

Editor's LETTER

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Fostering Major Breakthroughs

The emphasis on interdisciplinary scientific research is inescapable. In 1999, Metzger and Zare (1) referred to interdisciplinary research as the “mantra of scientific policy”. Evidence in support of this descriptor is abundant. The United States National Academy of Sciences, for example, has organized a task force focused on promoting interdisciplinary research. Private and public funding agencies, universities, research institutes, and professional organizations also have invested heavily in interdisciplinary programs. Many of these organizations are seeking to lower the barriers between scientific disciplines. Centers for interdisciplinary research abound; institutions are being restructured; research space is becoming more integrated. As researchers attracted to chemical biology, our interests naturally fall into the category of interdisciplinary science. Still, one wonders if the cross-talk between different disciplines will yield the desired benefits—major breakthroughs.

One line of evidence that interdisciplinary research will move us forward comes from an analysis of the factors resulting in the major discoveries of the past. J. Rogers Hollingsworth, a professor in the Sociology and History Departments at the University of Wisconsin–Madison, has examined the environment in institutions that have consistently produced major breakthroughs. Additionally, he has searched for characteristics common to scientists who have made such breakthroughs. One of his conclusions is that those successful researchers have “high cognitive complexity”; they easily intuit connections between different fields and readily relate ideas from one field to another (2). A surprising number of these successful scientists had integrated multiple cultural identities from diverse ethnicities, nationalities, or religions. It is perhaps this ability to see the world from different perspectives that allowed the researchers to make contributions with wide-ranging implications (3). Like those between different nations, the cultural barriers between different scientific disciplines (e.g., chemistry and biology) can be substantial. Yet, if our goal is to make major contributions to science, the historical data suggest that it is worthwhile to breach these barriers.

The case for increasing communication between scientists trained in different disciplines is likewise supported by Hollingsworth's analysis. Institutions in which many scientists have made major scientific discoveries share some common features (4). One key attribute is an ingrained culture that facilitates the interaction of researchers from different areas and with different perspectives. Mechanisms such as journal clubs, interdisciplinary seminars, and forums for casual and leisurely interaction are examples of how institutions can foster innovation. Such mechanisms can focus talented researchers on the most critical problems and elicit novel solutions. Although the specific means by which institutions facilitate interactions between scientists in different disciplines does not seem to be important, the benefits of removing boundaries between the disciplines are apparent.

As a forum for the publication of interdisciplinary research, *ACS Chemical Biology* seeks to facilitate conversations between chemists and biologists both in print and on the Web. It is in the latter arena that we are generating a new community, an on-line journal club of sorts, that enables the free and immediate exchange of ideas. One manifestation of our plan to stimulate discussion is the on-line feature “Ask the Expert”. This section was designed with the knowledge that one hallmark of interdisciplinary research is that its

practitioners often are using techniques that are new to them. To lower the barrier to entry, scientists can ask experts questions about fundamental issues, research directions, or techniques and methods. We shall feature different topics and encourage the community to join the discussion. Another manifestation of our plan is the “Chemical Biology WIKI”. This venue also allows for discussion of forefront scientific topics of interest to chemical biologists, as well as policy issues that affect the way we obtain funding, devise and conduct research, and educate and mentor those working at the interface.

In designing our journal, we are inspired by another insight from Hollingsworth’s analysis: Institutions that foster major breakthroughs lack inertia (4). Our vision of *ACS Chemical Biology* is that it will be nimble—it will respond to new scientific directions. We are interested in innovative ideas about how we can best serve our readership and the broader scientific community. We welcome your input.



Laura L. Kiessling
Editor-in-Chief

1. Metzger, N.; and Zare, R. N. (1999). Interdisciplinary research: From belief to reality. *Science* 283, 642–643.
2. Hollingsworth, J. R. (in press) *High cognitive complexity and the making of major scientific discoveries. Knowledge, communication and creativity* (Sales, Arnaud, and Fournier, Marcel, Eds.), SAGE Publications, Thousand Oaks, CA.
3. Hollingsworth, J. R.; Hollingsworth, E. J.; and Hage, J. (in press) *The search for excellence: Organizations, institutions, and major discoveries in biomedical science*, Cambridge University Press, Cambridge.
4. Hollingsworth, J. R.; and Hollingsworth, E. J.; (2000) Major discoveries and biomedical research organizations: Perspectives on interdisciplinarity, nurturing leadership, and integrated structure and cultures, in *Practising interdisciplinarity* (Weingart, P., and Stehr, N., Eds.), pp 214–244, University of Toronto Press, Toronto, ON.