



# AP Bio FRQ Fridays

2013 #7  
Question, Hypothesis, & Data Analysis  
from Experimental Data



# FRQ Friday #26

2013 #7

In an experiment, rats averaging 300 g of body mass were tested several times over a three-month period. For each individual rat, urine was collected over a three-hour period after ingestion of 10 mL of liquid (water, 1% ethyl alcohol solution, or 5% ethyl alcohol solution). The volume of urine was then measured, and the results were averaged for all individuals within each experimental group. The data are shown in the table below.

THREE-HOUR URINE OUTPUT FOLLOWING FLUID INGESTION

Fluid ingested (10 mL)	Water	1% Ethyl Alcohol	5% Ethyl Alcohol
Average urine output (mL)	3.5	3.8	4.7



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(a) Pose ONE scientific question that the researchers were most likely investigating with the experiment.

THREE-HOUR URINE OUTPUT FOLLOWING FLUID INGESTION

Fluid ingested (10 mL)	Water	1% Ethyl Alcohol	5% Ethyl Alcohol

Appropriate questions include but are not limited to the following:

- How does alcohol consumption affect urine output in rats (or any mammal)?
- How does alcohol consumption affect regulation of the kidney?

A question regarding this experiment could be:  
What effects do differing concentrations of Ethyl Alcohol have on the amount of urine output on a population of rats.



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(b) State a hypothesis that could be tested to address the question you posed in part (a).

Appropriate hypotheses include but are not limited to the following:

- Alcohol consumption increases urine output in rats.
- Alcohol consumption increases water retention/reabsorption in rat kidneys.
- Alcohol consumption reduces urine output in rats.
- Alcohol consumption has no effect on urine output in rats.

NOTE: This point may be earned without earning the point in part (a)

Because alcohol acts as an antidiuretic, there would be more output of urine, the higher the concentration of alcohol.



(c) Using the data in the table, **describe** the effect of ethyl alcohol on urine production.

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Fluid ingested (10 mL)	Water	1% Ethyl Alcohol	5% Ethyl Alcohol
Average urine output (mL)	3.5	3.8	4.7

- Alcohol consumption increases urine output.

The rats that ingested the higher concentration of Ethyl Alcohol produced more urine.

