# The UIC ICBG (University of Illinois at Chicago International Cooperative Biodiversity Group) Memorandum of Agreement: A Model of Benefit-Sharing Arrangement in Natural Products Drug Discovery and Development[⊥]

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*Received September 30, 2003*

The Convention on Biodiversity mandates a new approach to the discovery of natural product drugs, one that incorporates concepts of national ownership of genetic resources, intellectual property rights in traditional knowledge, and sharing of economic benefits with countries that are the source of new natural products. The International Cooperative Biodiversity Group (ICBG) program was established to support experimentation in implementation of the Convention through development and execution of international agreements for bioprospecting. The agreement of one such ICBG program, between the University of Illinois at Chicago and institutions in Vietnam and Laos, is presented here. The core elements contained in the single, five-way Memorandum of Agreement are the arrangements for intellectual property rights, treatment of informed consent, and plans for benefit-sharing (including the sharing of short- and long-term royalty benefits, capacity building, and community reciprocity). Program participants were able to develop a practical and flexible agreement that satisfies the wishes of all institutions that are parties to it.



The widespread ratification of the Convention on Biodiversity has changed natural products drug discovery in fundamental ways.[1] While genetic resources were previously felt to belong to all of humankind, the Convention makes it clear that they are the heritage of the countries in which they are found and that traditional knowledge of plant uses is the intellectual property of its holders. Those who plan to gain economic benefit from the commercial use of genetic resources or traditional knowledge must obtain the informed consent of their stewards and must share with them both the benefits of the research and development process and the ultimate financial rewards. The Convention does not, however, specify how these ideals are to be achieved, and discussions of their implementation have been contentious. Among the questions that arise are the following: Who actually grants permission to use genetic resources and traditional knowledge? How can chronically underfunded and isolated scientific institutions in developing countries contribute to a natural products drug discovery system dependent on highly technical bioassay-guided fractionation? If financial benefits are to flow to a source country for a new drug, who should receive them and how should they be distributed? How can the interests of the many groups that are potentially affected by all of these questions be reconciled?

To help advance these debates, the Fogarty International Center of the U.S. National Institutes of Health (NIH) has spearheaded a program that permits universities and businesses in developed countries to partner with institutions or groups in developing countries in efforts to achieve successful and ethical implementation of the Convention. In effect, the Fogarty Center has established a series of experiments in how the Convention can be implemented. This effort, the International Cooperative Biodiversity Group program, has three goals: discovery of new pharmaceuticals and agricultural chemicals, scientific and economic development, and conservation of biodiversity. The first request for proposals for this program was issued in 1992. After 5 years of funding the initial projects, a second competition was begun in 1997.

As a result of the 1997 ICBG award competition (RFA/Request for Proposal TW-98-001 from the Fogarty International Center dated August 15, 1997),[2] the following International Cooperative Biodiversity Groups were established:[1]

**Bioactive Agents from Dryland Biodiversity of Latin America, 1993−1998, 1998−2003** (Group Leader/Principal Investigator: Barbara N. Timmermann; institutional components: University of Arizona (ICBG base institution); collaborating with Instituto Nacional de Tecnologia Agropecuaria/Argentina, Pontifica Universidad Catolica de Chile/Chile, and Universidad Nacional Autonoma de Mexico/Mexico).

**Biodiversity of Vietnam and Laos, 1998−2003** (Group Leader/Principal Investigator: Djaja D. Soejarto; institutional components: University of Illinois at Chicago/UIC (ICBG base institution); collaborating with National Center for Science and Technology/Vietnam, Cuc Phuong National Park/Vietnam, Traditional Medicine Research Center/Laos, and Glaxo Wellcome (withdrew in 2001)).

**Biodiversity Utilization in Madagascar and Suriname, 1993−1998, 1998−2003** (Group Leader/Principal Investigator: David G. I. Kingston; institutional components: Virginia Polytechnic Institute and State University

[⊥] Dedicated to the late Dr. Monroe E. Wall and to Dr. Mansukh C. Wani of Research Triangle Institute for their pioneering work on bioactive natural products.

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10.1021/np0304363 CCC: $27.50 
Published on Web 01/30/2004

(ICBG base institution); collaborating with the Missouri Botanical Garden, Conservation International, Centre National d'Application et des Recherches Pharmaceutiques/Madagascar, Bedrijf Geneesmiddelen Voorziening Suriname, Bristol-Meyers Squibb Pharmaceutical Research Institute, and DowElanco Agrosciences).

**Drug Development and Conservation of Biodiversity in West and Central Africa, 1994−1998, 1998−2003** (Group Leader/Principal Investigator: Brian G. Schuster; institutional components: Walter Reed Army Institute of Research (ICBG base institution); collaborating with Center for Tropical Forest Science of the Smithsonian Institution and the University of Dschang/Cameroon).

**Drug Discovery and Biodiversity among the Maya of Mexico, 1998−2002** (Group Leader/Principal Investigator: Brent Berlin; institutional components: University of Georgia (ICBG base institution); collaborating with Molecular Nature Ltd./UK and El Colegio de la Frontera Sur/ECOSUR).

**Ecologically Guided Bioprospecting in Panama, 1998−2003** (Group Leader/Principal Investigator: Phyllis Coley; institutional components: Smithsonian Tropical Research Institute (ICBG base institution)/Panama, University of Panama, Gorgas Memorial Institute of Health Research, Monsanto, and Conservation International).

**The UIC-Based Vietnam-Laos ICBG.** At the outset, the UIC ICBG Consortium[3] was made up of the following groups: one U.S.-based academic institution (University of Illinois at Chicago/UIC, the administrative base of the consortium is the Program for Collaborative Research in the Pharmaceutical Sciences/PCRPS); two government research institutions (National Center for Science and Technology/NCST, Hanoi, Vietnam; and the Traditional Medicine Research Center/TMRC, formerly, Research Institute of Medicinal Plants/RIMP, Vientiane, Laos); one national park (Cuc Phuong National Park/CPNP, Ninh Binh, Vietnam); and one industrial partner (Glaxo Wellcome Research and Development Ltd./Glaxo or GW, now Glaxo Smith Kline/GSK, Stevenage, U.K., whose administrative base is at Greenford, U.K.).

Although only NCST appears as the Vietnam research institution member, in reality, there are three research institutions involved, namely, Institute of Biotechnology/IBT, Institute of Chemistry/ICH, and Institute of Ecology and Biological Resources/IEBR, all of which are daughter institutions of NCST. In the agreement document, IBT is the signatory on behalf of IBT, ICH, and IEBR, representing NCST. Effective on November 1, 2001, the industrial partner, Glaxo Smith Kline, withdrew from this ICBG, due to the phasing out of GSK's natural product research program, as a result of the merger between Glaxo Wellcome and Smith Kline Beecham in 2000.[4] Today only UIC, NCST, CPNP, and TMRC make up the UIC ICBG.

The specific aims of the UIC-Vietnam-Laos ICBG are[3] *drug discovery and development* (for cancer, AIDS, malaria, and tuberculosis therapies and therapies against CNS-related diseases, in particular Alzheimer's disease and pain) from plants of Vietnam and Laos; *biodiversity inventory and conservation* (with specific focus on plants of Cuc Phuong National Park and medicinal plants of Laos); *economic development* among communities where the ICBG work is undertaken; and *capacity building* among the collaborating institutions in the host countries.

In executing the goals of the consortium, five Associate Programs were structured:[3]

(i) Associate Program 1 (AP-1) to implement biotic survey and biodiversity conservation at Cuc Phuong National Park, with the administrative base at UIC and research base at CPNP (primary), IEBR (secondary), and UIC (tertiary);

(ii) AP-2 to implement studies on medicinal plants of Laos, with administrative and research base at TMRC;

(iii) AP-3 to implement drug discovery (cancer, AIDS, malaria, tuberculosis) research, with administrative and research base at UIC (primary) and at ICH (secondary);

(iv) AP-4 to implement biomass production and economic development among communities at CPNP, with administrative and research base at IBT;

(v) AP-5 to implement drug discovery and development (therapies against Alzheimer's disease and pain), as well as the development of any promising compounds derived from AP-3 research, with administrative and research base at GW.

Each of the APs-1−4 also implements capacity building (human resource development and infrastructure strengthening), in-country and abroad (primarily, at UIC).

The context of the present paper is drug discovery and development and the bioprospecting arrangement of this ICBG in the form of a five-way Memorandum of Agreement (MOA).

**The University of Illinois at Chicago−Vietnam−Laos International Cooperative Biodiversity Group Memorandum of Agreement**

Although the text of the Memorandum of Agreement is subject to confidentiality, the framework of the agreement, in the context of the ICBG program as a whole, as described by Joshua Rosenthal (1996)[5] is open for discussion and analysis.

The UIC ICBG agreement bears the name of "*Memorandum of Agreement between the Board of Trustees of the University of Illinois at Chicago (UIC), Chicago, Illinois, United States of America, and Institute of Biotechnology, National Center for Science and Technology (NCST), Nghia Do, Tu Liem, Hanoi, Vietnam, and Cuc Phuong National Park (CPNP), Nho Quan District, Ninh Binh Province, Vietnam, and Research Institute of Medicinal Plants (RIMP), Ministry of Health, Vientiane, Lao People's Democratic Republic, and Glaxo Research and Development Limited (GX), Glaxo Wellcome House, Berkeley Avenue, Greenford, Middlesex, UB6 0NN, England, United Kingdom*". Although the agreement was signed by the legal representatives of one academic institution, three research institutions, and one industrial partner, in fact, five research institutions are involved, since the legal representative of NCST represents three institutions, namely, the Institute of Biotechnology, the Institute of Chemistry, and the Institute of Ecology and Biological Resources.

The UIC ICBG Memorandum is one single document, consisting of 15 pages of text plus five Addenda. Addenda I and II provide the details of long-term benefit-sharing arrangements derived from royalty stream that would flow from the industrial partner. Addenda III−V spell out the milestone payments and the amounts accrued to the ICBG consortium. This MOA document binds the UIC ICBG components and carries the signatures of the legal representatives of the four institution-members and the industrial partner. The first signature (UIC) was affixed on June 9, 1999, by GW, the last on June 28, 1999, by TMRC. Because of GSK's withdrawal, currently, the MOA document carries an amendment for the withdrawal, with the first signature (by GSK) affixed on November 20, 2001, the last (by CPNP) on December 18, 2001.

**The Structure of the Memorandum of Agreement.** The UIC ICBG MOA is a five-entity "one-contract" or "full-

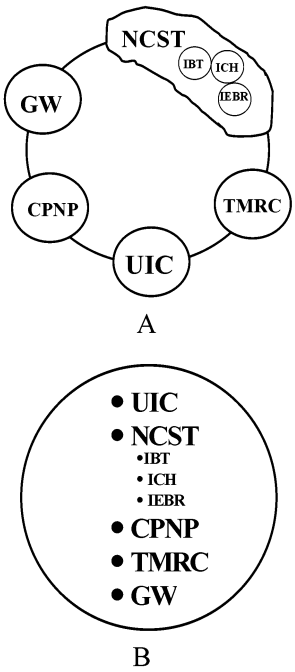


**Figure 1.** One-contract or full-contract-circle structure of the Vietnam-Laos ICBG (during the first half of its operation, 1998−2001) may be depicted as either part A or B. Glaxo Wellcome (today Glaxo Smith Kline) withdrew in November 2001. Abbreviations: UIC = University of Illinois at Chicago, the administrative seat of the Vietnam-Laos ICBG; CPNP = Cuc Phuong National Park (Vietnam); NCST = National Center for Science and Technology (Vietnam), with daughter institutes IBT (Institute of Biotechnology), ICH (Institute of Chemistry), and IEBR (Institute of Ecology and Biological Resources; TMRC = Traditional Medicine Research Center (Laos); GW = Glaxo Wellcome.



contract-circle" model (Figure 1). The University of Illinois at Chicago is the administrative seat and the institution that is bound by a contractual agreement with the United States government, through the Fogarty International Center. Actual transfer of funds (grant money) from UIC to other member-institutions, except Glaxo, is implemented through separate subcontract agreements; these agreements are not intellectual property rights (IPR) or benefit-sharing agreements. Glaxo is not a recipient of ICBG funds and does not provide any funding to the consortium; however, Glaxo agreed to contribute to capacity building of scientists and institutions in the countries of origin of the genetic (plant) material from which a promising compound(s) emerges.

**The Clauses of the Memorandum of Agreement.** Part I of the MOA defines the Scope of the Cooperation.

Part II defines the General Areas of Cooperation, which include exchange of faculty members or scientific personnel, joint research activities, participation in seminars and scientific meetings, exchange of academic and research materials and other information, and special short-term academic programs.

Part III spells out the details of the joint research activities and represents the bulk of the agreement (12 pages). This part consists of five sections (III-A/Precedents, III-B/Purpose, III-C/Objectives, III-D/Responsibilities, and III-E/Finance and Services).

(i) III-A/Precedents contains clauses that led to the cooperation (nine clauses), such as previous track record of collaboration between UIC and the member-organizations, the ICBG RFA TW-98-001, the proposal writing, the funding award, the key personnel and organizational structure and roles of components, and a reference to the terms and conditions of the ICBG award.

(ii) III-B/Purpose defines the purpose of the cooperation, namely, to permit the discovery and development of new medicines, the conservation and sustainable utilization of forest biodiversity of the Cuc Phuong National Park in Vietnam and of Laos, and the economic development (economic development of communities where the ICBG program operates and capacity building in the ICBG host institutions).

(iii) III-C/Objectives spells out the specific aims in detail (six clauses), namely, plant selection approaches, disease targets, inventory and databasing of the seed plants of CPNP, biomass production of biologically active and promising species, capacity building, conservation education and improvement of household economy of communities who live around the park, medicinal plant inventory and databasing (and community reciprocity) in Laos, and human resource development and infrastructure strengthening of the ICBG host institutions in Vietnam and Laos.

(iv) III-D/Responsibilities spells out the responsibilities of each member-organization and their joint responsibilities (six subsections). III-D-1 defines the responsibilities of UIC (23 clauses), III-D-2 the responsibilities of NCST (namely, IBT, ICH, and IEBR; 14 clauses), III-D-3 the responsibilities of CPNP (12 clauses), III-D-4 the responsibilities of TMRC (11 clauses), III-D-5 the responsibilities of GW (10 clauses), and III-D-6 the joint responsibilities of the member-institutions and the industrial partner (eight clauses), which include the time period the MOA is in force, conditions for withdrawal of any of the member-organizations, amount of samples at initial collection for screening and re-collection for isolation and structure determination, conditions for exchange of personnel as part of capacity building, the requirement for technical report writing submission, fate and use of materials and data in the event the agreement is terminated, limitation of member-organizations in the collaborative use of the genetic materials within the ICBG framework, requirements for acknowledging the Grant in publications, and the provision to seek an international arbitration in the event of disputes.

(v) III-E spells out the source of funding to undertake the research and training contemplated in the agreement, as coming from Fogarty International Center (NIH Grant 1UO1-TW01015-01).

Part IV defines the period of validity of the MOA, conditions for termination, extension, and amendment, and the number of copies of the MOA to be signed by members of the consortium.

The signature page states that the five addenda to the text of the MOA will become binding upon the signing of the legal representatives whose names are affixed therein. These include the Chancellor and two representatives of the Board of Trustees (for UIC), Director of the Institute of Biotechnology and an ICBG-NCST liaison (for NCST, and representing IBT, ICH, and IEBR), Director and Vice-Director of Cuc Phuong National Park, Director and Deputy Director of TMRC, and Director for Scientific Research of GW.

Addendum I presents a long-term benefit-sharing scheme, in the event that discovery of a drug is made by AP-3 at UIC, in cooperation with ICH, and Glaxo develops and commercializes the drug. In this scheme, the royalty stream is distributed among the organization members of the Vietnam-Laos ICBG (excluding Glaxo, which waived any share of royalties) and the communities in the ICBG host countries.

Addendum II presents a long-term benefit-sharing scheme, in the event that Glaxo discovers, develops, and

commercializes the drug. In this second scheme, the royalty stream is distributed among the member-organizations (excluding Glaxo) and the communities in the ICBG host countries.

Addendum III defines the granting of rights to Glaxo in the event of the licensing of discoveries made at UIC-ICH under the framework of the ICBG, and Glaxo's rights of first refusal.

Addendum IV defines the milestone payments by Glaxo and the conditions for payments, in the event the drug is discovered at UIC; the amount of payment is determined by the site of the screen (UIC vs Glaxo), the selection of compound for clinical trial, entry to Phase II and Phase III clinical trials, and approval of the New Drug Application.

Addendum V defines milestone and royalty payments of any drug developed and commercialized by Glaxo; the amount of payments is determined by the patent rights on and the chemical structure of the Glaxo development compound, and by the target activity, namely, whether the target is or is not relevant within the ICBG framework.

**Issues on Intellectual Property Rights.** Issues concerning intellectual property rights are defined within the clauses pertaining to the responsibilities of UIC, on one hand, and Glaxo, on the other. Thus, in the event of UIC discovery, UIC-PCRPS through the University's Office of Technology Management "will determine the ownership of any resulting IP with the assistance of all members of the Group". The named inventors may consist of individuals from GW, UIC-PCRPS, IBT-IEBR-ICH, CPNP, and/or TMRC, depending on the parties' respective contributions to any particular invention or discovery. The question of ownership shall be determined in accordance with the applicable law of the country in which any invention or discovery is made. UIC's Office of Technology Management will obtain patent protection for such invention or discovery and/or seek such other intellectual property protection as UIC deems appropriate with the assistance of all members of the Group. The Office of Technology Management will be responsible for the management and licensing of such inventions and discoveries in accordance with the terms of the agreement.

In the event that an invention or a discovery is made at Glaxo based on plants collected or acquired within the ICBG framework as defined in the MOA, Glaxo will determine the ownership of any resulting intellectual property with the assistance of all members of the Group. The named inventors (discoverers) may consist of individuals from GW, UIC-PCRPS, IBT-IEBR-ICH, CPNP, and/or TMRC, depending on the parties' respective contributions to any particular invention or discovery. The question of ownership shall be determined in accordance with the applicable law of the country in which any invention or discovery is made. Glaxo will obtain patent protection for such invention or discovery and/or seek such other intellectual property protection as it deems appropriate with the assistance of all members of the Group. Glaxo will be responsible for the management and licensing of such protected inventions. These inventors will be referred to as "GW Inventors". The parties further agree that assistance will include the making available of all relevant information, including the country of origin of the sample and its taxonomic identity, where appropriate, to allow Glaxo to register any intellectual property rights that may arise.

Glaxo will have the rights to file for patent protection for a discovery it makes that is based on plant samples or extracts received by Glaxo under the framework of the ICBG, but will consult with the Group in determining coinventorship of the discovery. Glaxo also agrees to notify the Group in the event a decision is made to proceed with the development of a compound(s) derived from plants supplied by the ICBG.

**Informed Consent.** Two aspects of informed consent are distinguished in the Vietnam-Laos ICBG agreement. The first deals with informed consent in the collection and use of the plant/genetic materials collected in Vietnam and Laos; the second deals with informed consent for acquiring information on the medicinal use(s) of a plant through an interview process with individuals in the community where the ICBG research is undertaken and the use of that information for purposes of drug discovery as defined in the ICBG project. Informed consent is addressed in the clauses that define each consortium member's responsibilities.

Thus, in Vietnam, "informed consent (collecting permits) of the Government of Vietnam, the owner of the samples (genetic materials) and derivatives thereof, will be secured before the implementation of the work proposed as described in the ICBG proposal", and ICBG through IBT, IEBR, and CPNP "will liaison with the Government of Vietnam in matters related to permit for the collection and export of plant samples or their extracts for use in the ICBG project". In Laos, TMRC will collect plant samples from various sites in Laos for use in the study within the ICBG framework, "through prior informed consent of the Government of Lao PDR, the owner of the samples (genetic materials) and derivatives thereof". Prior informed consent (collecting permits) will be secured before the implementation of the work proposed as described in the ICBG proposal.

As regards informed consent related to indigenous medicinal knowledge, in Vietnam, ICBG investigators "will seek the informed consent of individuals and/or communities for the recording and use of data on the medicinal and other uses of the plants in the Cuc Phuong National Park, for the intended study as described in the ICBG proposal". Full disclosure is implemented in seeking the prior informed consent. In Laos, ICBG investigators "will seek the prior informed consent of individuals and/or the communities for the recording and use of data on the medicinal and other uses of plants of Laos, for the intended study as described in the ICBG proposal". Similarly, full disclosure is implemented in seeking prior informed consent.

**Royalty Distribution.** The distribution schemes of royalties that may arise as a result of the discovery and development of a drug from a plant of Vietnam or Laos in this ICBG program were presented in earlier papers, first in a summary form,[7] in the context of the UIC policy on benefit-sharing in research on natural products, and later in full detail.[8] These full schemes of royalty distribution form Addenda (Addendum I and Addendum II, Supporting Information) to the MOA. At the time of negotiations for access and benefit-sharing, UIC channeled the net royalty stream (after deduction of out-of-pocket costs) received from an industrial partner or licensee into two equal portions, the "Trust Fund" and the "Common Fund" portions. Two scenarios for the distribution of royalty are outlined in Schemes 1 and 2 (summaries of Addendum I and Addendum II, Supporting Information, respectively). In both scenarios, the 50% "Trust Fund" share is distributed to a trust fund in the plant source country. In the first scenario (Scheme 1), the distribution of the 50% "Common Fund" share is governed by IPR ownership. In scenario 2 (Scheme

**Scheme 1.** UIC Discovers; Pharmaceutical Company Develops

NET ROYALTY IS SPLIT INTO TWO EQUAL PORTIONS

: 50% Trust Fund: this portion of the net royalty is intended, in its entirety, for the country of origin of the genetic material that gives rise to the commercialized compound.

: 50% Common Fund: 40% of this goes to inventors (referred to "UIC inventors"); 20% to ICBG institutions (namely, UIC, NCST, CPNP, TMRC; of this amount, 1/4 or 25% goes to UIC-PCRPS, 3/4 or 75% goes to the host institutions, namely, NCST+CPNP+TMRC); 40% to UIC administration (administration, legal effort). In the event that the plant genetic material that gave rise to the commercialized product originated from Vietnam, 80% of the 75% share of the host institutions goes to Vietnam institutions (NCST and CPNP), while 20% of the 75% share goes to Laos (TMRC). In the event that the plant genetic material that gave rise to the commercialized product originated from Laos, 80% of the 75% share of the host institutions goes to Laos institution (TMRC), while 20% of the 75% share goes to Vietnam (NCST+CPNP).

**Scheme 2.** Industrial Partner Discovers and Develops the Commercialized Product

NET ROYALTY IS SPLIT INTO TWO EQUAL PORTIONS

: 50% Trust Fund: this portion of the net royalty is intended, in its entirety, for the country of origin of the genetic material that gives rise to the commercialized compound.

: 50% Common Fund: 40% of this Common Fund goes to host-country institutions (Vietnam- and Laos-based ICBG institutions); 20% to UIC-PCRPS (US-based ICBG institution); 40% to UIC administration (administration, legal effort). In the event the plant genetic material that gives rise to the commercialized product originated from Vietnam, 80% of the 40% share of the host institutions goes to Vietnam institutions (NCST and CPNP), while 20% of the 40% share goes to Laos (TMRC). In the event the plant genetic material that gives rise to the commercialized product originated from Laos, 80% of the 40% share of the host institutions goes to Laos institution (TMRC), while 20% of the 40% share goes to Vietnam (NCST+CPNP).



2), IPR ownership belongs to the industrial partner, and the distribution of the 50% "Common Fund" share is governed by research effort.

In scenario 1, the total amount of royalty share that will go back to the source country (Vietnam and Laos) consists of the host countries' shares, the inventor's share, and the Trust Fund share, which could go up to 59% of the net royalty. In scenario 2, the total amount that will go back to the source countries consists of the 40% share of the Common Fund plus the Trust Fund, which amount to 70% (for further details see Schemes 1 and 2, Supporting Information). These benefit-sharing schemes, which are embodied in the ICBG MOA, remain in force to this date.

Through funds provided by GSK at the time of their withdrawal, two receiving Trust Funds are in the process of being established. One is the Nature Conservation Foundation in Vietnam and the other the Laos Biodiversity Fund, in Laos. The objectives of the Nature Conservation Foundation and Laos Biodiversity Fund are summarized in a previous paper[8] and include conservation of resources, capacity building, biodiversity research, and community reciprocity. Once these entities become functional, they will serve as the conduit for the 50% portion of "Trust Fund" money to be set aside in the royalty distribution schemes described above and delivered to these receiving trust funds in the respective source countries for management and use by those source countries.

**Community Reciprocity.** Community reciprocity measures in Vietnam and Laos are implemented in the Vietnam-Laos ICBG and are fully discussed in a previous 2002 paper.[8] A variety of measures have been implemented in these communities.

In the ICBG MOA, the subject of community reciprocity is stated in a clause within the UIC responsibilities, as follows: "*UIC, in collaboration with the cooperating organizations of this ICBG, will share royalties that may be derived from research in the ICBG according to a scheme that has taken into consideration ...the fundamental role of biological and chemical diversity in discovery and development of new drugs from natural products, the rapid extinction of that diversity, and the need to provide financial incentive to source countries and communities who bear the cost of conserving these resources*".

The responsibilities of host country institutions in Vietnam and Laos also include provision for implementing community reciprocity. In Vietnam, clauses on responsibilities for the Vietnamese institutions state that IBT-IEBR-ICH and CPNP "*will assist the ICBG Principal Investigator to identify communities in Vietnam who have collaborated in the ICBG studies, and to suggest measures to make funds from the Trust Fund available to them*" and will also "*assist the ICBG Principal Investigator to identify Vietnamese organization(s) dealing with conservation of resources, and to suggest measures to make funds from the Trust Fund available to such organizations*". In Laos, a similar statement is made that TMRC/RIMP "*will assist the ICBG Principal Investigator to identify communities in Lao PDR/Laos who have collaborated in the ICBG studies, and to suggest measures to make funds from the Trust Fund available to them*" and "*will assist the ICBG Principal Investigator to identify Laotian organizations dealing with conservation of resources, and to suggest measures to make funds from the Trust Fund available to such organizations, for purposes of conservation efforts and for upgrading the scientific expertise of their staff*".

## Conclusion

The ICBG Program is an important experiment in the design of bioprospecting efforts that involve a collaboration between scientists in countries rich in biotechnology (the "North") and countries rich in biodiversity (the "South"). The success of the endeavor depends on the goodwill and understanding of the collaborating parties toward the achievement of a common goal, namely, the conservation of the biodiversity, the development of pharmaceutically

beneficial products, and the equitable sharing of the benefits that may arise as a result of the effort and the process.

In setting up the arrangement, multiple and complex requirements must be dealt with and resolved, of which a contractual agreement that binds the collaborating parties is central. Eight ICBG bioprospecting groups, representing a North-South collaboration under the ICBG umbrella, have been put into experiment and resulted in various models of contractual arrangement. The common features of these models are satisfactory arrangements in fulfilling the rigors of intellectual property rights issues, informed consent, and benefit-sharing. In the UIC-based Vietnam-Laos ICBG, parties to this consortium have successfully achieved goodwill and understanding, in the form of the five-way Memorandum of Agreement. Issues on intellectual property rights, informed consent, and benefit-sharing in its various forms, including the sharing of short- and long-term (royalty) benefits, capacity building, and community reciprocity are core elements that form the foundation of the UIC ICBG Memorandum of Agreement. The UIC-based Vietnam-Laos ICBG has been responsive to these requirements, and despite the short time this ICBG has been in operation, the accomplishments of this ICBG to date have been substantial.[6,8]

**Acknowledgment.** The UIC-based Vietnam-Laos ICBG is funded by a U.S. government grant, NIH 1-UO1-TW-01015-01 (1998−2003), through funds from the National Institutes of Health, the National Science Foundation, and Foreign Agriculture Service of the U.S. Department of Agriculture, and administered by the Fogarty International Center of the National Institutes of Health. The authors express deep thanks to all members of the UIC-Vietnam-Laos ICBG for their goodwill, understanding, hard work, and dedicated effort during the structuring of the MOA presently in force, and in the implementation of the project activities.

**Supporting Information Available:** Addendum I outlines in detail the distribution of royalties that may be generated as a result of the discovery of an active compound derived from plants of Vietnam or Laos by the UIC ICBG team and its development and commercialization by the industrial partner. The royalty distribution here is governed by intellectual property rights ownership. Addendum II outlines in detail the distribution of royalties that may be generated as a result of the discovery, development, and commercialization of an active compound derived from plants of Vietnam or Laos by the industrial partner. The royalty distribution in this case is governed by research effort. This material is available free of charge via the Internet at http://pubs.acs.org.

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NP0304363