Author's Commentary on "Whose Lab Is It?"

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Whose Lab Is It?

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A cursory review of the case study "Whose Lab is This?" may lead the reader to notice and address the obvious dilemma confronting both student and professor, dwelling on the pressure that Professor Baker is under and the necessity for Alex to be free in developing his scientific analytical skills. Clearly, these issues are the overwhelming topics that must be addressed. However, several subtle issues emerge when the case is envisioned in a realistic setting.

Student-Mentor Relationship

The ethical and moral issues intertwined in the relationship between students and their mentors do not receive equal attention in comparison with more common ethical matters, such as data ownership, publication or authorship practices, plagiarism, peer review and human subjects research. Thus, it is difficult to develop a depiction of the way the relationship "ought" to be. There are many reasons why the student-mentor relationship is not clearly defined. An excellent report is available in the April 1993 issue of *The Journal of Dental Education*, which contains five papers that address topics ranging from a student's expectations of the research experience to the mentor's duties during the transition from graduate student to faculty member.

First, arguably more than any other aspect (ethical or not) in the research process, the relationship between a student and mentor is heavily driven by compatibility of personality traits. This compatibility is difficult to outline and define. As the case study suggests, Alex and Professor Baker appear to have a suitable match of personalities for a productive and enjoyable working relationship. The reader has no grounds for assuming any underlying tension that could escalate into a conflict.

Second, the relationship between a mentor and his or her students is dynamic. As suggested above, the subtle nuances of interpersonal relationships may play heavily on the success of the relationship. Joy and sorrow in all of our lives must be handled properly in the professional setting of a research training program. The case study highlights this aspect of the relationship quite clearly. The reader will notice the initial productive atmosphere in the lab where both professor and student are concerned primarily with the success of the project. Throughout the evolution of the case, this attitude is maintained. Depending on the inflections used to convey the dialogue, the reader may be correct to assume that Alex and Professor Baker are getting along quite well. This attitude immediately changes with the last passage by Professor Baker, however.

While the case does not indicate how this incident actually changes their relationship, tension and mistrust are evident at the end of the case. Alex feels that he should not always be told how to do his experiments. His graduate school education is not intended simply to carry out Professor Baker's research, but more importantly, to develop his own critical thinking and ability to design and carry out relevant experiments in the pursuit of scientific knowledge. How is Alex to think that Professor Baker is acting as a mentor when she forbids him to pursue his own experiments, restricting his actions to work she needs done? Many variations on this case study can alter the weight the reader imparts to the righteousness of either party's behavior.

Professor Baker states analogous feelings of mistrust of Alex. She has not only asked but told her student to perform a specific task. In addition, she also told him not to pursue a second line of experiments, which she felt diminished the impact of her laboratory on the scientific field. When Alex failed at the first request and violated the second, Professor Baker had every right to mistrust him.

An additional question that arises from this analysis is whether Professor Baker's requests were fair. Comments on her request and authority appear below.

As a result of a change in the research procedure, the relationship between Alex and his mentor has shifted from positive support and cooperation to anger and mistrust. Such fluctuations may be extreme, but are unfortunately realistic. Again we find it hard to clearly outline the fundamental role of personality traits in the student-relationships.

Often, labs are often composed of many students, technicians and post-doctoral fellows. The various roles that these members play in part regulate their rights and responsibilities. In the case study, it is entirely possible that Alex's position as a graduate student was the determining factor for the unfortunate outcome. If the reader decides that Alex was wrong in his choice of actions, would it change matters if Alex were a technician? A post-doctoral fellow? Even at the level of graduate student, could the mentor be justified in granting autonomy differentially to various students? The performance history, level of education, and cooperation of a given student most certainly affect this decision. Is the student-mentor relationship violated when one student receives an advantage over her peers in the same laboratory? The nuances of this relationship are extremely difficult to outline. Consequently, relatively little information on the ethics of the student-mentor relationship is available. G. T. Perkoff proposes the qualities that make a good mentor, including charisma, empathy and being a good personal and professional example. (Perkoff 1992).

Rights and Responsibilities

Professor Baker plays a dual role in the case study, that of mentor and that of laboratory supervisor. As a mentor, she has a duty to convey scientific expertise and research standards to Alex. The student will also infer from his mentor's words and actions implicit notions dealing with collegial interactions, funding pressures and laboratory supervision. This last item, laboratory supervision, extends into laboratory authority. It is central to the concept of mentoring and necessary to the correct direction of information transmittal from professional to apprentice. Professor Baker holds all of these responsibilities, which are necessary for the proper development of the trainee, Alex.

In the scientific graduate system today, students are frequently in a position to select their own mentors based largely on the research interests of the faculty most

congruent with those of the student. In addition, the reputation, productivity and atmosphere of the laboratory undoubtedly influence the selection of mentor. A few glimpses into these aspects are presented in the case study. For example, Professor Baker's status as assistant professor and a faculty member quite concerned with obtaining funding suggests her lab is not a well-established leader in the large scientific field. However, the productivity of the lab, as evidenced by already receiving a research grant and developing a successful detergent-free protein folding method, is commendable. Professor Baker therefore does have reasons for her desire that this procedure be carried out in the manner she has pioneered. In different circumstances, such as Alex making a smaller modification to the protocol, the reader's opinion as to whether Alex was correct in his decision may change.

Alex's responsibilities and Professor Baker's legitimate expectations of her student must also be addressed. This discussion can be quite broad, ranging from Alex's responsibility to carry out agreed-upon, documented experiments to his duty to prepare himself for independent scientific investigation in the next few years, considering he is in his fourth year of graduate school and nearing completion of his Ph.D. degree. Alex also has an obligation to his mentor to perform specific experiments, especially when she has presented a compelling argument justifying the manner in which they are to be executed. The question focuses therefore on whether Professor Baker's reason for insisting that Alex omit detergents from the protocol is justified. The reader is intentionally not provided with more details regarding the importance of CTAB to initiate discussion regarding importance of methods versus results, in this case, the folding of the cambin protein.

Creativity and authority seem be antagonistic forces, both present in the case study. Meshed within the rights and responsibilities of both Alex and Professor Baker, this antagonism is clear. Alex's desire to pursue his idea may be justified, especially in the circumstances where Professor Baker's method repeatedly failed. As a graduate student nearing completion of his doctorate, his scientific opinion begins to carry more weight than earlier in his training. Should he have the privilege of following his own line of reasoning? Equally, Professor Baker's argument for the omission of the CTAB detergent from the protein folding method may carry substantial weight. Her position as faculty member, mentor and principal investigator impart authority. She has shown creativity in her research by pioneering a detergent-free method while all of the competing labs resort to an implied inferior process. This interplay between creativity and authority on both parties emerges as an undertone to the case, yet it

is stated in the title.

Misconduct vs. Questionable Research Practices

In 1993, the National Academy of Sciences defined misconduct in science as "fabrication, falsification, or plagiarism, in proposing, performing, or reporting research." Errors in recording, analyzing, and interpreting data are not classified as misconduct. The NAS has also described "questionable research practices" as those which "violate traditional values of the research enterprise and may be detrimental to the research process." (National Academy of Sciences, 1992, p. 5)

The case study "Whose Lab is This?" outlines a scenario in which neither Alex nor Professor Baker appears guilty of scientific misconduct, yet both may be guilty of carrying out questionable research practices, depending on the decisions made in light of Alex's discovery. Many ethical discussions have focused on conducting research and handling the resultant data. As both Alex and Professor Baker are currently funded by tax-derived scientific research grants, they have a strong obligation to conduct their work in an efficient and justified manner. Science has an underlying assumption that research data will always be accurately and truthfully presented. Without this assumption, false statements will completely devalue those which are true. Money, time and ultimately lives will be lost when the field is biomedical research.

Alex has found a novel, efficient manner of folding a biologically important protein, or at least one whose study merits funding. That raises the issue of whether the Baker lab is justified in proceeding with the old, comparatively inefficient procedure in the face of Alex's new results. Frequently, scientists use an established procedure since it "does the job." Furthermore, the originator of the method may feel most allied with it, unwilling to change.

These issues are embedded in the case study and may justify Professor Baker's actions. However strong this argument may seem, Alex appears to have found a better way to approach the task of folding the cambin protein. Should his method be published or used? Even if detergents are undesirable, many proteins must be folded by detergents before any studies can be done on them. The inclusion of CTAB

may not be ideal, yet Alex's work appears to be a substantial contribution. The current importance of the cambin protein may dictate Professor Baker's and Alex's obligation to report the new procedure.

Many argue that research is to increase our knowledge in a particular field. Many of the landmark findings in science have resulted from findings which were unknown as to their importance at the time of publication. If other laboratories could potentially further their scientific contributions using Alex's method, one could argue that they are required to publish it.

Conclusion

"Whose Lab is This?" was written to focus very tightly on the student-mentor relationship. Just as with most ethical issues, not all the facts of the case are known when the critical decisions must be made. Alex and Professor Baker both have to balance their rights against their duties to each other and to the scientific research process. Hopefully this seemingly simplistic case has encouraged the reader to fully address the core issues, but also issues that can result from actions made by Professor Baker and her student. The student-mentor relationship is central to the case, yet topics including whistle blowing, conducting and reporting research, laboratory supervision, and conflicts of interest may all emerge, providing for a diversified discussion.

References

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