August 2021: Kaplan MCAT stumpers put premeds to the test

AUG 5, 2021

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If you’re preparing for the Medical College Admission Test® (MCAT®), you will want to consult the experts. These selections from Kaplan’s MCAT Question of the Day series can help you sharpen your skills as you prepare to begin your potential journey into medical training.

The questions below come from three of the four MCAT sections—biological and biochemical foundations of living systems; chemical and physical foundations of biological systems; and psychological, social, and biological foundations of behavior. A fourth section, critical analysis and reasoning skills (commonly referred to as CARS), is based largely on inference.

Medicine can be a career that is both challenging and highly rewarding but figuring out a medical school’s prerequisites and navigating the application process can be a challenge unto itself. For students preparing for medical school, the AMA premed glossary guide has the answers to frequently asked questions.

For those already in medical school, the AMA selected Kaplan as a preferred provider to support you in reaching your goal of passing the USMLE® or COMLEX-USA®. AMA members can save 30% on access to additional study resources, such as Kaplan’s Qbank and High-yield courses.

Section: Biological and biochemical foundations of living systems

Question: Which of the following is true about cholesterol?

A. Cholesterol always increases membrane fluidity in cells.

B. Cholesterol is a steroid precursor.

URL: https://www.ama-assn.org/residents-students/preparing-medical-school/august-2021-kaplan-mcat-stumpers-put-premeds-test

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C. Cholesterol is a precursor for vitamin A, which is produced in the skin.

D. Cholesterol interacts only with the hydrophobic tails of phospholipids.

The correct answer is B.

Kaplan explains why: Cholesterol is a steroid precursor that has variable effects on membrane fluidity depending on temperature, eliminating choice A. It interacts with both the hydrophobic tails and the hydrophilic heads of membrane lipids, nullifying choice D. It is also a precursor for vitamin D—not vitamin A—which can be produced in the skin in a UV-driven reaction, eliminating choice C.

Section: Chemical and physical foundations of biological systems
**Question:** The many steps of glycolysis all exist in a state of dynamic equilibrium between reactant and product concentrations. Which of the following actions does not affect the equilibrium position of a reaction?

A. Adding or subtracting heat.

B. Adding or removing a catalyst.

C. Increasing or decreasing concentrations of reactants.

D. Increasing or decreasing concentrations of reactants.

The correct answer is **B**.

**Kaplan explains why:** The equilibrium of a reaction can be changed by several factors. Adding or subtracting heat, choice A, would shift the equilibrium based on the enthalpy change of the reaction. Increasing reactant concentrations would shift the equilibrium in the direction of the product, and the opposite would occur if reactant concentrations were decreased, eliminating choice C.

Changing the volume of a reactant would affect any reaction with gaseous reactants or products, eliminating choice D. While adding or removing a catalyst would change the reaction rate, it would not...
change where the equilibrium lies.

Section: Psychological, social and biological foundations of behavior

**Question:** A rat is trained to press a lever to obtain food under a fixed-interval schedule. Which of the following behaviors would the rat most likely exhibit?

A. Pressing the lever continuously whenever it is hungry.

B. Pressing the lever exactly once and waiting for the food pellet before pressing it again.

C. Pressing the lever slowly at first, but with increasing frequency as the end of the interval approaches.

D. None of the above; the association formed by fixed-interval schedules is too weak to increase behavior.
The correct answer is C.

**Kaplan explains why:** In a fixed-interval schedule, the desired behavior is rewarded the first time it is exhibited after the fixed interval has elapsed. Both fixed-interval and fixed-ratio schedules tend to show this phenomenon: almost no response immediately after the reward is given, but the behavior increases as the rat gets close to receiving the reward.