

nature biotechnology

Ownership at too high a price?

It's a story of greed, legal wrangling and political intrigue. A US Senator and government officials are implicated. There is an 'alleged' cover-up (but no 'grassy knoll' or 'landing strip for alien spaceships' as far as we can tell). For once, the story does not center on a secretive biotechnology corporation bent on world domination. It focuses instead on a center of learning, New York's Columbia University, which apparently is bent on dominating biotechnology research through patents issued in the early 1980s (see p. 955).

The patents in question are based on research carried out in the seventies at Columbia by three scientists led by biochemist Richard Axel. Supported by the US National Institutes of Health, Axel and his colleagues demonstrated a method for transforming a recipient cell by inserting a gene that encodes a desired protein and a gene that encodes a selectable marker, an approach that has since become integral to the production of most biopharmaceuticals. Over the past two decades, the three original patents have brought Columbia a whopping \$300 million in licensing royalties, most of which have come from the biotechnology industry. In 1999, these revenues accounted for nearly a fourth of the university's entire research budget. But in August 2000, all this was scheduled to come to an end: the Axel patents were expiring.

Not willing to relinquish the patents' riches, Columbia decided to take evasive action. Its legal representatives set about filing a new patent in 1995 (by happy fortune one day before changes in US patent law would make such an application impossible thereafter). And in early 2000, the university recruited US Senator (R-NH) Judd Gregg (a Columbia alumnus, no less) to provide legislative assistance on Capitol Hill. Gregg attempted to amend unrelated appropriations bills with a measure that would extend Columbia's Axel patents for an additional 15 months, potentially generating an additional \$100 million for the university. Legislators and industry representatives had other ideas, however, and the measure did not pass. In the end, it did not matter because in September 2002, the US Patent and Trademark Office (USPTO) issued a new patent to Columbia, extending the monopoly on the Axel technology all the way to 2019.

Not surprisingly, the biotechnology industry is not amused. Five companies have filed lawsuits in recent weeks accusing Columbia of illegally extending its patent coverage beyond the allowable term. The lawsuits claim Columbia did this by failing to disclose completely its earlier patents and deliberately 'misleading' the USPTO about their scope.

The Columbia case provides the latest evidence of the increasing appetite of universities for licensing revenue as a supplement for shrinking research budgets. According to the latest survey from the Association of University Technology Managers released in May, over the past ten years, \$200 billion in US public research funding gave rise to approximately 100,000 invention disclosures, which

ultimately resulted in ~50,000 patents and 25,000 licenses. North American universities, teaching hospitals and research institutes generated in all nearly \$1.1 billion in royalty fees from discoveries licensed to companies in fiscal year 2001 (ending on June 30). The top ten income-generating universities took in a total of nearly \$511 million, most of which came from a few blockbuster biotechnology patents. Significantly, Columbia led the pack in revenue generation at \$130 million. In comparison, the UK's University of Cambridge, which has one of the most active technology transfer offices in Europe, garnered only \$2.5 million for the fiscal year ending in July 2002.

There are several lessons to take home from all this. First of all, enforceable broad, blockbuster patents on technology in academia are few and far between. This is a good thing because patents with broad and speculative claims generally lead to disproportionately large rewards for holders and tend to obstruct and delay, rather than facilitate, progress in science and medicine. Patents are supposed to be for novel inventions of clear utility. If patents with broad claims proliferate, the already costly business of developing new medicines will end up even more expensive.

Second, although the courts can sort out what is and what isn't patentable, there are still too many 'bad' biotech patents being issued by patent offices. These need to be eliminated because the delay and expense of legal challenges hinders scientific progress. One way of accomplishing this would be to reinvest a greater proportion of the funds from patent fees in qualified expertise and resources for the patent offices themselves.

Third, universities appear to be increasingly adept in patenting their discoveries and licensing them out to spin-offs and startups. While this is positive for the biotechnology sector as a whole, incentives or guidelines need to be introduced to ensure the greater use of nonexclusive licenses and the disclosure of licensing terms. This should provide more transparency about how publicly funded research is being exploited commercially and also promote competition.

Lastly, it is difficult not to view the machinations of Columbia's legal advisers (on the basis of the evidence presented) as a cynical attempt to maintain a lucrative monopoly, no matter the cost. One has come to expect such tactics from the pharmaceutical industry—a particularly egregious example being AstraZeneca's attempt to extend its monopoly on blockbuster Prilosec by filing a patent describing how the drug could be sprinkled on *applesauce* for use by patients who have trouble swallowing pills. But somehow one expects more from an institution like Columbia.

Our patent system should reward enterprise and ingenuity, not opportunism. Rather than enhancing biotechnology's ability to produce more medicines, more tools and more products, Columbia's actions simply provide more work for lawyers and more litigation. 