May 2021: Kaplan MCAT stumpers put premeds to the test

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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.

Biological and biochemical foundations of living systems

Question: Which ion channels are responsible for maintaining the resting membrane potential?

1. Ungated channels
2. Voltage-gated channels
3. Ligand-gated channels
4. No ion channels are involved in maintenance of the resting membrane potential

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The correct answer is A.

Kaplan explains why

The resting membrane potential is displayed by cells that are not actively involved in signal transduction. Ungated or “leak” channels permit limited free flow of ions, while the sodium–potassium pump is also active and corrects for this leakage. Ligand-gated and voltage-gated channels are involved in cell signaling and in the pacemaker potentials of certain cells, but cause deviation from—not maintenance of—the resting membrane potential.

Chemical and physical foundations of biological systems

Question: Biologically important carboxylic acids include pyruvic acid, citric acid, and the C-terminus of amino acid chains. Which of the following carboxylic acids will be the most acidic?

1. \( \text{CH}_3\text{CHClCH}_2\text{COOH} \)
2. \( \text{CH}_3\text{CH}_2\text{CCl}_2\text{COOH} \)
3. \( \text{CH}_3\text{CH}_2\text{CHClCOOH} \)
4. CH₃CH₂CH₂COOH

The correct answer is B.

Kaplan explains why

The acidity of carboxylic acids is significantly increased by the presence of highly electronegative functional groups. Their electron-withdrawing effect increases the stability of the carboxylate anion, favoring proton dissociation. This effect increases as the number of electronegative groups on the chain increases, and it also increases as the distance between the acid functionality and electronegative group decreases. This answer has two halogens bound to it, at a smaller distance from the carboxyl group compared to the other answers.

Psychological, social and biological foundations of behavior

Question: Which of the following would be most likely to be stored in long-term memory?

1. A list of nonsense words
2. A list of the dates of birth of 15 randomly selected people
3. A list of the names of musicians in an individual's favorite bands
4. A list of the dates of battles in the Peloponnesian War

The correct answer is C.

Kaplan explains why

The self-reference effect indicates that information that is most meaningful to an individual is the most likely to be memorized. Choice C is the most personally relevant to the individual memorizing the list.