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Biotech

KEEP YOUR GENES ON

GENE PATENTING will have dangerous repercussions for the biotech century, warns the economist Jeremy Rifkin. BY BLAISE ZEREGA

THE SUBJECT of patents is the most controversial area of human genomics—more so than even human cloning. Patents on what will become the most valuable genes will generate unforeseen riches for the patents' owners. Imagine the value of a gene that prevents breast cancer.

Since 1980, when the U.S. Patent and Trademark Office accepted an application from General Electric for a genetically engineered microörganism that eats oil spills, biotech companies have embarked on a landgrab to patent as many potentially useful genes from as many species as possible. As soon as a gene candidate is validated, companies file patents to protect their discoveries. Last year for instance, the partnership of Chiron and Hyseq resulted in patents filed on 2,200 gene targets for cancer treatment. Because of the secrecy surrounding patent filings, it is difficult to determine how many patents for the 100,000 or so genes that constitute a human being have been filed. Many experts predict that by 2005, patent rights to every human gene will have been assigned.

Opponents of genetic patents argue that it is wrong for a company to patent elements of nature, like genes, and that in a postgenomic marketplace, big pharma, armed with a wealth of patents, will have inordinate power over genetic research and the availability of genetic treatments. Advocates counter that drug research is so expensive and failure prone that, without its potential to be financially lucrative, no company would do it.

The *Red Herring* recently asked the economist and social activist Jeremy Rifkin, a critic of gene patents, to defend his position. Mr. Rifkin is the author of *The Biotech Century: Harnessing the Gene and Remaking the World* (reviewed in July's Print, page 138) and 13 other books, notably *The End of Work*, a critical look at technology displacement, corporate downsizing, and the future of jobs. He is also a fellow at the Wharton School of Finance and Commerce Executive Education Program and the president of the Foundation on Economic Trends in Washington, D.C.

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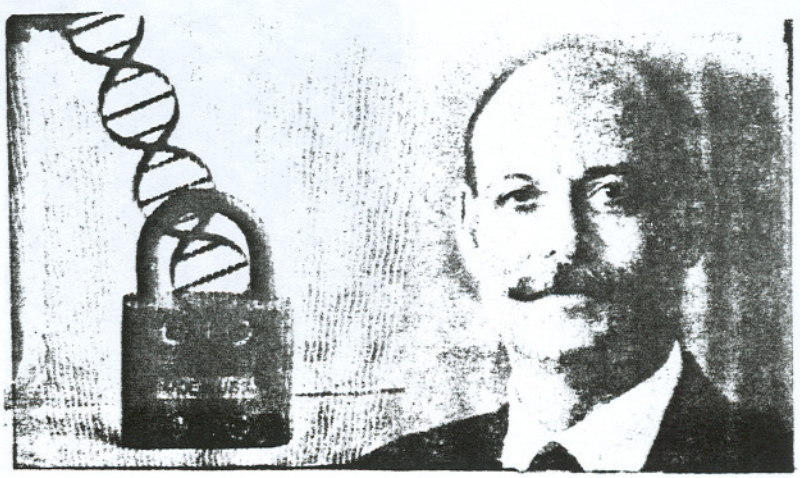
Why should the average person care about biotechnology and genomics?

It's where the global economy is headed in the 21st century. We're making a shift from fossil fuels and minerals, which were the raw resources of the industrial revolution, to genes, which are the raw resource of the biotech century. When I say genes, I mean genes for everything—not just food and medicine. The biotech industry is looking at genes as new sources of energy for building and construction materials, for fiber, energy, plastics. Bioinformatics and genomics are the bridge fields. They bring together computers and genes into a single technological and economic force. We're seeing strategic alliances and partnerships between software or information-related companies and life sciences companies. Eventually, those strategic alliances will fuse into single companies.

As this fusion occurs between computers and genetic information, will these new companies form a medical-industrial complex?

That is already beginning to happen. The mergers and consolidations going on in the life sciences industry



GENERAL PATENT: Jeremy Rifkin fights to keep genes free.

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rival and exceed those in the telecommunications, entertainment, and software industries. You have basically the beginning of a new structure, where a handful of life sciences companies are attempting to gain control over every aspect of biology through the human genome.

Fueling the industry's growth, in part, are partnerships that lead to the patenting of gene sequences. Why are you opposed to patenting genes?

Because whoever controls the genes controls the next century. Genes are the raw resources for everything important to commercial life in the coming century, just as fossil fuels were to the last 200 years. And the name of the game is patents. All the major life sciences companies—either on their own or through licenses with biotech startups and universities—are scouring the planet looking for rare genes that may have some commercial value that they can patent.

Why do you see these efforts as contradicting the patent code?

The statutes are very clear and have been from the time Jefferson conceived them; they were not meant to provide an advantage to companies, but to protect inventors so that they could recoup their R&D costs. They were granted as a privilege by the public. In other words, we allow these companies to patent certain products because that benefits the general welfare of the people. In this case, if we're going to allow these companies to patent discoveries in nature, then we have to change the patent laws. There has to be discussion in Congress.

I'm not opposed to patenting the *processes* used to find particular genes, but I do believe that, under the existing statute, it is illegal to patent the genes that constitute the genome, tissues, and organs. Process patents are more than sufficient to be competitive in the marketplace. Companies have a right to patent their inventions, but they have no right to claim the actual blueprint of

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life. The idea that if you isolate the gene that causes breast cancer, you can claim it as an "invention" simply because you've purified it and said what it does, is ridiculous.

You're saying that gene patents are actually illegal?

The statutory code says you cannot patent discoveries in nature. If you brought ten Washington patent lawyers down to the Mayflower Hotel and got them stinking drunk, they'd all admit that this is an emperor-has-no-clothes situation. But no one has an interest in exposing it, because everyone is making money on it.

And such patenting continues.

Yes. Within the next eight years, thanks to the Human Genome Project, we will have mapped virtually all the genes that make up human life. And virtually every one of the genes will become the intellectual property of a life sciences company, either directly or under a licensing agreement. This means that these companies will actually own, at least for a period of some years, the blueprint for human evolution: every single gene, cell, and chromosome.

How will their ownership affect the marketplace?

We have no precedent for this power, over the basic biology of life, in the marketplace.

What do you think about the argument that if companies are not allowed to patent genes, then genomics will not be a lucrative opportunity, it will not be pursued, and society will be denied genomics-based drugs? [David R. Henderson outlines this argument for gene patents in Economics, page 138.]

I totally disagree with that. There are so many examples of products on the market that did not have patent protection. What did we do all these years before patents? All the industries that make up the life sciences complex have made quite a bit of money in the marketplace without having to patent genes and chromosomes.

So how should genetic research be handled?

The gene pool should remain open. It is the common, shared legacy of evolution. It belongs to all human beings across political or corporate boundaries. It is also the shared legacy we have with the other creatures with whom we sojourn on this planet.

Are there any precedents for this kind of approach to scientific research and discovery?

The ideal model for this is the Antarctica arrangement. The last continent of the world was left open by international agreement as a "common," meaning that it cannot be reduced to political territory or commercial property. It has to remain open as a shared common, so that it can be scientifically explored.

What then is the ultimate role of patents and commerce in genomics?

There's a much bigger issue than just the short-term whims and caprices of the marketplace that wants to make as much profit as possible. I have no problem with profit. The marketplace has a function, but I don't think that the corporations that make up the marketplace ought to have final control over the genetic blueprint of the human race for their short-term benefit.

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