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(02/14/05)—Open source systems in biotechnology will empower small and medium-size businesses and researchers in poor communities who have been excluded from innovation by a web of patents, according to an executive of the Center for the Application of Molecular Biology to International Agriculture (CAMBIA). The organization is promoting an open-source model for biotechnology research.

The thickets of cross-licensing of biotechnology patents are so complicated that virtually no small and medium-size enterprises exist anymore in the industry, said Richard Jefferson, CAMBIA's founder and chief executive officer (CEO).

CAMBIA, an independent, nonprofit institute based in Canberra, Australia, has set up BIOS (Biological Innovation for Open Society), which aims to extend the concepts of open source to biotechnology and other forms of innovation in biology. Last week CAMBIA introduced under an open source license biotechnology tool kits that it developed. The technologies include TransBacter, a new method for transferring genes to plants, developed as an alternative to Agrobacterium-mediated transformation, and GUSPlus, a new reporter gene for use in molecular biology.

BIOS aims to replicate in biotechnology the success of open source in information technology, and derive similar benefits, according to Jefferson, who is also the CEO and founder of BIOS. After establishing the open source model in information technology and powerful open source tools became available, small and medium enterprises could develop application-level or service-level business plans, Jefferson said.

"The same concept needs to happen in biotechnology, and we are trying to push it from the very cutting-edge of it, meaning that we need to build a tool kit that is so robust that a small or medium enterprise with a modest capital outlay can start dealing with small margins," Jefferson added.

BIOS also launched last week BioForge (www.bioforge.net), an online collaborative research platform for biological innovation, developed with CollabNet Inc., a Brisbane, California, based provider of on demand, distributed software development environments.

BIOS and CollabNet believe that the worldwide biotechnology community will adopt the same grass-roots, bottoms-up approach to innovation and invention characterized by the open source community. The companies feel that the tools that facilitate collaborative software development can be adapted to solve similar problems that the biotechnology community faces, according to Brian Behlendorf, founder and chief technology officer of CollabNet and a founder of the Apache Software Foundation. These problems involve content organization, workflow management and

effective and archived communication within and between finely granular communities, Behlendorf said.

The new tools such as TransBacter and GUSPlus are provided under the CAMBIA BIOS License. The license stipulates that licensees must share any improvements they make, even patented improvements, to the licensor and other BIOS licensees who are contributors to the technology. The licensees can in turn use the same information to develop different products.

Although the licenses are royalty free, BIOS is trying to persuade private sector companies to pay fees. The fees are graduated in proportion to a company's resources, and allow technical advice and participation in the decision making of the community, which is otherwise free for public sector and individual participants, Jefferson said.

With the open source process, biotechnology entrepreneurs can address markets that larger biotechnology companies did not find lucrative enough to pursue, according to Jefferson. Small markets can only be serviced if the risk is modest and the outlay is modest, Jefferson said. This means that the cost of innovation has to be decreased and entrepreneurs have to increase the relevance of the innovation to the local community, and the complex ecology of each locality, he said.

"One of the powers of community is allowing in a sense nodes within the community to adapt to local requirements, and that is one of the beauties of the open source metaphor," Jefferson said. In parts of Andhra Pradesh in India, for example, where it is desperately dry and the soil quality is poor, only the people who live there — local entrepreneurs and local state agencies — will try to adapt crops for the local conditions, he added.

In an open source model of biotechnology it may however take longer to build the kind of spontaneous contributions that are seen with open source software, according to Behlendorf. "One key difference will be that, currently, applying biotech ideas to some outcome requires a lab of sophisticated equipment, and most likely some funding towards an outcome, whereas with software development, it is easy to turn source code into running software on a production network," Behlendorf added.

CAMBIA has also made available to BioForge its Patent Lens patent informatics and analysis resource, which includes a free, full-text searchable patent database, with over 1.6 million patents in the life sciences.

Two large multinational biotechnology companies are already talking to BIOS at an advanced level about licensing the CAMBIA technologies with an open source model of license, Jefferson said.

Like IBM Corp. in Armonk, New York, which embraced open source software, biotechnology companies too have to realize that the smart money is in the application of technology, in tight integration with user communities, rather than in patent-based exclusionary tactics, Jefferson said.

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