



# UIC Technology Corner

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## Biodiversity

### Exploring New Models for Technology Transfer with Developing Countries

It has been reported that 25 percent of the world's pharmaceutical products have their origins from plant materials. According to Doel Soejarto, Professor of Pharmacognosy at UIC's College of Pharmacy, flowering plants are a major source for modern drugs, yet only 50,000 of the 250,000 known plant species - most of which exist in the world's tropical forests - have been analyzed and tested for their medicinal properties. Because the high biodiversity typically found in developing countries provides an enormous variety of chemical compounds that could be potential sources of new drugs, UIC has several initiatives underway to overcome obstacles confronting research collaborations between UIC and academic institutions in developing countries.

#### Background

Doel Soejarto, Professor of Pharmacognosy at UIC's College of Pharmacy, sees

enhanced benefit sharing between UIC and the developing country as a mechanism linking biodiversity conservation with tangible economic development for the countries. He and other College faculty and graduate students lead several research expeditions a year to developing countries such as Laos, Vietnam, Uganda, Kenya, Congo, Madagascar, Guatemala, Costa Rica, Papua New Guinea, and the Philippines to search for plants that could potentially lead to the development of drugs to treat cancer, AIDS, tuberculosis, malaria, and other diseases.

"North America and Europe are rich in biotechnology but poor in biodiversity," Soejarto says. "The opposite is true in many developing nations. These countries own most of the world's biodiversity, but they lack the resources to conduct research as we do."

#### Web Resources

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[Chicago Technology Park](#)

[The Illinois Coalition](#)

[Illinois Medical District](#)

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## New Policies for Enhanced Benefit Sharing

One initiative aimed at enhanced benefit sharing is being developed by Daniel Marselle, Director of Pharmacy Intellectual Property, Office of Technology Management (OTM) and Jill Sorensen, Director of OTM. Their efforts in this area have been focused on creating a flexible policy to provide enhanced benefits to the country that is the source of the plant material. They worked closely on this initiative with UIC's College of Pharmacy, through Doel Soejarto and Charlotte Gyllenhaal, and the Office of International Affairs, through Dr. Allan Lerner. OTM invests its time to research and assess the market potential of plant-derived, novel drug candidates, and if there is commercial value, OTM takes on the risks associated with patenting, marketing, and licensing of these drugs. Subsequently, and regardless of its inventive contribution as defined by U.S. patent law, the source country will receive at least 51 percent of the net revenue stream from royalties generated by commercialization of drugs developed from its native plants, after all direct costs such as patent expenses are repaid.

Sorensen says, "The ultimate goals of this enhanced benefit sharing policy are to build research, education, bio-conservation, and sustainable economic development resources in countries that have critical need for them. Intellectual property is a useful tool for promoting these goals and, in proper partnership with developing countries, we can help them build their own economic resources. The mounting crises in world health

and nutrition calls for the United States to use its research resources and expertise wisely. This initiative is about contributing those resources aggressively, at least until the economies of the developing country partners are in more competitive positions to sustain themselves better economically"

Marselle says, "UIC realizes that without the source country, there is limited potential for research discoveries, which greatly diminishes UIC's ability to generate intellectual property (IP). Likewise, without OTM's investment in patents, marketing, and licensing, the revenue potential that can be harnessed from the IP embodied in these discoveries is significantly diminished. What our proposed policy represents is a partnership, in the truest sense of the word, between the source country, its collaborating academic institution, the UIC College of Pharmacy, and OTM."

He further explains that UIC recognizes that genetic material contributed by source country partners belongs to the country where the plant was found.

"We have an obligation to that country to share the economic benefits with them. UIC's enhanced benefit-sharing policy is a tangible solution to the dilemma of how to honor our commitment. In the context of the over-arching goals, OTM's investment in patents, marketing and licensing helps to create revenue to build local economies in these developing countries."

## New Models for Intellectual Property Management

Faculty within the College of Pharmacy, staff within OTM, along with the UIC Office of International Affairs (OIA) have envisioned two approaches (not mutually exclusive) that the University might take towards further refining its benefit-sharing policy in its international drug discovery collaborations. Specifically, these include establishing a Global Biodiversity Fund (GBF) and an Institute for International Partnership (IIP). The UIC College of Pharmacy, Office of the Vice Chancellor for Research and the ICBG Program of the Fogarty International Center, NIH, and co-funding agencies from NIH and NSF, are co-funding a \$42,700 study to understand the potential of these two approaches.

## Global Biodiversity Fund

If significant revenue (in the form of royalties, milestone payments, and genetic access fees) results from sales of a drug derived from a plant initially obtained from a developing country, the Global Biodiversity Fund (whether a trust, a non-profit foundation, or other type of legal framework) would manage the funds received and then disburse these funds to source countries. It might also operate in a larger context with the following objectives:

- Supporting international collaborations leading to the creation of intellectual properties with significant economic potential
- Recognizing the contribution of collaborators in source countries through shared results, shared authorship, and shared revenues
- Encouraging the development of

- programs on biodiversity inventory and conservation, collection, and related research skills in source countries
- ❑ Promoting awareness among local communities of the importance of environmental protection and conservation of biodiverse areas
- ❑ Encouraging economic development activities as part and as an outcome of the process of sharing of financial benefits of drug discovery
- ❑ Identifying agencies that could potentially fund international counterparts
- ❑ Training counterparts in preparing applications for additional funding.

Important activities envisioned for the GBF include the acquisition of further financial support to enable new projects sponsored by the GBF itself.

### Institute for International Partnership

The Institute for International Partnership is envisioned as a vehicle for building greater institutional capability in the source country to identify, screen, develop and bring to market adequately researched drugs and phytomedicines. The Institute might bring assistance to the partner academic institutions in the following areas:

- ❑ Governance
- ❑ Board formation and development
- ❑ Policy dialogue
- ❑ Internal operations
- ❑ Intellectual property

- ❑ Establishing or encouraging other international collaborations
- ❑ Regulatory development and adherence
- ❑ Funds management

### Support from UIC to Developing Countries

There is tangible evidence that UIC is honoring its commitment toward enhanced benefit sharing. In a recent instance, a voluntary contribution of \$180,000 came to UIC from GlaxoSmithKline (GSK), a research-based pharmaceutical company based in the UK as a result of GSK's early exit from an International Cooperative Biodiversity Groups program funded by the Fogarty International Center (NIH) and Co-funding agencies from NIH and NSF. The UIC based ICBG program is a collaborative research agreement between UIC, Vietnam, and Laos. Vietnam and Laos are countries where the College of Pharmacy researchers collect plants, inventory tropical forest plant diversity, and document medicinal plant use by tribal groups. UIC waived any rights to its \$60,000 share of this contribution. Laos and Vietnam will now share equally and are in the process of setting up separate Foundations to receive \$90,000 each. The Foundations' goals are aimed at supporting the biodiversity of plant materials in their respective countries.

Technology transfer policies with developing countries will continue to evolve. While UIC has developed several initiatives to address these challenges, new programs and policies will be necessary to enable University Faculty to conduct research in these countries.

Flexibility is the key to overcoming the challenges. The rewards for this effort are enhanced knowledge, education, bio-conservation, and sustainable economic development, which provide benefits to UIC, its collaborating institution, the country in critical need, its indigenous people, and society at large.



### UIC in the News



**i-street Reporter's** December 6th edition featured an article describing a new model of corporate relations with Universities. **Reprinted with permission from I-street.** Excerpt Below.

"Baxter International, the Deerfield-based healthcare company, announced in October that entrepreneurs could expect them to become much more visible in the local biotech scene. As part of that promise, Baxter has been quietly working with an especially promising startup at the University of Illinois at Chicago called MedLipids that may set the stage for a new model of corporate collaboration with universities.

Based on research from Drs. Hayat Onyuksel and Israel

Rubenstein at the University of Illinois at Chicago (UIC), MedLipids is a startup that develops small molecule drug delivery systems.

"The Baxter-UIC technology alliance is a new initiative designed to help us make choices about technology commercialization by getting an industry read that is relevant [about market potential for a product]," explained Jill Tarzian Sorensen, assistant vice chancellor and director of the Office of Technology Management at the UIC.

Joe Barrett, senior counsel for Baxter, said they are very enthusiastic about their collaborative partnership with UIC. "We structured it as a win-win situation. MedLipids is a very early stage company that we want to help progress to the point where it can attract outside funding. We have an option [to license] one small part of their technology but that leaves a lot on the table to attract [venture capital] funding."

Baxter is not a financial investor in MedLipids, which makes the program even more radical and very progressive.

In these times of lean corporate budgets and the urgency of introducing new, quality products on the market, partnering with startups at universities makes good economic sense"

Please link to [i-street reporter](#) to read the article in its entirety.



## UIC Chemists Identify Compound That Inhibits Cell Migration

By Paul Francuch

A high-throughput assay developed by University of Illinois at Chicago chemists has led to discovery of a small organic compound that shows the unusual ability to inhibit cell migration. The new compound, identified as UIC-1005, may play a role in developing new kinds of cancer drugs.

The findings are published in the November issue of the journal ChemBioChem.

"We've been looking for chemical compounds that slow the process of cell migration," said Gabriel Fenteany, assistant professor of chemistry and the study's principal author. "The process is poorly understood and has a lot of therapeutic potential."

Fenteany is also part of the UIC Cancer Center.

Fenteany and his co-workers grow skin-like epithelial cell sheets on tissue culture plates with many small depressions, or wells, each of which contains a culture of cells and a different chemical compound, providing the basis for the assay.

"We grow these cells and make little scratches in the resulting sheet of cells," Fenteany said. "A little gap forms, and cells move in to close that gap, similar to part of the wound healing process when you cut yourself.

"The process is also related to how a cancer cell will start to move to form a metastasis, and to how a tumor will recruit new blood vessels, which helps it

grow," Fenteany said. "The phenomenon of cell shape change and movement is universal, even though details differ on how these cells move in different situations."

The assay developed by the UIC chemists makes the process to find molecules that inhibit cell movement quick and easy.

"We can easily screen a thousand compounds a day, or more," Fenteany said, adding, "We're one of the few labs doing these sorts of screens. Therefore, there's not really a good sense of what sorts of compounds will inhibit the process. That's what we're looking at."

Fenteany and his colleagues began their search using the high-throughput assay in December 2000 and discovered UIC-1005 a few months later. The new compound is from a class of molecules called oxazolidinones, which in recent years have been used successfully to develop new antibiotics that kill bacteria now resistant to older drugs. UIC-1005, however, shows no antibacterial properties and acts differently.

Fenteany hopes other labs adopt this high-throughput assay to hasten the discovery of additional molecules that inhibit cell migration. That search continues at UIC, along with work to modify the compound UIC-1005.

"Once you find the active structure, you can modify that structure to improve its activity, find out what it binds in the cell, and how," Fenteany said. "We're working to find the protein it binds, and we have a candidate. Since the small molecule targets the protein and inhibits the process of cell movement, the protein becomes a potential target for drug development to

block the pathway during disease."

Fenteany predicts drugs that inhibit cell migration may prove effective in combination therapies against cancer.

"A person who has had a tumor removed through surgery still faces the problem that some cancer cells escaped. By taking a cocktail of drugs, including anti-migratory compounds like UIC-1005 and other compounds we've yet to discover, the cancer could be more effectively contained. So even if not every cancer cell was removed by surgery or controlled in traditional chemotherapy, you've limited the ability of cells to move and spread and start new tumors."

Other authors are Arun Ghosh, professor of chemistry, and researchers Kevin McHenry and Sudha Ankala, all of UIC.

Funding for this research was by grants from UIC and the National Cancer Institute. Ongoing research is supported by a new grant from the American Cancer Society.



## Technology Events

### Save the Date

The Office of Technology Management of the University of Illinois at Chicago would like to extend an invitation to you to attend **TechDay2003**.

This year's free symposium will be held on Thursday, February 20, 2003 at the **Chicago Circle Center (CCC)**, 710 S. Halsted Street, Chicago, IL. The Inventor of the Year Celebration and Networking event will follow. The symposium is scheduled to begin at 1:30PM.

This year's symposium theme is "**Law, Ethics & Technology**" The event will feature sessions on Law, Ethics and Technology.

Registration material will be available on our website. <http://otm.ovcr.uic.edu>

For more information please contact, Dee Alexander at (312) 996-7018



For further information on the technology transfer process at University of Illinois, contact the Office of Technology Management (312) 996-7018, or visit the [OTM website](#).

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