Alternative Explanations

*Scientific investigations do not always result in straightforward explanations.*

When considering the results of a scientific experiment, it is important to explore all of the possible explanations. Sometimes the data will not suggest anything concrete about the hypothesis being tested. Other times, the very design of the experiment might make reaching a firm conclusion impossible.

Students and working scientists sometimes make mistakes in organizing their scientific experiments. One of the most common mistakes involves *failing to isolate the independent variable*. This means that due to the design of the experiment, the resulting data may have been caused by something that the scientist didn't consider.

Example:

Dr. Hankerstein tests drugs that treat skin cancer.
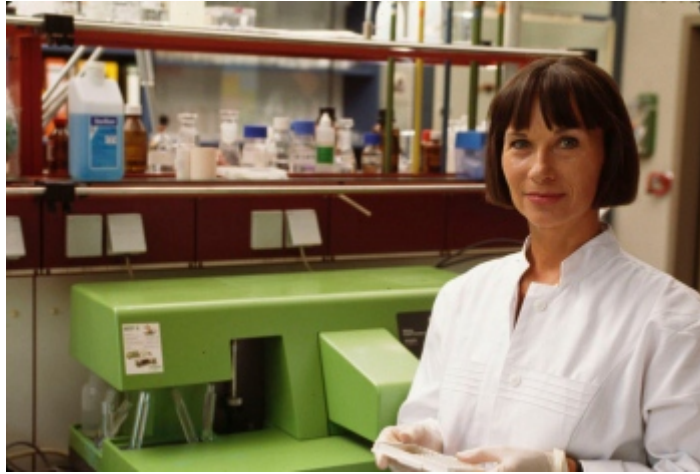
She treats three cancerous mice with drug X every day for one month. She also feeds them a specific food designed to enhance health. At the end of the month, the cancer affecting each mouse is in remission. Dr. Hankerstein concludes that the drug is a cure for cancer.

Question:
Is there another explanation for Dr. Hankerstein's results?

Answer:
Yes, perhaps the food the mice ate contributed to their ability to fight off the cancer. Dr. Hankerstein did not completely isolate her independent variable. Although the mice recovered, there are possible explanations that do not involve the cancer treatment drug (her independent variable).

Dr. Hankerstein would need to redesign her experiment in order to get more reliable results.

Comment on Lesson