

Biotechnology Education

Commentary: Translational Research Curricula

Received for publication, December 27, 2006

Sheldon M. Schuster ‡*From the Keck Graduate Institute of Applied Life Sciences, Claremont, California 91711*

To educate the leaders of a new era in which basic science discoveries will be increasingly converted into useful products, we need to expand curricula and programs around an expanded context of what is becoming known as “translational research.” Recently a great deal of effort has been devoted to advancing the curricula of our Biochemistry and Molecular Biology graduate programs to include deeper understanding of unmet medical needs. Spurred by initiatives at the NIH as well as private funding organizations, the need to derive practical benefit from our basic research in the life sciences has made the term “bench-to-bedside” a mantra for educational changes within many PhD programs. These have included closer coordination and even some modest integration of MD and PhD educational programs encouraging our young scientists to learn more about the problems facing the practice of medicine. In an era when genomic information is abundant and opportunities for applications vast, the ability to focus on important and practical problems is an appropriate and worthwhile emphasis.

A recent report on one such program to foster closer integration of basic and applied advancement to speed translational research was described by Kuehn [1]: an effort by the Howard Hughes Medical Institute to support innovation in both MD and PhD programs that might address an important problem with much needed integrative approaches. This program surely will help in assuring that basic scientists and clinicians have a clearer understanding of each others’ capabilities and issues. However, one major component that is necessary for the translation of basic science to clinical products has not yet been adequately integrated into the solution: the path from the “bench-to-bedside” most always runs through a business. The advances in modern, high technology medicine need the insight of the basic scientists and the practical knowledge of the physician as well as the skills of those who understand intellectual property protection, the intricacies of regulatory affairs, and the management of capital. The development of new devices, diagnostics, and therapeutics virtually all require the investment of substantial amounts of money and time in a complex and difficult process that often fails to produce the desired result. I applaud the effort to enhance opportunities for our basic science graduate students to learn and

be inspired by hands-on learning about the practical issues of clinical practice, but isn’t there equal value in having some of our students learn the necessity for intellectual property protection, the challenge of clinical trial funding and design, the difficulties in scale up and production of usable quantities of potential therapeutics, and the formidable difficulty in raising the substantial amounts of capital needed to support the entire process? Our PhD students will learn valuable lessons from interactions with clinical faculty and programs, so would some not learn equally valuable lessons from spending time in a well-run company that commercializes basic science discoveries into products?

Appropriate educational opportunities for helping young scientists understand the role of business in translating science into products are abundant, but they are not integrated into our curricula. In addition to hands-on experiences in industry these could range from courses taught by business school faculty with experience in relevant industries, to short courses delivered by business leaders in the community. But besides the necessity for clear and current background information, a major criterion for the effectiveness of any course is experience in some aspect of the Biosciences industry and the ability to lead informative discussions of relevant cases. From a great deal of experience among business teaching faculty as well as the work of my colleagues teaching business to scientists and engineers, the consensus is overwhelming that case-based teaching with real-world examples is most effective. The limitation, however, is a dearth of available published cases that contain relevant and well-documented examples of the life sciences generating beneficial products by a transfer of the technology from the bench to bedside, through the planning and execution of effective and ethical business practices.

The publication of well-documented business cases wherein the science is presented credibly, the business process analyzed critically and the outcome of interest is described, is exactly what BAMBED is encouraging. Such cases will serve an important need in complementing ongoing curricular efforts to enable translation of basic discoveries into practical solutions in the life sciences by our young scientists.

‡ To whom correspondence should be addressed. E-mail: Sheldon_Schuster@kgi.edu.

REFERENCE

- [1] B. M. Kuehn (2006) PhD programs adopt bench-to-bedside model to speed translational research, *JAMA* **295**, 1506–1507.