

March 2022: Kaplan MCAT stumpers put pre-meds 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 pre-med glossary guide](#) has the answers to frequently asked questions.

Section: Biological and biochemical foundations of living systems

Question: A researcher wishes to study the effects of replacing a mouse's hemoglobin with leghemoglobin, a hemoprotein that has a very high affinity for oxygen, by comparing that mouse's oxygen pressure (P_{O_2}), oxygen saturation (S_{O_2}), total oxygen content (C_{O_2}), and blood pH to those of a normal mouse. The researcher is manipulating the:

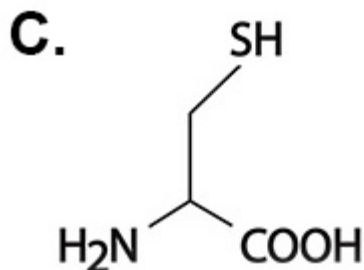
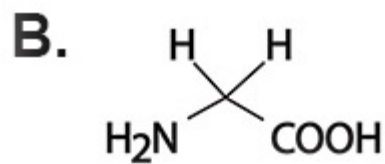
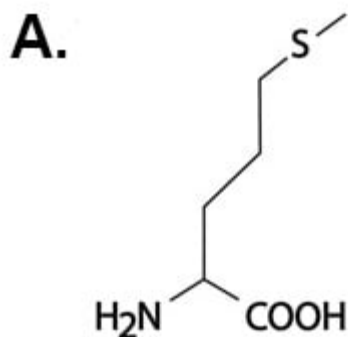
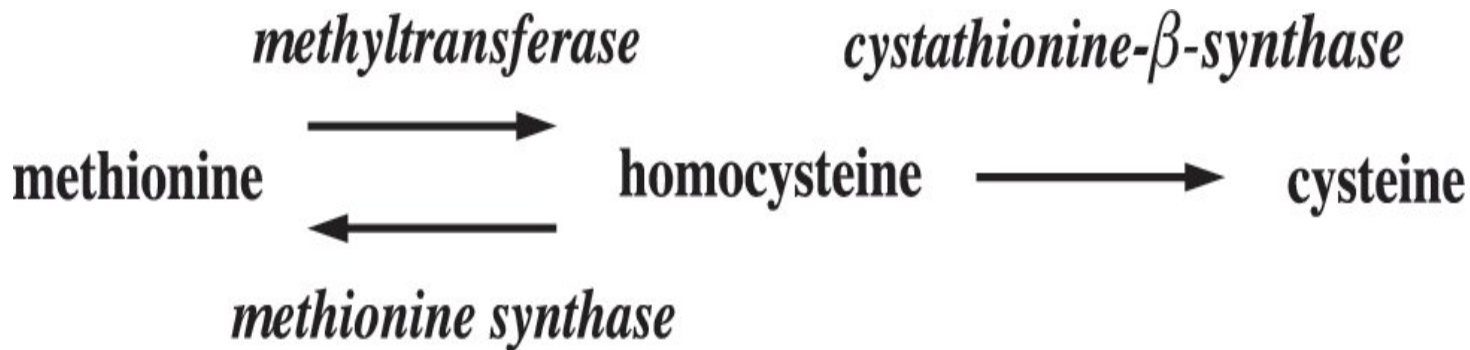
- A. Dependent variable.
- B. Independent variable.
- C. Control variable.
- D. Confounding variable.

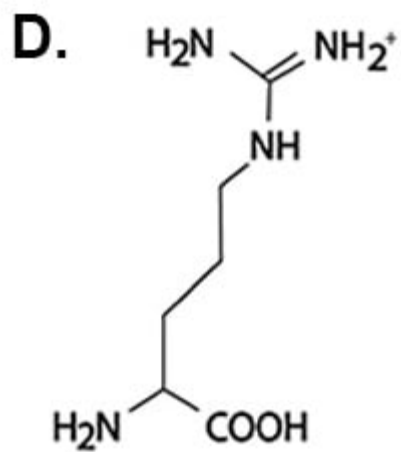
The correct answer is B.

Kaplan explains why: Since the independent variable is the one that is tested for its effect on the dependent variable, exchanging hemoglobin for leghemoglobin means the researcher is manipulating the independent variable.

Section: Chemical and physical foundations of biological systems

Question: Homocystinuria is an inherited disorder that causes developmental delays. The syndrome is caused by a deficiency in cystathionine- γ -synthase. Which of the following is expected to appear in excess in the body of a patient with inherited homocystinuria?





The correct answer is A.

Kaplan explains why: For test day, it is necessary to recognize the twenty amino acids used to create proteins. In this question, the cysteine synthesis pathway is blocked, which leads to an accumulation of the upstream precursors. Both methionine and homocysteine would be expected to be found in excess in the patient. Since homocysteine does not appear among the answer choices, methionine, **choice A** is correct.

Choice B, glycine, and **choice D**, arginine, are irrelevant to the discussion since they are not mentioned in the pathway. **Choice C** is incorrect because cysteine is deficient, not in excess, in individuals with cystathionine- β -synthase mutations.

Section: Psychological, social and biological foundations of behavior

Question: A professor reduces grades in response to coursework being handed in late. This is an example of:

- A. Negative reinforcement because it uses unpleasant means to motivate better behavior.
- B. Positive reinforcement because it will encourage better study habits.
- C. Negative punishment because the grade penalty serves to reduce bad study habits.
- D. Positive punishment because it is adding a new condition to the coursework requirements

The correct answer is C.

Kaplan explains why: The professor is taking away something desirable (a good grade) in an attempt to decrease a behavior (handing in work late). This is a classic example of a negative punishment, so **choice C** is a good match.

Choices A and B both involve reinforcement, which would seek to increase a behavior, and are thus opposite of what we're looking for. **Choice D** asserts that the punishment is positive because the professor is adding something new, but there is nothing in the question stem that indicates that the grade reduction policy was new, nor does **choice D** connect the term “punishment” to a reduction in behavior.