

Teach Your Children Well

Mending Rifts between Academy and Industry

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Disease mechanisms are being reported by academic laboratories at the molecular and cellular level at a mind-boggling rate. Society regards these findings as solutions and expects healthcare products to follow in the near term. Nations around the globe have asked whether biotechnology can be an engine that drives economic growth.

Academics claim biomedical significance and innovation in their discoveries, but few actually see their responsibilities extending beyond the laboratory and publication. If treasure troves of biological and biomedical discoveries in academic institutions are to be vetted and developed as a driver of the economy, there needs to be a sea change in the academic culture.

Having advanced through the academic ranks as a leader in research after receiving a Ph.D. in cell and molecular biology in 1982, I found it difficult to start a biotech company in 2003. My training had ingrained in me the belief that academic science and an academic career were for elite critical thinkers. I supposed that going into industry, in the nicest terms, did not require investigative acuity.

Many faculty in academic institutes view starting a company as taking a “drop back” position after failing to secure funding, or they see it as turning to the “dark side,” or yielding to the desire for higher income po-

tential.

Herein lies a cultural rift that separates discovery (the description of nature as it exists) and invention (the creation of something new based on the discovery). On the discovery side of the divide, hypothesis-driven research requires a relentless preoccupation with money in the form of requests to the federal government and foundations for grants.

And yet this quest for research funding is not seen as capitalistic because federal funding indicates professional validation. Those who win federal funding are institutionally rewarded. Reduced funding, however, causes unparalleled hardships for academic labs, turns students and young scientist away from pursuing careers in biomedical sciences, and results in the loss of opportunities to explore innovative ideas.

It is remarkable that the aversion to entrepreneurship has persisted despite the marked decline in NIH funding. It is curious that testing and validating a discovery in a clinical setting is valued by universities as “translational research,” but vetting a discovery in a biotech setting and developing a lead compound for market is not.

Academic Incentives and Rewards

Truths are hard to extract from nature, and there is substantial personal reward in the perception that one has been fortunate

enough to have had the training and resources to make a discovery that is new, true, and important.

The coin of the academic realm is acceptance of one’s work in top-flight, peer-reviewed journals, the award of research funding, the prestige of invitations to speak at important scientific conferences, and the career advancement that comes with being recognized as leading researcher. Products developed, services launched, and patents filed are not as highly valued as grants received and papers published when academic institutions consider faculty for promotion and tenure.

Some of the most prestigious colleges and universities go so far as to forbid faculty from having any leadership roles in spinout companies, even those founded on their own discoveries. Contract research is not a significant motivator in the academic arena. It is not peer-reviewed, it can restrict the freedom to explore and publish, and it cannot be used to support the backbone of most academic labs—graduate student thesis research.

A high value is placed on sharing discoveries or methods at meetings with academic colleagues, and on publishing findings in peer-reviewed journals. These are considered sufficient contributions to society.

Intellectual Property

Additionally, there is an ideological rift that comes with discovery being the contribution to society: it must be free to everyone.

Many discoveries in academic institutes are not filed as invention disclosures or pat-

ent applications before public release of information at meetings or through the submission of a grant proposal for review. For some, patenting one's discoveries is tantamount to an admission of a financial interest, which is dismissed by academics as a less worthy motive for doing science because it biases and subverts the virtue of intellectual freedom to query the unknown.

The use of intellectual property (or material transfer agreements) is perceived by many academics in the biological sciences as an impediment to sharing or even as part of a tainted system. This point of view is ideologically opposed to the business mindset, which sees intellectual property as the key to maximizing the economic potential of biotechnology.

Many states have invested large sums of money with universities to access the academic talent pool and its intellectual property as fuel for the biotech economic engine. Several centers have been built and filled with advanced instrumentation, and leading research scientists have been appointed to oversee the "entrepreneurial" activities. The money and resources have yielded exciting discoveries but meager return in new products.

Product development lags because the resources for biotech are allocated through universities and doled out by committees of research scientists. These institutions are skewed to basic research because they adhere to an academic ideology whose main goal is discovery, not product development.

If the cultural and ideological rifts are

not understood and addressed, money and resources intended to fuel economic growth through biotechnology will be consumed in underwriting academic research in universities and used to recover institutional overhead costs following the collapse of federal resources.

Possible Solutions

The solution depends on how the next business development monies are invested as well as how we train the next generation of undergraduates, graduate students, and postdoctoral fellows in terms of the scientific culture, ideals, and responsibilities as scientists. Our approach needs to extend beyond the expedient use of universities as incubators for biotechnology and instead needs to identify footprints in the community that independently functioning biotech companies can occupy.

We need a national biotechnology policy that is implemented through national and statewide commissions charged specifically to nurture and fund the development of the biotechnology industry. These commissions should be advocates who ensure appropriate access to funding for all stages in development of biotechnology companies. Their goal should be to achieve the societal and economic objective of improving our health and quality of life by increasing the flow of new medicines to market.

This will require unbiased and informed review of proposals for funding by reviewers who are truly expert in the field and savvy about the biotech business development pro-

cess. They should establish and facilitate access to resources and space; network appropriate mentors; and cultivate industrial, venture capital, and government relationships.

Academics can bring important mentoring in critical thinking and technology training to the career development of biotech entrepreneurs. In this context, mentoring of the next generation of scientists with a flexible career perspective is extremely important for the growth and long-term success of the biotech economic engine.

If universities are going to participate in the biotech economic engine, they will have to adopt a flexible policy for incentives and rewards. Universities will have to find ways to recognize all faculty contributions to society, including those that take the form of goods and services.

The use of commissions will be essential to keep universities sufficiently at arm's length from the commercial objectives of biotech industry to permit academic institutions to retain their tax-exempt status. With appropriate oversight by the university and the biotech commissions, the changes I propose will encourage economic growth through biotechnology but will not subvert academic ideals and values. **GEN**

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