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FOR ENGINEERING AND SCIENCE

Truth or Consequences

Year

1999

Description

This case discusses issues such as including proper data management and the responsibilities of authors, collaborating researchers and faculty research advisers as well as trust and honesty.

Body

Part 1

Peter Hogan and Sally Wheeler are both graduate students in Dr. Larson's laboratory. Although both are in their fourth year of graduate study, neither has published a manuscript, and both are beginning to worry that if they do not publish soon, they will be unable to get first-rate postdoctoral positions.

Finally, Peter's project begins to look promising. Through the use of genetic engineering, Peter has succeeded in generating a few knockout mice. These mice no longer have any working copies of the gene SLAM; the gene SLAM is completely "knocked out." Now Peter can move on to analyses of cellular function and development in the knockout mice to try to determine what role SLAM usually plays in a normal mouse.

Peter completes a preliminary examination of one knockout mouse. He is excited to find that several important cell types appear to have abnormal function. Dr. Larson is also excited by the data. He tells Peter that he has heard of several other laboratories that are competing to produce and analyze the same type of SLAM knockout mice. "Peter," Dr. Larson says, "we must confirm your initial findings as quickly as possible. If these results are correct, and we get our data written up first, we could get into a big journal like *Nature*."

Although only a few mice are available to study at this point, Peter and Dr. Larson agree that they must push ahead and work quickly but carefully. There will only be enough mice for two sets of experiments. In order to study as many cell types as possible, Dr. Larson decides to move Sally onto the project to assist Peter. Her research was still not progressing, and Dr. Larson believed that even a second author status on a big paper would help her career. Peter does not think much of Sally's work habits, but he agrees with Dr. Larson that it would benefit them both if she investigated one aspect of cellular function that Peter had not yet examined. Dr. Larson tells Sally that if her data are informative, she will be included as the second author on their manuscript.

Sally's project involves harvesting blood samples from the mice and carrying samples to a nearby building that houses the equipment needed to perform her cell function tests. During this time, Peter sacrifices the mice and conducts experiments on the tissues of interest. Because the mice have been sacrificed, there is no way for Sally to collect more cells from the mice.

Sally completes the first set of experiments and is thrilled by what she sees. She creates a graph of her data and shows it to Peter and Dr. Larson. It appears that SLAM has an unsuspected critical role in blood cell function, supporting their hypothesis that SLAM is required for the normal function of many cell types.

On the day that the experiments are being repeated, Sally calls Peter from the other building. "Peter," she says frantically, "are you sure that you didn't mix up the mice before I collected the blood?" "Yes, I'm sure," Peter cries. "But why?" "I'm not seeing the same trend as last time," Sally answered. "I think you must have mixed up the mice!" Peter thinks quickly about what to do. "Sally, just bring back any remaining blood this time, and I can do additional genetic tests to determine which sample is which."

However, when Sally returns to the lab several hours later, she does not have the leftover blood. She tells Peter that she had figured out her mistake and knew which sample was which, so she had thrown out any cells that remained. There is no way for Peter to verify her results without obtaining more mice, which they currently do not have. Sally tries to calm Peter and shows him a graph she had made, which clearly shows the same cell function trend as her first experiment.

Dr. Larson is ecstatic about the new data and tells Peter to begin writing up the manuscript. Although Peter does not want to accuse Sally of lying, he is no longer sure of the validity of her data. Later that day, he flips through Sally's notebook, trying to determine how she had done the experiment, but all he can find is the finished graph. In contrast, the entry for the first experiment has procedural notes and computer printouts from the equipment Sally had used to analyze her samples. Is it possible that Sally has purposefully altered her data to reflect the trend she wanted to see? If she had done nothing wrong, why had she thrown out the remaining cells, and why is the computer printout missing from her notebook? Peter is unsure of what to do.

Discussion Questions

1. Should Peter ignore his misgivings and write up the manuscript incorporating Sally's graph? Why? What are his other options?
2. What are Peter's responsibilities as the first author of the manuscript?
3. What are Sally's responsibilities as a contributing author?
4. How, if at all, did Dr. Larson's actions contribute to this problem?

Part 2

Now assume that in order to avoid creating conflict in the lab, Peter wrote up the manuscript using Sally's graph. The manuscript was published in *Nature*, and created quite a stir in the scientific community. However, in the next six months, Peter was dismayed to read several publications by competing labs that contradicted Sally's data. It had even been suggested at a national conference that Dr. Larson's lab had performed their experiments poorly or had misrepresented their

data. Peter now felt certain that Sally had falsified her data.

Discussion Questions

5. Have Peter's options changed significantly from those open to him in Part 1? Why?
6. Now that the paper has been published, are the decision-making criteria different? What are some of these criteria?

Notes

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Case Study / Scenario

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Topics

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Collaboration

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Mentors and Trainees

Publication Ethics

Research Misconduct

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