Editor's LETTER

ACS chemical biology

Communicating Science to the First Degree

The ability to understand and interpret scientific research is becoming a required skill in our society. It helps us choose our medical care, both for ourselves and for our loved ones. It informs our discussions about political funding, legislation, and candidates. It guides the education of our children and provides a gateway to careers in important and exciting new fields. It helps shape our understanding of the world around us and our impact upon it, in both positive and negative ways. Science does not define a strict path in any of these situations, but it does provide many insights that should not be ignored. At a time when scientific literacy is flagging, scientists have an obligation to educate the public, not only in journals and classrooms, but in personal interactions as well.

When I first started grad school, my classmates had a running joke about the conversations we would have with our parents about our research. It went something like this:

Parent: How are things in the laboratory? Are you trying to find a cure for cancer?

Student: Actually, I'm studying chromosome modifications in *Drosophila* that are involved in sex determination.

Parent: I see.... And that is going to help you find a cure for cancer?

Student (rolls eyes): Yes, Mother. So, what's going on there?

Of course, this is joke, but there is some truth to it. Perhaps these family members did not understand our lingo. Perhaps we were afraid we might bore them or insult them if we used simpler language, or that it would just go over their heads no matter how we described our work. Often, we became so comfortable speaking in jargon that we forgot how to relate scientific ideas in simple language. Or, we had been so personally involved with the minutiae of our experiments that we forgot the importance of conveying the big picture. I contend that it is possible to explain scientific ideas to any person with any educational background. Just as with any scientific presentation, the key is to recognize the audience.

Communicating about science does not have to be about experiments and data. Understanding the process of science can be just as important for the public as understanding scientific discoveries. How is research evaluated? What steps are taken to prevent fraud? How does a particular finding make the long trip from journal article to textbook? How can we trust science when ideas held to be true are constantly disproved? Discussing these issues requires no scientific background, and they lie at the heart of society's interaction with science.

Classroom teaching is an equally important component of scientific communication but is often a mixed blessing for faculty members at research institutions. It is a wonderful opportunity to educate the scientists (and nonscientists) of tomorrow. The pressures of running a competitive research laboratory can be extreme, however, and teaching can become a secondary concern. This month, we feature four In Focus pieces on science education (*1*–*4*).

Taylor and Drennan (*1*) describe a newly enriched chemistry curriculum at the Massachusetts Institute of Technology. In a class for nonspecialists, the instructors now highlight the connections between chemistry and biology in order to harness the students' excitement about medicine and biology. The teaching assistants for this large class are often first-year chemistry graduate students with little teaching experience. To better prepare them for their

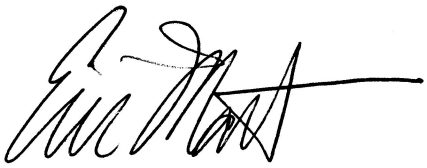
10.1021/cb700169r CCC: $37.00 Published online August 9, 2007

teaching responsibilities, the department has instituted a week-long training program that focuses on interdisciplinary teaching, team building, and specific techniques for teaching difficult material. Interestingly, it is not just the nonmajors who take the course who seem to be enjoying the new changes. Once considered an undesirable teaching assignment, there has been a recent upsurge in the number of students requesting to teach this class. Excited teachers and interested students will always be a potent combination for successful education.

Two other In Focus commentaries address the difficulties of being a teaching scientist. Tahmassebi and Williamson (*2*) discuss an exciting joint program between the University of San Diego (USD), known for its undergraduate education, and the Scripps Research Center, a world-class research institute. The Joint USD–Scripps Training Program provides an opportunity for postdocs at Scripps to have a mentored teaching experience at USD. They are given a valuable opportunity to develop independent teaching and research programs before their first faculty position and to gain experience in balancing the two.

Coppola *et al.* (*3*) describe another program for postdocs at the University of Michigan. They note that researchers are increasingly being drawn toward interdisciplinary areas like chemical biology. While this is very exciting from a research perspective, it means that less attention is given to the core topics that underlie the research. The University of Michigan program in chemistry now offers a competitive teaching fellowship for postdocs in which they are called upon to teach a broad range of these core areas. One participant in the program said, "The biggest benefit has been to develop communication skills outside my specific discipline of study. I think I have developed the ability to both listen to other people ... and to explain myself, and my perspective, to people in other disciplines." That is the essence of knowing one's audience, and an admirable goal for any scientist.

I believe it is important for scientists to accept a greater role in communicating their research to nonscientists. Most researchers do not have the free time to begin a second career as a journalist, so why not start close to home? Call your parents, siblings, cousins, grandparents, nieces, nephews, and friends and tell then about your work in a way they can understand. Tell them why you love science and why you think it is important. No scientist can bemoan the state of science awareness in this country without taking this small step. And after all, they say there are only six degrees of separation between every person in the world; why not start with the first degree?



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