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**Turning science into medicine**

By David A. Shaywitz | September 29, 2005

IT IS THE season of the Nobel Prize, and if tradition holds, the award in medicine will recognize a fundamental advance in basic biology. Unfortunately, moving from laboratory discovery to clinical practice turns out to be exceptionally difficult. While our universities have little trouble churning out basic researchers or skilled physicians, we struggle to train -- or even identify -- translational investigators who specialize in bridging the gap between lab and patient.

Yet, a solution may be within easy grasp. Translational research is exactly what is happening every day in the dozens of start-up companies that dot the landscape of Boston and other university towns; these companies are focused on the problem of turning science into application and represent an entrepreneur's best effort at solving this problem. The question now is whether academic leaders can overcome their intrinsic distrust of the private sector.

Basic research -- in which the pursuit of an interesting question is its own reward -- sits squarely at the top of the academic research hierarchy. In the United States, most basic research in the life sciences is funded by the National Institutes of Health, based on the reasonable assumption that in order to understand disease, you first must understand the biology behind it. It has become increasingly apparent, however, that translating research into application is neither easy nor inevitable; it requires both a unique type of investigator and an environment where the pursuit of such questions is valued and enabled. While some exceptionally talented translational researchers exist at university medical centers, they are certainly hard to come by.

Perhaps academics should embrace one of the best examples of translational research -- the small start-up company. In most cases, these companies represent the effort of an entrepreneur who would like to turn a basic scientific discovery into a useful clinical application, reflecting translational research in its rawest form. For the enterprise to succeed, the entrepreneur must understand the science at a sophisticated level, recognizing its limitations as well as its promise; the entrepreneur must also possess a sophisticated understanding of the clinical problem to be tackled, if the new approach is to represent a significant improvement.

These entrepreneurs seem like ideal role models for students in medicine and the life sciences, yet exposure to such entrepreneurs is almost nonexistent in most training programs. In part, this reluctance may reflect a practiced disdain for industry research and the atavistic belief that industry scientists are those who couldn't make it in academia.

The major reason universities are reluctant to engage the private sector, however, may stem from the view that students represent a vulnerable population and must be protected from corrupting industry influences. Efforts by drug companies to promote their products over "free" lunches and dinners have contributed to the universities' sense of cynicism.

Unfortunately, most universities have responded to these concerns in a blunt, reflexive fashion -- essentially keeping industry contacts to a minimum.

As a result, while graduate students in other disciplines are founding Google, Yahoo, and Akamai, trainees in medicine and the life sciences are conspicuously absent from this important intellectual space.

If universities are to cultivate innovation in medicine and the life sciences and do their best to facilitate the translation of science into clinical application, then they must learn to appreciate the opportunities that entrepreneurship represents. Students should receive exposure to life-science entrepreneurs and be given the opportunity to intern at small start-ups and at young biotechnology companies. Entrepreneurship in the life sciences should be included as at least an optional course in the curriculum, and consulting for companies should be permitted, following institutional review of the contract.

We must also keep in mind that innovation is not limited to the private sector and many important ideas do not lead to companies. The novel use of an off-patent medication is one example; the creation of therapies to serve patients in underdeveloped nations is unfortunately often another.

Any university serious about innovation must support and provide training opportunities for students interested in these important areas as well. Many of our best young minds go to medical school and biology graduate school determined to make a difference. By exposing these students to the excitement and challenges of entrepreneurship in the life sciences, universities can empower them to turn our most promising laboratory discoveries into real clinical progress.

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