

4. Conclusion

I believe strongly that industry continues to exert influence on the academic activities of private and full-time academic ophthalmologists, sometimes to the detriment of patient care. We owe our first loyalty to the welfare of our patients, not to our academic advancement or our national reputation. We in ophthalmology should go forward with industry to bring even better drugs and devices for our patients. The boundaries should be clear and the information transparent. Published articles should allow the reader to distinguish marketing from scientific reporting and to know who wrote what. Research, even when funded by industry, should be free of bias and all results reported.

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Strengthened ties between industry and academia are historical, productive, and crucial

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ARTICLE INFO

Article history:

Received 26 February 2013

Revised 28 June 2013

Accepted 9 July 2013

Available online 18 March 2014

Keywords:

conflict of interest
scientific collaboration
academia
industry
ethics

ABSTRACT

Scientific collaboration between academia and industry has a long history in the United States and abroad. Initially U.S. companies took responsibility for patenting and licensing discoveries made in collaborating universities. A publicly funded “middle man”, The Research Corporation, was the next paradigm and had the advantages of neutrality and centralization, but proved ultimately unworkable. More recently, universities have negotiated their own patenting and licensing activities. The ethical pitfalls of scientists and physicians dealing directly with industry stimulated much public discussion in the past decade, with a resultant backlash discouraging collaboration. I discuss this evolution, and recent developments with models of possible productive collaboration and rules of engagement.

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That industry and academia should collaborate if we are to maximize the potential of our great research institutions, our publicly and privately funded research granting mechanisms, our business sector, and our entrepreneurial society is not open to question. How to do so, however, has proved more

problematic. I focus here on the evolution of issues that have historically beset academic–industrial partnership in the United States and present some of the recent scholarship modeling productive collaborations.

The history of collaborative relationships between industry in the United States and its universities is a long one, with significant changes over the years. Beginning with the development of relationships around chemical engineering in the 1920s and 1930s, technical schools such as the Massachusetts Institute of Technology (MIT) began to interact with nonacademic entities. In the pre- and postwar period, new models for patenting and licensing emerged, with the academic centers ultimately developing research corporations—nonprofit entities created to manage the licensing activities. A crucial watershed was the enactment of the Bayh-Dole Act in 1980, which ushered in a new era in the university–industry collaboration.¹³

The original paradigm for industry–academic collaborations persists in some sectors. Mowery and Rosenberg¹³ illustrate this model with the example of the collaboration between MIT and Standard Oil of New Jersey, which they single out as a key contributor to the development of the discipline of chemical engineering in the United States before 1940, augmented by similar collaborations at the University of Wisconsin and the University of Illinois. Prominent professors, including Warren Lewis and Arthur D. Little at MIT, fostered the development of partnerships that included research as well as teaching, starting a school of chemical engineering, and pushing for personnel growth along parallel tracks both at the university and industry levels. Mowery and Rosenberg cite the “symbiotic relationship between Standard Oil of New Jersey and MIT faculty who worked to codify, advance, and disseminate the key tenets of the emergent discipline (of chemical engineering)”. Under the umbrella of this nascent discipline, the Standard Oil refinery in Baton Rouge, Louisiana, became in effect an external laboratory and field station for MIT students, many of whom eventually worked there. The culmination of the collaboration was the breakthrough that occurred with the development of fluidized bed catalysis in 1941, with the patent assigned entirely on the industry side to Standard Oil, a process and a result quite different from what we would see today. Key to this signal industrial and scientific advance was the personnel exchange, with MIT faculty consultants rotating in and out of Standard Oil, as well as job placement of graduates in the industry. The exchange was in both directions, because interaction allowed the operational side of the industrial equation, missing in academia, to be transferred back to the university where it could be refined, codified, and taught as a true academic discipline. The MIT campus naturally was not equipped with the large scale and type of industrial facilities available at the Standard Oil refinery. Industry benefited from the intellectual property rights assigned, and academics benefited from publishing many of the results of the research, as well as from consulting contracts for research support. Although this old model still exists, it has been largely supplanted by other approaches to patents and licensing.

In the postwar years, the academic–industrial relationship burgeoned, with significant modification and the founding of a public entity, The Research Corporation (TRC), founded in

1912 as a result of University of California Berkeley professor Frank Cottrell’s development of an antiprecipitant pollution technology for reducing particulate emissions.¹ Cottrell’s portfolio of patents was licensed by TRC to industry, and he used the proceeds to support scientific research, extending grants to other researchers as well, and building a quasi-philanthropic engine through his industrial work. TRC flourished initially with a focus on antipollution technology in the pre- and postwar years, building a reputation and expertise in patent development and licensing, with associated application and litigation management. In that era a number of academic inventors donated their patents, for example, the Williams-Waterman patent for vitamin B1, given to TRC in the 1930s to support other areas of scientific endeavor.¹

In 1937, MIT entered into an agreement with TRC that greatly expanded its patent and licensing activities. Karl Compton, then-president of MIT, saw an income-generating opportunity in the productive research of his faculty and negotiated an agreement for TRC to act as a third party to manage MIT’s patent portfolio. He was advised in this matter by famed industrial inventor and MIT professor Vannevar Bush, who took the position that MIT should not be directly responsible for the management of patents and licensing contracts because it would leave academics open to criticism by politicians or other competing industrial entities. His was one of the first enunciated ethical stances on the potential for industry–academic conflict of interest, although not in precisely the way it is viewed today. Under the agreement, TRC would obtain patents on MIT inventions and license the patents, as well as deal with patent infringements and intellectual property suits. This model expanded after World War II, as TRC negotiated similar agreements as a “middle man” for other American universities with technology portfolios, growing in number from 5 in 1946 to more than 280 by the 1980s.^{1,13}

Unfortunately, the cost savings anticipated to accrue from the centralized management of licensing and patenting services did not materialize. TRC became most effective in the biomedical area and effectively managed some of the early pharmaceutical patents, but its overall lack of expertise in other areas—notably for MIT in electronics—led to termination of the exclusive relationship in 1947. MIT moved to working with independent private firms specializing in patent law. Other universities, particularly ones geographically distant from TRC, increasingly required on-site presence of patent and licensing representatives, and the logistical issues as well as expense of time and travel that ensued caused a strain on finances and collegiality. Another contributor to the final breakdown of the experiment in public administration of a centralized system was conflict over TRC’s focus on income maximization, which many universities regarded as interfering with their relationships with industrial identities that supported research. An example of this was the aggressive litigation pursued by TRC against IBM for infringement on MIT’s patent on magnetic memory for computer technology. IBM was a major corporate supporter of MIT, and the university was so distressed with the lawsuit that it took back the patent from TRC and licensed the rights to magnetic memory independently to IBM. As Mowery and Rosenberg point out in their discussion of this incident, “This conflict between the goal of maximizing income and a broader set of institutional

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