USMLE-STEP-1 Q&As

United States Medical Licensing Step 1

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QUESTION 1

Sara is a 15-year-old healthy female. With which of the following would one expect a girl of her age to spend a lot of time?

A. a mixed group of peers

B. adults

C. animals

D. furry toys

E. older females

Correct Answer: A

Section: Behavioral Science and Biostatics An adolescent veers away from childish toys and develops an interest in the opposite sex. Peer relationships include members of the opposite as well as the same sex.

QUESTION 2

Metformin is one of the most prescribed hypoglycemia-inducing drugs in the treatment of Type II diabetes. One of the effects of metformin is a reduction in adipose tissue lipolysis, which is effected via the activation of AMP-activated kinase (AMPK). Which of the following actions of AMPK explains the adipose tissue benefits of metformin?

A. activation of ACC

B. activation of FAS

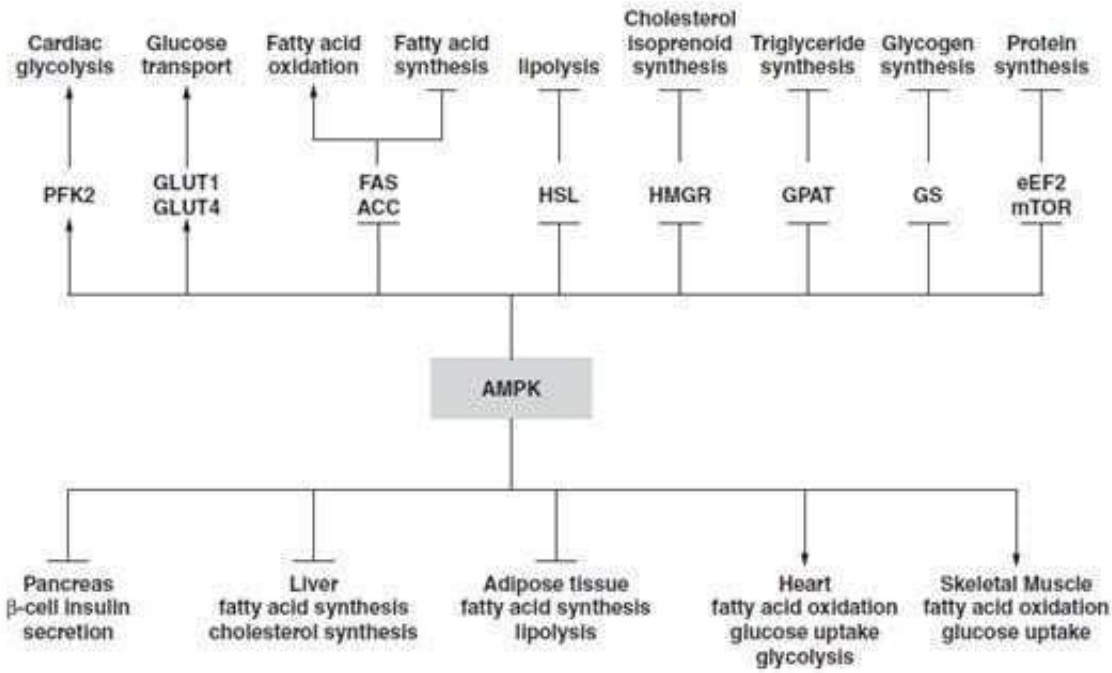
C. inhibition of hormone-sensitive lipase

D. inhibition of mammalian target of rapamycin (mTOR)

E. inhibition of 6-PFK-2

Correct Answer: C

Section: Biochemistry AMP-activated protein kinase (AMPK) was first discovered as an activity that inhibited preparations of ACC and 3-hydroxy-3-methylglutaryl- CoA reductase (HMG-CoA reductase, HMGR) and was induced by AMP. AMPK induces a cascade of events within cells in response to the ever changing energy charge of the cell. The role of AMPK in regulating cellular energy charge places this enzyme at a central control point in maintaining energy homeostasis (see below figure). Once activated, AMPK- ediated phosphorylation events switch cells from active ATP consumption (e.g., fatty acid and cholesterol biosynthesis) to active ATP production (e.g., fatty acid and glucose oxidation). Other important activities attributable to AMPK are regulation of insulin synthesis and secretion in pancreatic islet beta-cells. As shown in AMPK inhibits (not activates) both ACC (choice A) and FAS (choice B). Activation (not inhibition) of PFK-2 (choice E) occurs in response to AMPK. Although AMPK does indeed inhibit mTOR (choice D), this inhibition does not have any influence on adipose tissue lipolysis.



QUESTION 3

A neurology resident is testing the jaw-jerk reflex in a patient by tapping gently on the right masseter muscle and observing elevation of the mandible. What is the location of the neuronal cell bodies of the proprioceptive fibers mediating the jaw-jerk reflex?

A. mesencephalic trigeminal nucleus

B. motor trigeminal nucleus

C. principal (main) trigeminal nucleus

D. spinal trigeminal nucleus

E. trigeminal (gasserian) ganglion

Correct Answer: A

Section: Anatomy The jaw-jerk reflex is a monosynaptic (stretch) reflex for the masseter muscle. Proprioceptive fibers from the muscle travel by way of the trigeminal nerve back to their cell bodies in he mesencephalic trigeminal nucleus. Projections from this nucleus synapse on motor neurons of the motor trigeminal nucleus (choice B) which elicits contraction of the masseter muscle. The principal (main) trigeminal nucleus (choice C) receives light touch sensory information from the face, whereas the spinal trigeminal nucleus (choice D) receives pain and temperature sensations. The trigeminal (gasserian) ganglion (choice E) contains the cell bodies of all sensory neurons projecting to the principal (main) and spinal trigeminal nuclei.

QUESTION 4

According to Piaget, in which of the following do children of middle teenage years typically engage?

A. abstract thinking

B. circular reactions

C. cognitive map

D. concrete operations

E. preoperational activities

Correct Answer: A

Section: Behavioral Science and Biostatics According to Piaget, at about the time of puberty (which is on the average about age 11 in girls), the final stage of maturation in cognitive functioning, the period of formal operations, occurs. The individual\\'s thought processes become more flexible, and transcend the here and now. Propositional thinking and hypothesis testing are prominent features of this stage.

QUESTION 5

A 60-year-old man arrives at the emergency room with chills, high fever, headache, and muscle pain. He is a slaughterhouse worker. Believing he had a flu, the man had stayed at home for 9 days after the onset of the symptoms. You suspect a diagnosis of leptospirosis. What body fluid should the clinical laboratory check for the presence of L. interrogans?

A. blood

B. saliva

C. serum

D. spinal

E. urine

Correct Answer: E

Section: Microbiology/Immunology

Leptospirosis is a zoonosis of worldwide distribution and is caused by spirochetes of the genus Leptospira.

L. interrogans is the main pathogen. Leptospirae grow best under aerobic conditions at 28 30°C in seru m-containing semisolid media. After 12 weeks, the leptospirae produce a diffuse zone of growth near the top of the tube and later in a ring corresponding to the level of optimal oxygen tension for the organisms. Human infection results usually from ingestion of water or food contaminated with the bacteria. The organisms establish themselves in the liver and kidneys. Kidney involvement in many animal species is chronic and results in the shedding of many leptospirae in the urine (choice E). Other body fluid choices (A, B, C, and D) are not preferred specimens for leptospirae isolation.