

Biotechnology can do without patents and adhere to open source ideas

Susana Dias, Comciencia (Brasil), 10 August 2004

Biotechnology, particularly in area of agriculture and pharmaceuticals, faces a great quandary today. Two of its main pillars threaten to fall in: secrecy and protection, which until recently were considered essential to generate innovation and economic yield. Researchers warn that instead of promoting innovation, the current intellectual property system has manacled scientific knowledge production and generated impractical costs. Determined to give a new push to biological research and development, scientists of diverse countries, including the United States, South Africa and Australia, are considering the proximity between biotechnology and open source code, a concept created in the 80's in the free software world.

The term *open source* appears in the context of free software as a way to show investors that the term "free" should mean "freely usable", not "cost-free/profit-free". Although it maintains the freedoms postulated by Richard Stallman in 1984 - freedom for users to use, copy, distribute and modify software as desired - open source code projects are clearly turned toward the business world. The ideological differences between what is associated with "freeware" as a group and the open source code movement are described in the film "Revolution OS" (<http://www.comciencia.br/200406/resenhas/resenha1.htm> has a summary of this film).

Proposals of *open source biotechnology* have in common the objective to share the research with a wide community of scientists, and, for this, they sign agreements that trade patents for permanent access to the tools of research and databases. Meaningful benefits include possibly diminished costs, greater research freedom, greater quality in the developed innovations and increased speed of making new products available to final consumers.

Despite the proposals' promise of knowledge and technology democratization, many doubts still hover: Will the principles of open source really be applied to biotechnology, or will this analogy not fit the majority of cases? Will the benefits of open sourcing, for example, be extended to the final consumer, or restricted in scope to research only? As the biotechnology field is marked for its narrow science-to-market relationships, will it be possible for a viable biotechnology business to function with open source principles?

Open source pharmaceuticals

One of the most recent open source biotechnology projects was presented at the International Conference of Biotechnology in San Francisco by Stephen M. Maurer of the University of California Goldman School of Public Policy, Arti Rai of Duke University Law School, and Andrej Sali of the University of California Department of Biopharmaceutical Sciences and Pharmaceutical Chemistry. The researchers had considered the *Tropical Disease Initiative (TDI)*, which plans to use the principles of open source for the production of pharmaceuticals directed to the treatment of tropical illnesses such as malaria, cholera, dengue fever and trypanosomiasis, which affect more than half a million people worldwide. Read more in the article [Finding Cures for Tropical Diseases: Is Open Source An Answer?](#) published in June 2004.

According to the proposal, scientists from universities, laboratories and corporations could work together in initial stages of research, sharing information and results in a website. Each page of the site would focus on different stages of the process, such as new drug target identification and chemical products that affect the targets. The participants would register in a database sharing each new discovery, which could be analyzed in discussion groups or website conferences. All the information and research tools would be freely available to all participants.

According to the researchers, many benefits could be attained with this proposal. It will be possible to diminish costs and speed up the process of research, development and manufacture of drugs. Moreover, as open source discoveries will not be patented, contracts for drug development will be offered to companies that can offer the lowest costs. Assuming competition between generic manufacturers, Maurer, Rai and Sali expect that the prices offered to end consumers will be close to the costs of production.

In this way, researchers will be enabled to dedicate themselves to research of a type that, in general, does not interest the big laboratories and pharmaceutical industry, in order to reach populations of poor countries that cannot bend to the high costs of drug production. "This will be an excellent chance for the scientific community to escape the logic of the State, for example, to work on weapons, and the profit logic that has guided much of the research in biotechnology" analyzes Pablo Robert Gibaldi Vaz,

professor and researcher at the Federal University of Rio De Janeiro.

Patents become manacles shackling research

Open source biotechnology appears as a response to the dissatisfaction of researchers with the limits placed on innovation today from the combination of restriction and secrecy. "The increasing pressures of market fundamentalism (economic rationalism, for some) are transforming public institutions into simple arms of financial capital, prejudicing their ability to represent the needs of our society (or the needs of our society), which is rather problematic", suggests molecular geneticist Richard Jefferson in an interview with *ComCiência*.

Jefferson is the creator and managing director of the Center for Application of Molecular Biology in International Agriculture ([CAMBIA](#)) in Canberra, Australia and coordinator of Biological Innovation for an Open Society ([BIOS](#)). The objective of BIOS, by means of open source projects, is to help to liberate crop producers and biotechnology companies from their extreme dependence on the monopolies practiced by agribusiness giants.

The approach of biotechnology toward open source is intended to abolish, or at least reduce, problems of access to scientific knowledge and research tools associated with the proliferation of intellectual property rights and high transaction costs. For Janet Hope of the School of Social Sciences of Australian National University, even though the question of access can stimulate researchers to open up patents, the possibility that open source projects can generate profit is more central. This is because the life sciences have intense ties to the market, mobilizing great expectations of economic return on high investments in research.

Hope seems intrigued by researchers having been stimulated, voluntarily, to dislocate from the intellectual property environment in favor of the less restrictive, more collaborative open source world. Although social aspects of some projects justify the adoption of open source, Hope identified in interviews she has already carried out that the question of many scientists: "how to associate the attainment of profit in biotechnology research with the culture of sharing openly?" For a researcher, if the application of open source to biotechnology will not bring economic return, it will never be more than an analogy.

It's already possible to verify the researcher's suspicions in some projects that consider sacrificing patents only in the research phase, while participants are allowed to patent discoveries. In this case, the biggest benefits will be restricted to the scientific community and the biotechnology industry, not reaching end consumers. But Janet Hope maintains what she calls "hopeful skepticism" that open sourcing can generate profit, as is the case with software (such as Linux). This not only would remove the economic argument of defenders of the patent system, but would swing the pendulum toward application of the idea in the realm of biotechnology R&D. Read more on Janet Hope's research project at <http://rsss.anu.edu.au/~janeth/home.html>

Robin Feldman of the University of California explains in his article [The Open Source Biotechnology Movement: Is it Patent Misuse?](#) that, even if it were true that open sourcing reduces economic rewards, it can considerably increase non-economic rewards, promoting, for example, an increase in innovation and the speed with that innovations will be available for public benefit. For Feldman, "this only happens because open source explores resources that cannot be reached with the patents system".

The creators of "open source code" in the software context affirm that the future will be to those that know how to develop open projects that can count on the collaboration of hundreds, thousands of people for improvements. Read more in the book *The Cathedral and the Bazaar* by Eric S. Raymond, available at <http://www.catb.org/Esr/writings/cathedral-bazaar/>.

Guaranteeing that the innovations remain free

One of the central questions for some scientists involved in open source biotechnology projects is about the creation of strategies to guarantee that the technologies and innovations remain available. The open source code software movement utilizes the "copyleft" to guarantee that the users be able to freely study, copy, modify and distribute the software. In the case of biotechnology projects, it is not always possible to use the notion of copyleft. Biotechnology projects centered in bioinformatics, which

use software to generate and analyze facts, can follow the rows plowed by the open source code software movement. Such software is created and improved in a diverse and cooperative process and in diverse programming languages, for example BioPerl, BioJava and Biophyton, freely available in the environment of open source code. The South African company Eletric Genetics Corporation developed a business model named "biotechnology of open source software ". The company provided its bioinformatics software under a free license and passes the costs of supplying services on to the users.

However, for research outside the scope of software, the use of the copyleft is not possible, because the projects are not subject to copyrights but to patent rights. Patent law defines that a modification of existing technology could result in a new patent. In answer to that problem, open source biotechnology has demanded of its participants signed agreements in which all agree to maintain improvements in the technology as open as the original technology.

Richard Jefferson explains that, in BIOS, it is envisioned that the agreements will be developed to permit sharing improvements in the licensed technology; sharing information related to biosecurity and regulation; and all joining in the collective defense of the common protected intellectual property. In exchange, each of the participants in the agreement receives a royalty-free worldwide valid license. With this, there would be no imposition of restraints or need for royalty valuation of the products developed, but what would be formed is a strong and well-tested platform on which to develop these products.

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