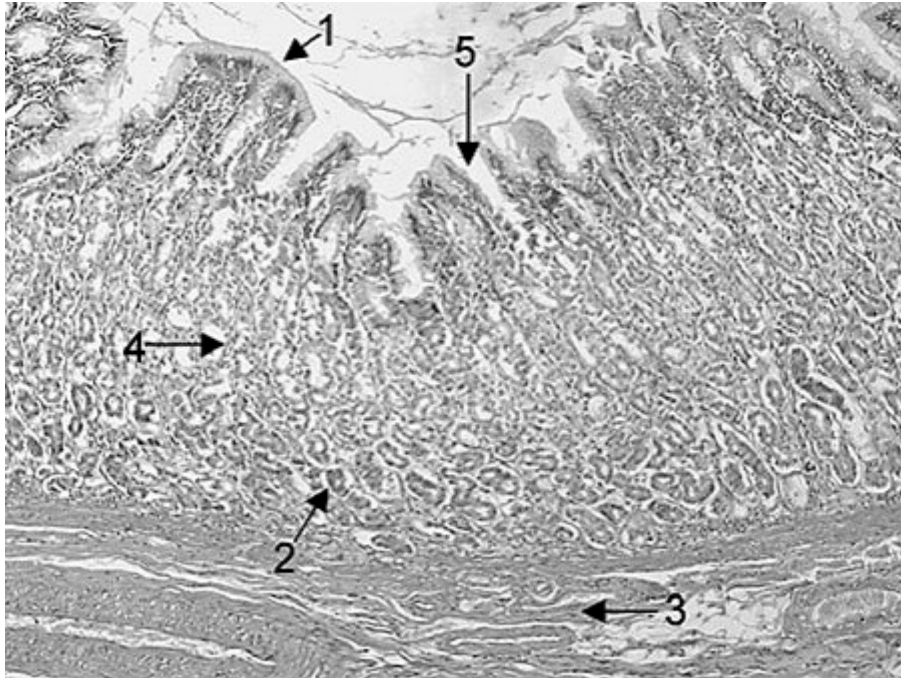
C. posterior inferior cerebellar artery

D. posterior spinal artery

E. superior cerebellar artery

Answer(s): C

12. The chief or peptic (zymogenic) cells of the gastric glands secrete pepsinogen. The latter is converted to pepsin, a 35-kilodalton (kDa) proteolytic enzyme, when the pH in the stomach falls below 5.0. In Following figure, which of the following arrows point to the location of chief or peptic (zymogenic) cells?



A. 1

B. 2

C. 3

D. 4

E. 5

Answer(s): B

13. A 62-year-old patient diagnosed with prostate carcinoma complains of a right-sided headache worsening over 4 days and displays a drooping right upper eyelid. Examination reveals a right third nerve palsy. An MRI reveals a single metastasis of the prostatic carcinoma in the right side of the midbrain, causing Benedikt's syndrome. Which of the following signs would also be seen in this patient?

A. complete paralysis of facial expression musculature on the left side

B. deviation of the tongue to the right

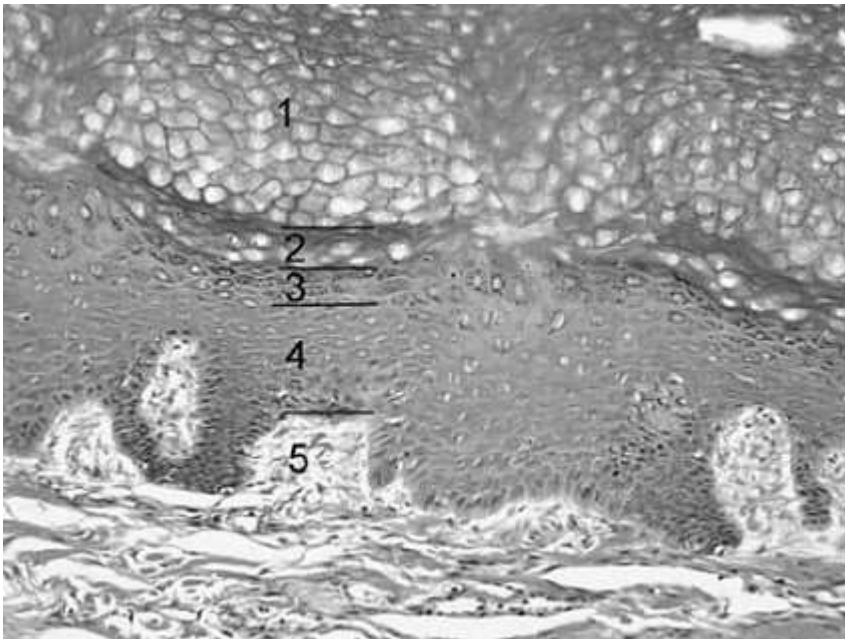
C. intention tremor in the left upper and lower extremity

D. ipsilateral hemiplegia

E. vertical gaze palsy

Answer(s): C

14. During a routine physical examination, you notice that your patient, a 35-year-old avid surfer, has spots of abnormal pigmentation on two of her fingers. You explain to your patient that long-term exposure to the sun increases the risk of neoplastic changes and that you would like to perform biopsies to verify the nature of the abnormal pigmentation. Referring to following figure, cells from which layer of the epidermis are most vulnerable to neoplastic changes due to long-term exposure to the sun?



A. 1

B. 2

C. 3

D. 4

E. 5

Answer(s): D

15. A female 44-year-old patient suffers from acute bacterial sinusitis localized to the frontal sinus. The patient displays a mucopurulent greenish discharge from the nose bilaterally, with associated fever and malaise. The patient also complains of pain over the forehead with headache. Which of the following innervates the frontal sinus?

A. anterior ethmoidal nerve

B. lacrimal nerve

C. nasociliary nerve

D. posterior ethmoidal nerve

E. supraorbital nerve

Answer(s): E

16. In a medial medullary syndrome that involves a left-sided branch of the anterior spinal artery, which of the following deficits is seen?

A. deviation of the tongue to the left, hemiplegia of arm and leg on the left

B. deviation of the tongue to the right, hemiplegia of arm and leg on the right

C. loss of conscious proprioception and precise tactile discrimination over the right side of the body exclusive of the face

D. only deviation of the tongue to the left

E. only hemiplegia on the right

Answer(s): C

17. A neurologist is performing the neurological examination on a patient who recently suffered a head trauma. You note that, as part of the examination, she uses a cotton swab to touch the upper part of the auricle, the external auditory meatus, and the lobule. The external auditory meatus of the ear is innervated by which of the following?

A. vagus (tenth cranial) nerve

B. great auricular nerve

C. auriculotemporal nerve

D. greater occipital nerve

E. facial (seventh cranial) nerve

Answer(s): A

18. A 48-year-old male patient is brought to the emergency room because of intense pain of the right face and neck with transient visual loss of the right eye. On examination, the patient has palsy of the oculomotor nerve on the right side with resulting diplopia, along with a right lateralized painful Horner syndrome. This constellation of signs is suggestive of a cervical carotid dissection, which is a separation of the arterial tunical intima from the subjacent tunica media. Which numbered structure in following figure, is the tunica intima?

A. 1

B. 2

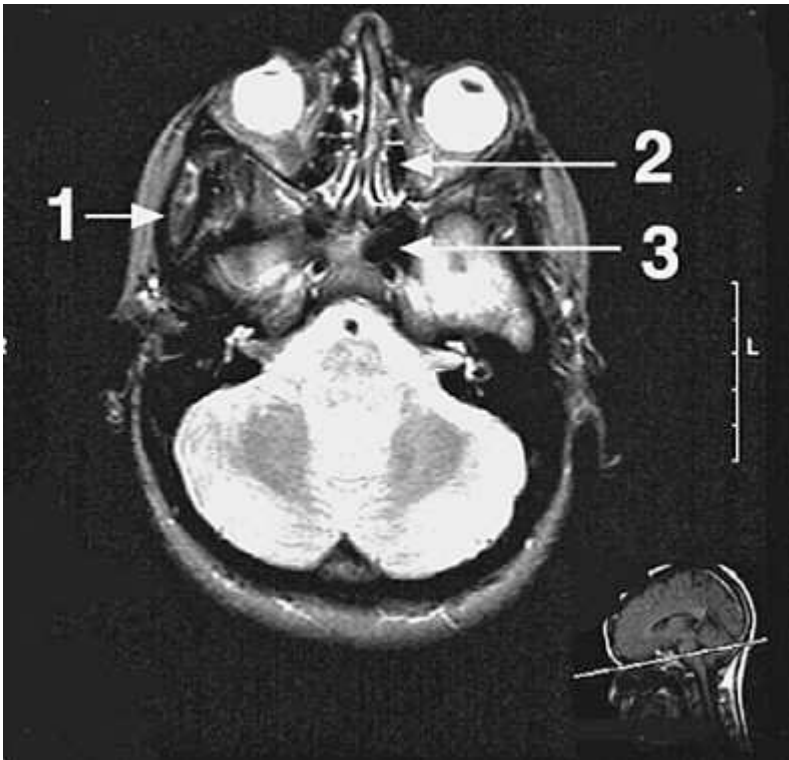
C. 3

D. 4

E. 5

Answer(s): D

19. The structure indicated by arrow 2 in following figure, is which of the following?



A. ethmoidal sinus

B. inferior nasal meatus

C. infratemporal fossa

D. maxillary sinus

E. sphenoidal sinus

Answer(s): A

20. A stroke resulting from obstruction of the structure indicated by arrow 1 in following figure, may result in ischemia in which of the following brain regions?

A. Broca's area in the left frontal lobe

B. cerebellum

C. medial aspect of the right frontal lobe

D. pons

E. Wernicke's area in the left frontal lobe

Answer(s): C
