Kaplan USMLE Step 1: Five most-missed questions involving research

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Over the years, the AMA has run dozens of example questions from Kaplan Medical. If you’re preparing for the United States Medical Licensing Examination® (USMLE®) Step 1 exam, you might want to know which questions are most often missed by test-prep takers. We’ve compiled six cases from Kaplan Medical involving research. Each question comes with an expert explanation of the answer. You can check out all posts in this series.

Think you can answer these questions involving research? Find out now.

**Identify drugs used in an experiment** A diagram shows changes in blood pressure and heart rate in an animal with intact reflexes in response to drug X (agonist) and drug Y (antagonist). Assume that the antagonist's effects will last for the duration of the experiment and that the agonist's effects are transient. What are drug X and drug Y most likely to be?

**Drawing a conclusion from drug study** An investigator is evaluating the effects of new synthetic drugs on arteriolar resistance. Drug X maximally increases vascular resistance by 50% at a dose of 20 mg/mL. Drug Y maximally increases vascular resistance by 75% at a dose of 40 mg/mL. What conclusions can be drawn from this study?

**Interpreting investigational study data** An investigational oral contraceptive causes less weight gain than other oral contraceptives because it contains a unique progestin that blocks mineralocorticoid receptors. One hundred consecutive female participants are instructed to take 21 days of active pills, starting at day zero, containing the progestin and ethinyl estradiol, followed by seven days of placebo. Based on the data shown in the news article, which parameter is most likely being measured?

**Predict viral replication in enucleated cells** An investigator is studying virus life cycles. He creates a continuous culture of kidney fibroblasts that are suitable hosts for a large variety of viral agents. In
one experiment, the nuclei of these cells are removed by cytosurgery, and various viral agents are added to the cultures. Following culture of the viruses with the enucleated cells, the yield of cytopathic units of virus is quantified. Which virus would be capable of replication in these enucleated cells?

**Half-life of investigational drug** During an investigational study, the pharmacokinetics of a newly synthesized drug are studied in healthy volunteers. The volume of distribution and clearance determined in the first volunteer are 40 L and 2.0 L/hour, respectively. What is the most likely half-life of the drug in this volunteer?

For more prep questions on USMLE Steps 1, 2 and 3, view other posts in this series.

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