USMLE-STEP-1 Q&As

United States Medical Licensing Step 1

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QUESTION 1

Steroid hormones interact with specific receptors within target cells. The steroid-receptor complexes then regulate the rate of which of the following intracellular processes?

A. posttranscriptional processing of specific mRNAs

B. posttranslational processing of specific proteins

C. replication of DNA

D. transcription of specific genes

E. translation of specific mRNAs

Correct Answer: D

Section: Biochemistry Steroid hormones are lipophilic and hence freely penetrate the plasma membrane of all cells. Within target cells, steroid hormones interact with specific receptors. These receptor proteins are composed of two domains: a hormone-binding domain and a DNA-binding domain. Following hormone-receptor, interaction the complex is activated and enters the nucleus. The DNA-binding domain of the receptor interacts with specific nucleotide sequences termed hormone response elements (HREs). The binding of steroid-receptor complexes to HREs results in an altered rate of transcription of the associated gene(s). The effects of steroid-receptor complexes on specific target genes can be either stimulatory or inhibitory with respect to the rate of transcription. Complexes of steroid with receptor have no direct effect on posttranscriptional processing of RNA (choice A), posttranslational events (choice B), DNA replication (choice C), or translation (choice E).

QUESTION 2

Which of the following is an id function?

A. aggression

B. cognition

C. conscience

D. perception

E. psychological defense mechanisms

Correct Answer: A

Section: Behavioral Science and Biostatics The id is the collection of psychological functions having to do with basic instincts, such as sex and survival. Aggression is a basic instinct, therefore, an id function. The ego functions to mediate between the personality system on one hand and the demands of external reality and the superego on the other hand. Thus, psychological defense mechanisms (choice E), perception (choice D), and cognition (choice B) are all ego functions. Superego is the part of the personality system that encompasses conscience (choice C).

QUESTION 3

A 38-year-old female patient suffers from pleurisy and requires pleural fluid sampling (thoracentesis). The attending physician asks you to perform the procedure at the midaxillary line on the right side. Which of the following would be the appropriate level to perform the procedure?

A. above the level of the 7th rib

B. at the level of the 10th rib

C. at the level of the 5th rib

D. below the level of the 10th rib

E. between the level of the 8th and 10th ribs

Correct Answer: E

Section: Anatomy

The needle for thoracentesis should be inserted in the intercostals spaces between the 8th and 10th ribs.

Remember that the parietal pleura extends approximately two ribs inferior to the lung: at the midaxillary

line, the inferior surface at the lung is at the level of the 8th rib and the parietal pleura at the 10th rib.

Above the level of the 7th (choice A) and 5th (choice C) ribs, the needle will injure the lung. At (choice B)

or below the level of the 10th rib (choice D), it will injure the liver or other abdominal organs.

QUESTION 4

A 78-year-old woman is found to have a first morning urine specific gravity of 1.010. Assuming that she has not had anything to drink since yesterday evening, this is most indicative of which of the following?

A. acute pyelonephritis

B. advanced renal failure

C. diabetic glomerulosclerosis

D. hyperlipidemia

E. normal kidney function

Correct Answer: B

Section: Pathology and Path physiology Aurine specific gravity of 1.010 is the same as the specific gravity of glomerular filtrate (i.e., isosthenuric). Thus, this woman was not concentrating her urine overnight (usual SG > 1.020) which is an indication of severe renal damage as seen in advanced renal failure. Patients with acute pyelonephritis (choice A), diabetic glomerulosclerosis (choice C), and hyperlipidemia (choice D) who are not in advanced renal failure would still be expected to show some overnight concentrating ability as, of course, would normal kidney function (choice E).

QUESTION 5

All patients who have trisomy of autosome 21 who survive to adulthood develop which one of the following conditions?

A. Alzheimer\\'s disease

B. lewy body dementia

C. multi-infarct dementia

D. Pick disease

E. secondary dementia

Correct Answer: A

Section: Behavioral Science and Biostatics Down syndrome is a congenital mental retardation associated with trisomy of autosome 21. All patients with Down syndrome who survive into adulthood develop the brain pathologies of Alzheimer\\'s disease, rendering support to the notion that at least one form of Alzheimer\\'s disease may be associated with an autosome 21 abnormality. Choices B, C, D, and E are not associated with trisomy of autosome 21.