

Enhancing ties between academia and industry to improve health

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Concerns about conflicts of interest have driven a wedge between academia and the pharmaceutical and devices industries. Although elevated concern for bias is justified, particularly when academics may affect drug sales, partnerships between industry and academia are essential to achieve the full promise of health improvement from the public investment in biomedical research. New models for such partnerships are developing and should be encouraged.

Rancor over conflicts of interest in health care and biomedical research has steadily increased in recent years. Instances of undisclosed financial ties between faculty at academic medical centers and industry have surfaced, some with multimillion dollar payouts to prominent experts¹. These cases have led to pillorying of the academics and, by association, their home institutions, putting a chill on ties between academia and industry. However, not all such ties are nefarious, and much value may be lost if collaboration is discouraged.

Clearly, conflicts of interest have important consequences, particularly when bias could affect the approval or use of therapeutics. When a lecturer recommends a treatment from a manufacturer with which he or she has undisclosed ties, a breach of trust has occurred. Similarly, conflicts may subvert the objectivity of guideline development². Pharmaceutical and device-company marketing can also corrupt the prescribing behavior

of individual physicians. In research, unstated sources of potential conflicts of interest also have been revealed, raising questions about the reliability of published findings. The need for greater transparency and control of potential conflicts is obvious.

Academic institutions have responded to revelations of conflicts of interest by setting more explicit policies. These policies include requiring full public disclosure of all financial ties, limiting campus access of pharmaceutical company employees and setting strict limits on the types of ties and amounts of compensation. However, in the heat of apprehension and sometimes embarrassment, such policies may have unintended negative consequences, driving a wedge between academia and industry. The atmosphere of inquisition has forced distance, with many faculty avoid-

ing contacts with industry in fear of being called out as corrupt. The press has fueled this concern. We have seen many prominent experts appear on the pages of *The New York Times* for reasons other than glorious discoveries. An article in the *BMJ* listed 100 physicians not 'on the take', implying that others not similarly vetted should be avoided for commentary³.

Although it is clear that new attitudes and policies about conflicts of interest are necessary, the importance of academic-industry collaboration in improving health cannot be denied. Academic researchers judge their relationships with industry to be very meaningful⁴, and nonfinancial relationships may be as important as financial ones⁵. There are many examples of discoveries made and patented by universities, now licensed by phar-

Box 1 Comments of Brian Druker on the discovery of imatinib

In 1988, Nick Lydon, who led a drug discovery group at a pharmaceutical company that eventually became Novartis, came to talk to me. He was interested in developing drugs to block a family of cellular enzymes implicated in several cancers. I said to him: "If you want to develop targeted chemotherapies, CML is the disease to study. We know the most about it—and, if we can figure out a way to block this enzyme, we can turn off the cancer switch." So in Nick's lab at the pharmaceutical company, he began screening for agents that worked on CML. He'd send me his best compounds. I found one, STI571, that was better than the others; it would kill every CML cell in a Petri dish. By 1995, STI571 was a lead compound set for clinical development.

... I don't see a penny, though that never was an issue for me. When I obtained the compound, it was already patented. I wasn't going to get to test it if I tried to put my mark on it. I wanted to work on it because I thought it was going to be the way to treat CML. You know, my patients were people who'd been told "to get their affairs in order" because they were going [to] die soon. And now some of them play with grandchildren they'd thought they'd never live to see. That's worth more than money.

—Brian Druker, from an interview with Claudia Dreifus, *The New York Times*, 2 November 2009. © 2009 *The New York Times*. All rights reserved. Used by permission and protected by the copyright laws of the United States. The printing, copying, redistribution or retransmission of this content without express written permission is prohibited.

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Table 1 Incentives in drug development for academia, industry and society

	Academia		Industry		Society	
	Institutions	Faculty	Companies	Executives	Government	Individuals
New discovery	++	++	0	+	+	0
Drug target	+	+	++	++	0	0
Effective drug	+	++	++	++	+	++
Wide use	+	++	++	++	+	0
High profit	±	±	++	++	-	-
Appropriate use	0	+	0	0	++	+

Academia, industry and society share many but not all incentives in the development of new discoveries and in their distribution and use. Incentives: ++, strong; +, weak; ±, possible; 0, no incentive; -, disincentive. Estimates based on the authors' opinions.

maceutical and device companies⁶. Several of these are blockbuster drugs with major health benefits and financial returns to academia.

The discovery and development of imatinib—a highly effective and widely used cancer drug—is a compelling example (**Box 1**). A scientist from industry, Nicholas Lydon, partnered with an academic investigator, Brian Druker, to identify novel compounds to inhibit a tyrosine kinase inhibitor implicated in chronic myelogenous leukemia (CML). The identification and early clinical testing of imatinib was recognized by their selection, along with Charles Sawyers, as Lasker-DeBaakey Clinical Medical Research Award recipients in 2009. Imatinib is now recommended as first-line therapy for many patients with CML and has been credited with substantial improvements in quality of life.

Academic medical centers are a natural engine for biomedical discovery. Innovators tend to aggregate at academic institutions, and government funding for fundamental science fuels discoveries, some quite unexpected. However, academics also tend to be inefficient and distractible, and may not be focused on a mission of improving health (**Table 1**). Academia is not charged or organized to bring therapies to the public. Faculty members often lack the knowledge and interest to identify discoveries that could form the basis for new therapies and to shepherd an agent forward through development. Access is limited to funding and infrastructure to support the practical steps of translation. With rare exception, the public benefits of discoveries made in academia are realized only when they have been translated into use through industry. Unlike academia, industry is designed to effectively and efficiently produce and distribute therapies. Thus, academia and industry each have an essential role in improving health through biomedical discoveries.

A profound increase in the funding of medical research over the last 20 years has not led to an increase in the rate of new drug approvals⁷. Given that translation is generally

dependent on passing the baton to industry, discouraging free discourse between academia and industry is likely to result in an even slower rate of new drug discovery. Also, the US National Institutes of Health has been historically a poor funder of translational research, which may seem utilitarian and mundane to reviewers. So, investigators who want to develop therapies may be forced to look for funding from industry.

Some have argued that the fruits of academia belong in the public domain, where they can be picked by industry for further development. Eliminating intellectual property concerns from academic discoveries, the argument goes, would clarify the mission of academics and avoid the corrupting influence of industry. Although the moral clarity of this stance is enticing, it would be counterproductive for two reasons. First, given the low yield of candidate drugs in development, the inability to control intellectual property would become a major disincentive for companies to invest the money required to take a potential drug through clinical testing to market, recently estimated to average \$171 million⁸; when failures are considered, the cost of development is estimated at \$1.2 billion for a drug that ultimately is approved by the US Food and Drug Administration⁸. Second, without free transfer of knowledge, skill sets and reagents between academia and industry, the energy of activation to move some discoveries into further development may be too great.

Although the ultimate rewards may be different, the goal of improving health is shared by both academic investigators and the biomedical industry (**Table 1**). Preclinical research and early-phase clinical trials are important to both industry and academics, and incentives to produce reliable evidence and report it accurately are generally well aligned. Unlike research that may influence prescribing behavior or drug approval, these studies are most valuable to all sponsors if unbiased. Proceeding with drug development based on overly favorable interpretation of

results can be costly for a company. Of course, there are still opportunities for conflict in this arena, including pressure to delay publications for patent filing or competitive advantage, and pressure to increase the stock price of small companies through positive results or restricted publication of negative results. Academic medical centers must insist on complete control of publication content and timing in these relationships.

Bridging the cultures of academia and industry can be challenging. There are many examples of partnerships gone awry. For example, an investigator at the University of California, San Francisco, signed a contract with Boots Pharmaceuticals to compare Synthroid to three generic forms of levothyroxine; when the trial did not show Synthroid to be superior, Boots blocked publication of the results, creating a public outcry and subsequent release of the results⁹. Also, large settlements to universities for patent infringement and theft by pharmaceutical companies are well known. Such examples impair trust, a chief predictor of successful university-industry partnerships, and become reminders of the importance of formalizing these engagements¹⁰. Many previous partnerships between academic medical centers and pharmaceutical companies have not been renewed, also suggesting that the return on investment has not been adequate. New partnerships will need to reduce barriers, improve trust, preserve scientific freedom and deliver adequate returns for both parties: a tall order that will require careful planning and management.

We should be searching for ways to promote strategic research interactions between academia and industry, not setting policies that prevent them. Academic institutions should strive for regulatory parsimony and equanimity as they oversee these relationships. For example, the need to declare travel reimbursement as a conflict of interest for attendance at an industry-sponsored professional meeting (the current policy at our institution) seems an excessive regulation

that stigmatizes useful and mutually beneficial relationships. However, there is no place for promotional junkets, gifts and expensive entertainment, and personal compensation should never be the primary motivation for academics to work with industry. In some areas, more oversight is needed. Relationships with industry that are not financial in nature but valuable to the academic investigator's career—for example, deals involving access to industry-owned technology, use of databases or leadership of clinical trials—may not require disclosures in the current academic environment but probably should, as these are potentially significant sources of bias.

Fully disclosed and carefully managed research collaborations can be very valuable to academic medical centers, industry and the public. Eroding trust is not a necessary side effect: relationships should be disclosed not as scarlet letters but as medals of pride. Those capitalizing most on academic-industry collaborations are more likely to improve public health through new discoveries, a major accomplishment and the truest measure of success for the biomedical research enterprise.

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