nature biotechnology

Sitting up and taking notice

The sheer pace of discovery in genetics is placing companies that pursue an aggressive infringement strategy for gene patents increasingly at odds with innovation.

On March 29, the sound of sabres rattling loudly emanated from a local court in the Southern District of New York. In a case that involved the *BRCA1* and *BRCA2* genetic tests for familial breast and ovarian cancer developed by Myriad Genetics, Judge Robert W. Sweet handed down a summary judgement that, if supported by higher courts, would not only invalidate Myriad's composition of matter and method claims but could also undermine many patents on isolated genes.

The plaintiffs in the case won on virtually every count. And the fact that they did so at summary judgement—a stage that usually acts only as rehearsal of the arguments that will be made in court before a jury—means that the judge felt that Myriad had no case to argue.

Despite the clarity of the ruling, any declaration that gene patents are dead is premature. This decision is but the first salvo in what will be many exchanges between proponents and opponents of gene patents in the US courts. Most legal commentators believe that Myriad will appeal the case to the US Federal Circuit court, and most believe that the court will overturn the bulk of Judge Sweet's rulings.

That is not to say that the biotech sector should be unconcerned about, or dismissive of, the views being expressed by Judge Sweet and the plaintiffs. Indeed, there are many reasons why gene diagnostic businesses should sit up and take notice. The gene patent controversy is not going away; in fact, it is more likely to intensify.

Unrest about gene patents is spreading. In the Myriad case, physicians, patients, clinical geneticists and citizens' groups all came together to challenge the biotech company—an indication not only of dissatisfaction about Myriad's overzealous pursuit of intellectual property (IP) rights but also of more broad distaste about the way gene inventions have been, and are being, exploited.

The Myriad plaintiffs were joined by the International Center for Technology Assessment, Greenpeace, the Indigenous Peoples' Council on Biocolonialism and the Council for Responsible Genetics. These 'friends of the court' argued that gene patents have negative consequences, such as the privatization of genetic heritage, the creation of private rights of unknown scope and consequences and the violation of patients' rights. The alignment of physicians' and patients' groups with what are, in effect, antibiotech lobbyists is a worrying development.

Broader concerns about gene patents, exclusive licensing and aggressive IP infringement strategies are finding an echo within research. It often seems unfair that the patent system rewards only the last inventive step—the small breakthrough that enables a concept to be realized. The research enterprise, which continually renews itself, especially in rapidly moving areas like genetics, is increasingly at odds with the commercial conservatism of patent monopolies based on gene findings that are obsolescent compared with current art. Despite both cultural and economic incentives for innovation, the difficulty in dislodging incumbent approaches is reinforced by a patent system that insists that any use, however small, of a protected method is infringement. Is it so outrageous to expect that a properly functioning IP system could provide an unobstructed path to the market both for the initial innovators and for subsequent improvers? Surely, a different balance of rights is possible that better serves the society with whom the patent bargain has been struck.

In this regard, Myriad's influence has been particularly pernicious. Its lawyers have issued cease-and-desist letters to genetics laboratories in universities, hospitals and clinics that offered diagnostic services based on the *BRCA1* and *BRCA2* genes. Its monopoly thus enforced, Myriad continues to charge around $3,000 per patient for the tests, a price that is difficult to afford and which richly offsets operational costs: Myriad's fiscal 2009 results show $326 million in revenue from molecular diagnostic testing against $43 million in costs. The technical discomfort with Myriad—and perhaps the popular objections, too—reflect not specific malice directed at one company but a more general sense of disconnectedness between invention on the one hand and the availability of improved gene test products.

The more important general point is the perceived impasse between patents that make claims on the use of individual DNA sequences and new diagnostics that look at many different sequences simultaneously. In the United States, the Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS) has addressed this problem in a report *Gene Patents and Licensing Practices and Their Impact on Patient Access to Genetic Tests.* The report, which is currently being finalized, concludes that patented sequences would be infringed by not only microarray and microbead methods using equivalent probes, but also whole genome sequencing methods. As a solution, the SACGHS report proposes that the pooling of patents or clearinghouses for royalty collection might serve as machetes to allow innovative companies to hack a way through the patent thickets.

Patent pooling and clearinghouse mechanisms are probably not going to emerge in biotech of their own accord. History tells us that, with one exception—the patent pool for Golden Rice—the life sciences have got through thus far without them. It will therefore probably take some form of government or legal coercion to get things moving for gene tests.

As we move from single-gene tests to multiple-gene signature testing and whole genome sequencing, it might also be possible to assign rights according to the importance of any specific gene sequence in the utility of the test. Such a principle, instead of rewarding companies that managed to surround the early gene mutant discoveries (which now look rather trivial) with an impenetrable wall of IP, would incentivize those who continue to develop tests of high medical value with commensurate financial remuneration. That this ideal is implausible within the current petrified patent system and commercial infrastructure doesn't have to stop the dream, and certainly shouldn't stop the discussion.