BIO VENTURES FOR GLOBAL HEALTH Partnership Hub

2012 YEAR-END REPORT
FOR FUNDING MEMBERS

Prepared for:  Alnylam, AstraZeneca, Eisai, GlaxoSmithKline, Merck (MSD), Novartis, Pfizer, and Sanofi

Date:  March 11, 2013

CONFIDENTIAL TO FUNDING MEMBERS AND WIPO
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1. Executive Summary

Summary of 2012 Deliverables:

- **Facilitating Partnerships:** BIO Ventures for Global Health (BVGH) has established **thirteen research agreements and collaborations** between Member organizations in 2012. These are presented in Table 1. **Ten more agreements** are in advanced stages of negotiation between Members – a total of **twenty-three collaborations**. Agreements in advanced stage discussions are presented in Table 2.

  Table 5 presents twenty-five collaborations in early stage discussions between Members through the end of 2012. These collaborations were presented in the first two “Reports to Funding Members” and are updated in this report.

  BIO Ventures for Global Health has far surpassed the objective of establishing 3-4 agreements and 2 research collaborations between Members in 2012.

- **Increasing Membership:** **Thirty two** new Members were recruited during 2012, including nineteen new potential Users and Providers, and thirteen new Supporters (some new Members joined in all three categories). BIO Ventures for Global Health has met and more than tripled the objective to recruit 6 new potential User members in 2012.

Summary of Key Accomplishments:

1. **There continues to be strong interest, response and enthusiasm among Members in exploring neglected tropical disease (NTD) research collaboration opportunities presented by BVGH. Establishing sustainable partnerships and collaborations takes significant time and effort. Momentum and interest continues to build among Members and we anticipate a successful year ahead.**

2. **User Member recruitment is tracking well ahead of program objectives with nineteen new User Members on board compared to the 2012 target of six new Users. Membership growth clearly demonstrates support and recognition of the WIPO Re:Search program and concept.**

3. **BVGH continues to invest heavily in time and travel to build relationships with Members, learn about research programs, identify Member needs, increase awareness of WIPO Re:Search and explore new collaboration opportunities. To meet the needs of our growing Membership, the Partnership Hub will bring on additional partnership support in early 2013.**

4. **WIPO Re:Search has generated considerable interest, attention and publicity since launch. Publicity efforts in 2012 are summarized in Section VI of this report along with a summary of media and other coverage and publications in the Exhibits section. BVGH anticipates an opportunity to generate even more media and publication interest in WIPO Re:Search in 2013. The Partnership Hub will work with Members to identify and execute on publication and media opportunities. We look forward to your collaboration in this regard.**

5. **BVGH and WIPO cooperated to plan and execute the first Annual Meeting on October 29-30, 2012 in Geneva, Switzerland. The meeting was well-attended and included training workshops, panel discussions, and networking events. Reports from attendees were very positive and the meeting appeared valuable for stakeholders. Additional details are included in the Special Edition of our December 2012 Snapshot (Exhibit 1).**
6. BVGH organized and held a Member Workshop in conjunction with the American Society of Tropical Medicine and Hygiene (ASTMH) Annual Meeting in Atlanta, GA on November 11, 2012. The workshop was attended by 32 Member representatives from pharmaceutical companies, nonprofit organizations, government agencies, and academic research institutions. The topics focused on establishing high-value partnerships within the WIPO Re:Search consortium and discussing challenges in neglected disease research and development. A feedback survey reported that attendees felt the workshop was valuable and multiple requests for additional workshops were received. Additional details are included in the Special Edition of our December 2012 Snapshot (Exhibit 1).

Introduction

This report summarizes BVGH’s Partnership Hub activities during 2012 and highlights progress toward achieving the Partnership Hub’s WIPO Re:Search objectives. Our first two reports covered periods from launch until March 1, 2012 (First Report) and March through June 30, 2012 (Second Report). These reports are available upon request.

WIPO Re:Search members are united in their commitment to support the development of drugs, vaccines and diagnostics for neglected tropical diseases, malaria and tuberculosis. The consequences of these devastating diseases on global health and the economy are immeasurable. These diseases are estimated to impact more than one billion people world-wide leaving those affected disfigured, incapacitated, blinded, and incapable of pursing education or work. The impact from a global economic and development standpoint is staggering.

Through the Partnership Hub, BVGH continues to build on the successful launch and early momentum established by WIPO Re:Search. Partnerships are challenging and BIO Ventures for Global Health recognizes this and continues to take a very “hands on” and active role in identifying and facilitating collaborations. This approach has been successful in establishing numerous relationships between Members. Several of these initial relationships have progressed to agreements and research collaborations. Collaboration is not a new concept or approach when it comes to advancing product development but the membership, commitment and focus WIPO Re:Search brings to neglected tropical diseases is unique.

The BVGH team has held numerous one-on-one meetings with Members and have attended meetings to present WIPO Re:Search to a broader audience including at COHRED Forum 2012, Oxford’s, Partners in Innovation: PDPs and the Future of Public-Private Collaborations program, Keystone conferences, the Biotechnology Industry Organization’s (BIO’S) Annual International Convention, BIO Dundee, and ASTMH 2012 Annual Meeting.

II Partnership Hub Objectives and Achievements

The Partnership Hub objectives center around establishing partnerships between members and increasing WIPO Re:Search membership. Specifically, the Partnership Hub objectives were to establish at least 2 research projects, conclude 3-4 license agreements and recruit 6 new User Members in 2012. BVGH is also responsible for developing communication messaging and materials to support the achievement of objectives.

The following table presents thirteen collaborations and agreements established between Members as of December 31, 2012.
### Table 1: Research Agreements Established in 2012

<table>
<thead>
<tr>
<th>Collaboration Description</th>
<th>Members</th>
<th>Agreement Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Develop and test a diagnostic for helminths</td>
<td>Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR) and Stanford</td>
<td><strong>Agreement in place.</strong> This collaboration will enable the sharing of stool samples to support Stanford’s helminth diagnostic product development and testing.</td>
</tr>
<tr>
<td>2  MetAp-1 inhibitor drug development for tuberculosis</td>
<td>GlaxoSmithKline (GSK) and Center for World Health and Medicine (CWHM)</td>
<td><strong>Collaboration in place.</strong> GSK has shared information and data with CWHM and provided insights into the development of MetAp-1 inhibitors for tuberculosis. This information sharing resulted in approximate savings of $50,000, three months of FTE time for CWHM and reprioritization of projects.</td>
</tr>
<tr>
<td>3  Computational chemistry support for tuberculosis drug candidates</td>
<td>AstraZeneca (AZ) and iThemba</td>
<td><strong>Agreement in place.</strong> AstraZeneca is providing computational and predictive chemistry know-how and support to iThemba in order to improve compound characteristics for tuberculosis drug candidates.</td>
</tr>
<tr>
<td>4  Cysteine protease inhibitor library for multiple neglected diseases drug discovery efforts</td>
<td>AstraZeneca and University of California at San Francisco (UCSF)</td>
<td><strong>Agreement in place.</strong> AstraZeneca is providing UCSF with a diverse cysteine protease inhibitor compound library to screen against <em>T. cruzi</em>, <em>T. brucei</em>, <em>P. falciparum</em> and <em>S. mansoni</em>. Agreement was amended to include screening of compounds against hookworm.</td>
</tr>
<tr>
<td>5  Glycogen Synthase Kinase 3 (GSK-3) inhibitors for Kinetoplastids drug discovery</td>
<td>AstraZeneca and University of Dundee</td>
<td><strong>Agreement in place.</strong> AstraZeneca is providing a GSK-3 inhibitor compound library to the University of Dundee to screen against Kinetoplastids.</td>
</tr>
<tr>
<td>6  In-kind support from the NIH for Dengue drug discovery</td>
<td>National Institutes of Health (NIH) and Emory University</td>
<td><strong>Agreement in place.</strong> This agreement provides Emory University researcher with biology expertise and support from the NIH for RNA-dependent RNA polymerase inhibitor program for dengue. The characterization of the compounds included screening against the Rift Valley Fever virus.</td>
</tr>
<tr>
<td>7  Characterization of pre-clinical compounds for malaria</td>
<td>GlaxoSmithKline (GSK) and University of Washington (UW)</td>
<td><strong>Agreement in place.</strong> This agreement enables the sharing of confidential information and transfer of a UW compound to GSK. This compound will be re-profiled at GSK’s Tres Cantos facility.</td>
</tr>
<tr>
<td>Collaboration Description</td>
<td>Members</td>
<td>Agreement Status</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------</td>
<td>------------------</td>
</tr>
<tr>
<td>8 Fabl inhibitor compound structures and data sharing for Shigella</td>
<td>AstraZeneca and Anacor</td>
<td>Collaboration in place. AstraZeneca has shared knowledge and data on Fabl inhibitors and compound structures to inform and support Anacor’s development of products for Shigella.</td>
</tr>
<tr>
<td>9 Compounds for schistosomiasis</td>
<td>Merck and University of California at San Francisco (UCSF)</td>
<td>Agreements in place. Initial confidentiality Agreement to enable discussions around compound selection. Research Agreement and MTA will allow for the sharing of compounds with UCSF for screening against S. mansoni.</td>
</tr>
<tr>
<td>10 Research Collaboration around multi-kinase inhibitors in malaria</td>
<td>GlaxoSmithKline (GSK) and University of Washington (UW)</td>
<td>Agreement in place. GSK to work collaboratively with UW to identify lead compound in a series. The initial compounds screened at UW were from the Tres Cantos Anti-Malaria (TCAMS) data set.</td>
</tr>
<tr>
<td>11 Co-Development of onchocerciasis diagnostic</td>
<td>PATH and Kumasi Center for Collaborative Research in Tropical Medicine (KCCR)</td>
<td>Agreement in place. This confidentiality Agreement will enable discussions and planning for co-development of a novel onchocerciasis diagnostic.</td>
</tr>
<tr>
<td>12 Research Collaboration around tuberculosis drug discovery</td>
<td>AstraZeneca and Anacor</td>
<td>Agreement in place. Anacor compounds will be screened against AstraZeneca tuberculosis targets.</td>
</tr>
<tr>
<td>13 Sharing of preclinical compound libraries for malaria</td>
<td>AstraZeneca and Liverpool School of Tropical Medicine</td>
<td>Agreement in place. This agreement will enable sharing of AstraZeneca’s advanced preclinical and clinical compounds for screening against the malarial parasite.</td>
</tr>
</tbody>
</table>

In addition to the collaborations and agreements listed above, there are ten collaborations in advanced stages of negotiations described below in Table 2.
### Table 2: WIPO Re:Search Agreements in Advanced Negotiations as of December 31, 2012

<table>
<thead>
<tr>
<th>Collaboration</th>
<th>Members</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Research Agreement (MTA) to enable sharing of CYP51 inhibitors</td>
<td>UCSF and AstraZeneca</td>
</tr>
<tr>
<td>2</td>
<td>Research Agreement (MTA) to enable sharing of Jak-3 inhibitor</td>
<td>McGill University and Pfizer</td>
</tr>
<tr>
<td>3</td>
<td>Research Agreement (MTA) to enable sharing of Calcium channel blocker</td>
<td>University of Dundee and Eisai</td>
</tr>
<tr>
<td>4</td>
<td>Research Agreement (MTA) to enable sharing of proteasome inhibitors</td>
<td>University of Dundee and Eisai</td>
</tr>
<tr>
<td>5</td>
<td>Agreement (MTA) to enable sharing a compound to support anti-diarrheal product development</td>
<td>Center for World Health and Medicine (CWHM) and Pfizer</td>
</tr>
<tr>
<td>6</td>
<td>Agreement (MTA) to enable sharing of neutral endopeptidase inhibitors</td>
<td>Center for World Health and Medicine (CWHM) and Sanofi</td>
</tr>
<tr>
<td>7</td>
<td>Agreement (MTA) to enable sharing of anti-helminthic compounds</td>
<td>McGill University and AstraZeneca</td>
</tr>
<tr>
<td>8</td>
<td>Agreement (MTA) to enable sharing of Aurora Kinase B inhibitors</td>
<td>University of Dundee and AstraZeneca</td>
</tr>
<tr>
<td>9</td>
<td>Hosting of African Researcher</td>
<td>University of Buea, Cameroon and AstraZeneca</td>
</tr>
<tr>
<td>10</td>
<td>Hosting of African Researcher</td>
<td>Kumasi Center for Collaborative Research in Tropical Medicine (KCCR)/Kwame Nkrumah University and UCSF</td>
</tr>
</tbody>
</table>
III BVGH Collaboration Strategy and Tactics

We noted in our first two reports that, as the Partnership Hub Administrator, BIO Ventures for Global Health (BVGH) continues to actively engage with Members to:

- **Facilitate** the sharing of WIPO Re:Search resources and expertise
- **Match** Provider and User Member programs and capabilities to accelerate research and development
- **Present** new partnering ideas that will advance research and development of products for neglected topical diseases, malaria and tuberculosis.

BVGH facilitates neglected tropical disease research collaborations among WIPO Re:Search members in several important ways including:

- **Actively identifying collaboration opportunities among members:**

  BVGH reaches out to Members to learn about their research programs, capabilities, areas of expertise, and partnering interests. With this information in hand, BVGH explores, identifies and catalyzes collaboration opportunities that strategically match Providers with Users based on research and development needs, requests and programs.

- **Facilitating member connections around potential collaborations:**

  BVGH speaks with Members to establish mutual interest in exploring research collaborations. Once mutual interest is established, BVGH connects Members so that scientists can discuss their research and further-explore the possibility of working together and sharing assets. BVGH assists Members in the initial stages of putting together their collaboration agreements.

- **Serving as a scientific expert on WIPO Re:Search contributions and neglected tropical diseases:**

  BVGH understands how WIPO Re:Search database contributions can be applied to neglected tropical diseases, malaria and tuberculosis research and product development. With this knowledge and understanding of Provider contributions, BVGH proactively matches these contributions with User’s research programs.

- **Fielding requests:**

  WIPO Re:Search Users are encouraged to search the database to identify assets that could support or accelerate their neglected tropical disease research. Once an asset of interest has been identified, the Member contacts the Partnership Hub to learn more about the asset and the type of collaboration the Provider is interested in. BVGH establishes mutual interest between Members and then connects the interested parties.

- **Fielding “special requests”:**

  BVGH welcomes “special requests” through the Partnership Hub for compounds, libraries or other resources that are not captured in the WIPO Re:Search Database. Providers are usually willing to explore requests that support the development of products for neglected tropical diseases. Researchers that have specific targets or compounds of interest should contact the Partnership Hub to facilitate inquiries into whether these could be made available by WIPO Re:Search Providers.

- **Recruiting new Users and supporting recruitment of new Providers and Supporters:**
BVGH reaches out to potential new Users based on their research programs and ability and desire to develop drugs, vaccines or diagnostics for neglected tropical diseases. BVGH is identifying and reaching out to recruit more developing country participants. BVGH is also supporting WIPO who is leading the effort to bring on new high quality Providers and Supporters.

- **Attending meetings to network and stay current on NTD research:**

  BVGH team members attend targeted conferences such as ASTMH, Keystone Neglected Disease meetings, Vaccine conferences, etc. to stay up to date on neglected disease research and developments and also to meet existing Members and network with potential new Members.

- **Tracking developments in global health and industry:**

  BVGH tracks developments in global health and stays current and up to date on relevant scientific literature and review articles so that the Partnership Hub can provide the best possible service to Members.

### Driving Partnerships

Throughout 2012, BVGH continued to establish relationships with new Members and build upon existing Member relationships. These connections are critical to enabling BVGH to successfully explore and establish collaborations between WIPO Re:Search members. Web-based inquiries are infrequent and, to-date, none of these web-derived requests have led to collaboration opportunities between Members. Proactive partnering is essential to establishing research agreements.

BVGH meets in person, where possible, with Members to talk about WIPO Re:Search, the Partnership Hub and the process of facilitating neglected tropical disease collaborations. More often, BVGH has telephone discussions or conference calls with Members to learn about research programs, collaborations of interest and to present partnership opportunities. BVGH is committed to ensuring a positive WIPO Re:Search experience for all Members and recognizes the critical importance of a customized and flexible approach to working with each Member organization.

With an additional nineteen new Provider and User Members on board in 2012, Jennifer Dent, Roopa Ramamoorthi and Lisa Nelson have plenty of new research programs and collaborations to explore. New Members bring a diverse range of neglected disease research and development approaches, capabilities and technologies to the Consortium. These new researchers and programs expand the Partnership Hub’s opportunity to identify even more complementary partnership opportunities for our Members. To support Membership growth and the expanding interest among current Members, BVGH will be adding an additional resource to our partnering team. This new team member will bring complementary knowledge and skills to our team and will work closely with Roopa, Jennifer and Lisa to support the Partnership Hub activities and responsibilities.

The Partnership Hub captures WIPO Re:Search Member contacts along with their disease and partnership interests and core capabilities in a database. This database of WIPO Re:Search contacts, programs and interests includes and builds on the information obtained through BVGH conversations to ensure continuity and effective follow-up. As of December 31, 2012, the database contains 573 individual contacts across the WIPO Re:Search consortium.

BVGH has visited several WIPO Re:Search member organizations to meet with key decision makers, business contacts and researchers to learn about WIPO Re:Search partnering interests, core capabilities and research programs. Productive meetings have been held with the following WIPO Re:Search members at their facilities.
<table>
<thead>
<tr>
<th>Meeting</th>
<th>Attendees And Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of California, Berkeley Berkeley, CA</td>
<td>Don Joseph, Jennifer Dent and Roopa Ramamoorthi met with senior leadership from the Office of Intellectual Property and Industry Research Alliances. Jennifer and Roopa also met with Temina Madon, Executive Director of CEND and discussed presenting WIPO Re:Search to a broader audience of UC Berkeley faculty and students engaged in neglected disease research.</td>
</tr>
<tr>
<td>University of California, San Francisco San Francisco, CA</td>
<td>Jennifer and Roopa met with Phillip Rosenthal to discuss his research partnering interests in malaria.</td>
</tr>
<tr>
<td>National Institutes of Health Washington, DC</td>
<td>Jennifer and Roopa visited the National Institutes of Health to have conversations with program officers to learn more about the resources the NIH could provide to WIPO Re:Search Members. Meetings also took place with individuals from the NIH's technology transfer office and Parasitology &amp; International Programs Branch.</td>
</tr>
<tr>
<td>Drugs for Neglected Diseases Initiative (DNDi) San Francisco, CA</td>
<td>Jennifer and Roopa met with Jean-Pierre Paccaud at BVGH’s office where they discussed collaborations of interest to DNDi and WIPO Re:Search.</td>
</tr>
<tr>
<td>Stanford University Palo Alto, CA</td>
<td>Jennifer and Roopa met with Kevin Grimes, Amy Lockwood and Nancy Federspiel to present the Partnership Hub, learn about Stanford’s NTD programs and begin to explore potential collaborations.</td>
</tr>
<tr>
<td>McGill University Montreal, Canada</td>
<td>Jennifer and Roopa presented WIPO Re:Search to a broad group of infectious disease researchers at McGill. This session was followed by a day of one-on-one and small group meetings with researchers to learn about their programs and collaborative interests.</td>
</tr>
<tr>
<td>EU Commission Brussels, Belgium</td>
<td>Jennifer presented WIPO Re:Search at the EU Commission in Brussels, following another presentation in Oxford, where there was considerable interest in joining the Consortium as a Supporter Member.</td>
</tr>
<tr>
<td>National Institutes of Health Washington, DC</td>
<td>Jennifer was invited to present WIPO Re:Search to a group of NIH program leaders including: Bonny Harbinger, Deputy Director, Office of Technology Transfer; Michael Mowatt, NIAID; Thomas Stackhouse, National Cancer Institute at Frederick; Rashmi Gopal-Srivastava, Office of Rare Diseases Research; Steven Ferguson, Office of Technology Transfer, and Judith Hedje, Regional Program Officer Sub-Saharan Africa, as well as a team of guests from South Africa’s Technology Innovation Agency (TIA). Participants from TIA expressed interest in joining WIPO Re:Search.</td>
</tr>
<tr>
<td>MRC South Africa San Francisco, CA</td>
<td>Roopa met with Niresh Bhagwandin at BVGH’s offices in San Francisco where they discussed collaboration opportunities and neglected disease programs.</td>
</tr>
<tr>
<td>University of Washington Seattle, WA</td>
<td>Jennifer and Roopa met with University of Washington faculty members Wesley Van Voorhis, Wim Hol and Erkang Fan to learn about their research and partnering interests. In a follow-up meeting, They also met with Fred Buckner, Gregory Crowther and research fellow Kayode Ojo.</td>
</tr>
</tbody>
</table>
**Infectious Disease Research Institute (IDRI)**
Seattle, WA  
**Aug/Sept 2012**

Jennifer and Roopa met with scientific leaders at the Infectious Disease Research Institute (IDRI) in Seattle. IDRI scientists expressed interest in exploring a number of the collaboration opportunities presented.

**Foundation for Innovative New Diagnostics (FIND)**
Geneva, Switzerland  
**Sept/October 2012**

Jennifer and Tom Bombelles (WIPO) met with Philippe Jacon, CEO of Foundation for Innovative New Diagnostics (FIND) and his colleagues at FIND to present a detailed overview of WIPO Re:Search and to encourage FIND’s membership. FIND followed up and joined WIPO Re:Search.

**Stanford University**
Palo Alto, CA  
**Nov/Dec 2012**

Roopa had discussions with Michael Hsieh, Stanford Professor and postdoctoral researcher Nir Qvit from Stanford around schistosomiasis and cutaneous leishmaniasis respectively.

BVGH has participated in and presented WIPO Re:Search at a number of key global health and neglected disease events. *Table 4*, below, summarizes specific events and BVGH’s participation.

**Table 4: BVGH Participation and WIPO Re:Search Presentations at Targeted Events**

<table>
<thead>
<tr>
<th>Event Name</th>
<th>Date</th>
<th>Presentation Details</th>
</tr>
</thead>
</table>
| **Keystone Conference on Drug Discovery for Protozoan Parasites**  
Santa Fe, NM  
**January 15-20, 2012** | Roopa Ramamoorthi met with WIPO Re:Search members Paul Wyatt from the University of Dundee, as well as with David Watson and Brice Campo from Medicines for Malaria Venture (MMV). Roopa also spoke with Thierry Diagana, of Novartis Institute of Tropical Diseases (NITD), and various researchers from the Kenya Medical Research Institute (KEMRI) and BIOTECH Thailand. |
| **Washington Vaccine Forum**  
Washington, DC  
**Jan 30 – Feb 1, 2012** | Jennifer Dent attended the Washington Vaccine Forum, where she met and spoke with Lee Hall, Chief, Parasitology & International Programs Branch, Division of Microbiology & Infectious Diseases at the National Institutes of Health (NIH), about the critical importance of collaborations to advance neglected disease research. Jennifer also had productive conversations with representatives from Novartis, Merck, PATH, and AstraZeneca/MedImmune at the conference. |
| **Encouraging Therapeutics for Neglected Diseases Conference**  
Philadelphia, PA  
**March 12-13, 2012** | Jennifer and Roopa attended and met with WIPO Re:Search members from Merck and DNDi. Discussions with Merck representatives resulted in a better understanding of partnership interests and a mutually agreed process to explore inquiries. Conversations about WIPO Re:Search took place with contacts from the FDA, Johnson and Johnson, Northeastern University and others who wanted to learn more about WIPO Re:Search. (Northeastern University joined WIPO Re:Search soon after) |
| **World Malaria Day**  
San Francisco, CA  
**April 25, 2012** | Roopa attended the World Malaria Day in San Francisco where several discussions with researchers from WIPO Re:Search organizations took place. |
| **COHRED Forum 2012**  
Cape Town, South Africa  
**April 23-26, 2012** | Jennifer Dent presented the Partnership Hub to an audience of ANDI Center of Excellence representatives and other developing world research organization leaders at COHRED Forum 2012. The satellite session was organized by WIPO and MRC South Africa and was attended by approximately 50 individuals. Numerous one-on-one meetings took place at the conference to recruit ANDI Centers to WIPO Re:Search and expand developing world membership. |
| **Seattle Parasitology Conference**  
Seattle, WA  
**May 17-18, 2012** | Jennifer attended the 24th annual Seattle Parasitology conference held at Seattle BioMed. She met with Ken Stuart, President and Founder of Seattle BioMed and Wesley Van Voorhis, Head of Allergy and Infectious Diseases at the University of Washington and many other neglected disease researchers to present WIPO Re:Search and recruit new members. (Seattle BioMed and the University of Washington join WIPO Re:Search shortly after) |
<table>
<thead>
<tr>
<th>Event Title</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIO Dundee Conference</strong></td>
<td>Jennifer was invited to present WIPO Re:Search at BIO Dundee. The program was attended by an audience of biotechnology and research organizations primarily based in the UK. Prior to the event Jennifer met one-on-one with a number of University of Dundee faculty members and toured the Drug Discovery Unit headed by Paul Wyatt.</td>
</tr>
<tr>
<td><strong>University of Oxford Event</strong></td>
<td>Jennifer presented WIPO Re:Search alongside Member representatives from GSK, DNDi and MMV at an event organized by the Institute for Science, Innovation and Society at the University of Oxford titled: <em>Partners in Innovation: PDPs and the Future of Public-Private Collaborations.</em></td>
</tr>
<tr>
<td><strong>2012 BIO International Convention</strong></td>
<td>Don Joseph chaired a WIPO Re:Search panel with Member representatives at the BIO International Convention – the largest biotech/pharma partnering event of the year. The BIO panel included Member representatives: Roy Waldron - Pfizer, Steven Bossone - Alnylam, Steven Ferguson - National Institutes of Health and Peter Ruminski - Center for World Health and Medicine, presenting their organizations WIPO Re:Search experiences. Jennifer Dent presented WIPO Re:Search on a separate panel chaired by Meir Pugatch, titled: <em>Intellectual Property and Biotechnology - The Way Ahead.</em> A number of one-on-one meetings took place at BIO including with representatives from: Fiocruz, CWHM, iThemba, Roche, Exelixis, European Commission and others.</td>
</tr>
<tr>
<td><strong>Foundation Merieux’s 5th Moving Forward in Diagnostics Forum</strong></td>
<td>Jennifer represented BVGH and WIPO Re:Search at Foundation Merieux’s 5th Moving Forward in Diagnostics Forum in Annecy, France. She met with Members, presented WIPO Re:Search to potential new Members and learned about a number of promising point-of-care diagnostic products in development.</td>
</tr>
<tr>
<td><strong>Emerging Paradigms for Anti-Infective Drug Design</strong></td>
<td>Jennifer stopped in London to attend a meeting at the London School of Hygiene and Tropical Medicine. She met with Simon Croft to discuss WIPO Re:Search and to secure his support to bring LSHTM on board as a member. Several WIPO Re:Search members presented at and attended the event, which was considered a success by all participants. A number of collaboration opportunities were discussed with Members and many attendees were interested in learning about the Consortium.</td>
</tr>
<tr>
<td><strong>2012 American Society of Tropical Medicine &amp; Hygiene (ASTMH) Annual Meeting</strong></td>
<td>Jennifer and Roopa met with Peter Hotez, President of the Sabin Vaccine Institute and Professor at Baylor College of Medicine and Erin Knievel, Resource Development Associate at Sabin and discussed how best to leverage pharmaceutical expertise to support process development and manufacturing of GMP lots for clinical trials for neglected disease vaccines. Jennifer and Roopa also met with Frederick Duncanson, Senior Director and Michael Everson, Senior Clinical Research Scientist at Eisai. Roopa met with Sushant Sahastrabuddhe, Associate Research Scientist at the International Vaccine Institute (IVI) at ASTMH and learned about IVI’s capabilities around dengue vaccines. Alex Debrah, Faculty Member in Allied Health Sciences and Linda Basta, Graduate Student at Kwame Nkrumah University in Ghana discussed their research and interests with Roopa at ASTMH.</td>
</tr>
<tr>
<td><strong>DNDi’s: ‘Lives in the Balance: Delivering Medical Innovations for Neglected Patients and Populations’ Conference</strong></td>
<td>Jennifer represented WIPO Re:Search and BVGH at the event where she met with many current members as well as potential new members. At the conference Jennifer connected with Marcel Tanner, Director, Swiss Tropical Public Health Institute; David Reddy, CEO MMV; Carlos Morel, Director, Center for Technological Development in Health (CDTS), Fiocruz; David Olsen, Jackie Fine and Deborah Nicoll-Griffith from Merck.</td>
</tr>
</tbody>
</table>

**Status of 2012 Early Collaborations Opportunities**

The following table highlights WIPO Re:Search collaboration opportunities included in our first two Reports to Members (launch through June 2012) and updated for this report through December 31, 2012. These collaboration opportunities have progressed and in several cases we are anticipating Agreements will be in place within the next several months. Some opportunities are on hold and waiting for feedback from one party
regarding next steps. BVGH continues to engage with Members to move discussions forward and encourages Members to make decisions to pursue collaboration or decline the opportunity.

Table 5 presents collaboration opportunities facilitated by BVGH and currently being evaluated by Members. Mutual interest in exploring the opportunities below has been established between Members and discussions are underway.

Table 5: Early Stage WIPO Re:Search Collaboration Opportunities

<table>
<thead>
<tr>
<th>Collaborations under consideration</th>
<th>Members Involved</th>
<th>Status and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Canine Leishmaniasis</td>
<td>Pfizer</td>
<td>Exploratory Phase: Pfizer and Fiocruz have expressed interest in developing a product for canine leishmaniasis (dogs are the carriers that transmit disease to humans). Waiting for Fiocruz to determine interest and follow-up.</td>
</tr>
<tr>
<td></td>
<td>Fiocruz</td>
<td></td>
</tr>
<tr>
<td>2 Leveraging tuberculosis drug discovery expertise for Buruli ulcer drug discovery</td>
<td>Swiss Tropical and Public Health Institute (Swiss TPH)</td>
<td>Exploratory Phase: Initial discussions have taken place to explore collaboration opportunities. There is potential to leverage AstraZeneca’s tuberculosis knowledge in drug discovery for Buruli ulcer. Next steps and timelines are under consideration.</td>
</tr>
<tr>
<td></td>
<td>AstraZeneca</td>
<td></td>
</tr>
<tr>
<td>3 RNAi targeting for leishmaniasis and for tuberculosis</td>
<td>Infectious Disease Research Institute (IDRI)</td>
<td>Exploratory Phase: Initial call scheduled to discuss the possibility of leveraging Alnylam’s RNAi targeting expertise for IDRI programs.</td>
</tr>
<tr>
<td></td>
<td>Alnylam</td>
<td></td>
</tr>
<tr>
<td>4 Hosting LMIC Researchers</td>
<td>University of Bamako, Mali</td>
<td>Exploratory Phase: Novartis is considering hosting senior researchers from Africa at their Basel site. A researcher at the University of Bamako has expressed interest.</td>
</tr>
<tr>
<td></td>
<td>Novartis</td>
<td></td>
</tr>
<tr>
<td>5 Hosting LMIC Researchers</td>
<td>University of Buea, Cameroon</td>
<td>Exploratory Phase: Novartis is considering hosting a senior researcher from Africa at their Basel site. A candidate at the University of Buea, Cameroon has expressed interest.</td>
</tr>
<tr>
<td></td>
<td>Novartis</td>
<td></td>
</tr>
<tr>
<td>6 Understanding immune response in Dengue Fever</td>
<td>Emory University</td>
<td>Exploratory Phase: Researchers from Emory University met with WRAIR researchers to further explore a collaboration around Dengue fever programs.</td>
</tr>
<tr>
<td></td>
<td>Walter Reed Army Institute of Research (WRAIR)</td>
<td></td>
</tr>
<tr>
<td>7 Applying system vaccinomics to hookworm, schistosomiasis and Chagas vaccines</td>
<td>Emory University</td>
<td>Exploratory Phase: A teleconference was coordinated between Sabin/Baylor and Emory University researchers to explore applying system vaccinomics to identify biomarkers for the development of immunity after vaccination against Chagas. This opportunity will be pursued at a later stage when the vaccine is in clinical trials.</td>
</tr>
<tr>
<td></td>
<td>Sabin Vaccine Institute</td>
<td></td>
</tr>
<tr>
<td>8 Applying RNAi to dissect apoptotic genes affected by macrolactone toxin of Buruli ulcerans</td>
<td>Swiss Tropical and Public Health Institute (Swiss TPH)</td>
<td>Exploratory Phase: Initial discussion between Swiss TPH and Alnylam has taken place to discuss potential collaborations. Follow-up discussion are planned to agree on next steps.</td>
</tr>
<tr>
<td></td>
<td>Alnylam</td>
<td></td>
</tr>
</tbody>
</table>
| 9 | Genetic Analysis for drug susceptibility in lymphatic filariasis and onchocerciasis | African Institute of Biomedical Science and Technology (AIBST)  
Kumasi Center for Collaborative Research in Tropical Medicine (KCCR) | Exploratory Phase: Mutual interest in exploring collaboration opportunities has been established. A researcher and student at KCCR will contribute disease area expertise while the AIBST researcher has experience in genetic analysis. |
|---|---|---|---|
| 10 | Computational blood brain barrier prediction | Northeastern University  
AstraZeneca | Exploratory Phase: AstraZeneca might be able to provide computational prediction for a limited set of anti-trypanosomal compounds for Northeastern University researcher. |
| 11 | Testing cutaneous leishmaniasis hits against visceral leishmaniasis | Northeastern University  
AstraZeneca | Exploratory Phase: Northeastern researcher will share some sub-structure information with AstraZeneca to determine if there is interest in exploring hits from cutaneous leishmaniasis screens in visceral leishmaniasis. |
| 12 | GMP manufacturing for vaccines | Sabin Vaccine Institute  
Pfizer  
GSK  
Merck | Exploratory Phase: BVGH has met with and had further discussions with Sabin Vaccine Institute and Professor Peter Hotez to gain an understanding of collaboration interests.  
**Pfizer:** Chief Scientific Officer, Vaccine Research will serve as an expert advisor to Sabin on the hookworm and schistosomiasis vaccines.  
**GSK:** Exploring request internally to support Sabin’s vaccine efforts. Sabin’s report on potential impact of vaccines shared with GSK.  
**Merck:** Request communicated via Merck asset access request form and it is under consideration. |
| 13 | Protease Inhibitors | Infectious Disease Research Institute (IDRI)  
GSK | Exploratory Phase: GSK to evaluate the possibility of sharing around 1500 serine, cysteine and metalloprotease inhibitors for screening against tuberculosis at IDRI. |
| 14 | Isoprenoid pathway inhibitors screening | Infectious Disease Research Institute (IDRI)  
GSK | Exploratory Phase: IDRI will apply to GSK’s Open Lab program to facilitate a collaboration between GSK and IDRI around the isoprenoid pathway in tuberculosis. |
| 15 | Access to Natural Products for screening against tuberculosis | Infectious Disease Research Institute (IDRI)  
University of California San Francisco (UCSF) | Potential Collaboration: UCSF will share natural compounds with IDRI when resources are available for accessing and plating the compounds. |
| 16 | Applying stabilized antibody technology for malaria diagnostics | California Institute of Technology (Caltech)  
Center for Malaria Diagnostics at the University of Lagos, Nigeria | Exploratory Phase: Researchers at the Center for Malaria Diagnostics and Caltech have expressed interest in exploring further the application of stabilized antibodies in malaria diagnostics. |
<table>
<thead>
<tr>
<th>Page</th>
<th>Description</th>
<th>Institution(s)</th>
<th>Collaboration Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Screening anti-malarial compounds against liver stage diseases</td>
<td>MRC South Africa Novartis</td>
<td><strong>Potential Collaboration:</strong> Medical Research Council of South Africa has compounds targeting the malaria parasite. A collaboration opportunity to screen the compounds blinded has been presented to Novartis for consideration and is under review.</td>
</tr>
<tr>
<td>18</td>
<td>Sharing a small collection of protease inhibitors to screen against a tuberculosis bacterial protein that inhibits host immune response</td>
<td>Emory University GlaxoSmithKline (GSK)</td>
<td><strong>Potential Collaboration:</strong> GSK will consider sharing a small protease library with Emory University researcher. Emory to provide CDA for GSK’s consideration.</td>
</tr>
<tr>
<td>19</td>
<td>Leveraging the combination of Dengue Immunology expertise with a liver stage model</td>
<td>MIT Emory University</td>
<td><strong>Exploratory Phase:</strong> MIT researcher has expressed interest in applying her liver stage model to study Dengue fever. Emory researcher with extensive experience in dengue immunology will explore a potential collaboration.</td>
</tr>
<tr>
<td>20</td>
<td>Capacity building in preclinical drug development, toxicology, drug formulation, scale-up and manufacturing</td>
<td>Fiocruz</td>
<td><strong>User request:</strong> Fiocruz has expressed interest in collaborations that support capacity building. BVGH has explored this request with several members including: Pfizer, AstraZeneca, Merck and Novartis. In process of obtaining more information from Fiocruz and agreeing on process to explore collaborations for Fiocruz.</td>
</tr>
<tr>
<td>21</td>
<td>Access to HDAC inhibitors for studies in malarial parasite</td>
<td>University of Calgary Merck</td>
<td><strong>Exploratory Phase:</strong> University of Calgary researcher is interested in accessing HDAC inhibitors contributed to the WIPO Re:Search Database. Interest has been shared with Merck and Merck Asset Access form will be completed and submitted for Merck’s consideration.</td>
</tr>
<tr>
<td>22</td>
<td>Hosting of African Researcher</td>
<td>Stanford University Theodor Bilharz Research Institute, Egypt</td>
<td><strong>Potential Hosting Arrangement:</strong> Stanford professor has expressed interest in hosting an African researcher in his laboratory. The goal is to enable a researcher from TBRI to participate in pathology studies of schistosomal bladder carcinogenesis and fibrosis.</td>
</tr>
<tr>
<td>23</td>
<td>Access to samples and possible collaboration</td>
<td>Stanford University Theodor Bilharz Research Institute, Egypt</td>
<td><strong>Exploratory Phase:</strong> Initial conversation has taken place between Stanford and TBRI researchers. Collaboration opportunity will be assessed and considered further at a later time.</td>
</tr>
<tr>
<td>24</td>
<td>Hosting of graduate students</td>
<td>MRC South Africa AstraZeneca</td>
<td><strong>Exploratory Phase:</strong> Resumes of two graduate students have been forwarded for consideration to AstraZeneca’s tuberculosis drug discovery research center in Bangalore. The goal is to enable students from LMIC countries to gain pharmaceutical experience in tuberculosis drug discovery.</td>
</tr>
</tbody>
</table>
IV Membership – Recruiting New WIPO Re:Search Members

Since January 2012, a total of **thirty two new Members—of which nineteen are User Members**—have joined WIPO Re:Search, far exceeding the Partnership Hub’s 2012 objective of recruiting six new User and six new Provider Members in 2012. The second half of 2012 saw remarkable progress in recruitment with the addition of 14 new Members (see listing in Table 6).

Overall, a total of 63 organizations are participating in the WIPO Re:Search consortium as of December 31, 2012. Thirteen of these members are located in Low-Middle Income Countries (LMICs), including several African Network for Drugs and Diagnostics Innovation (ANDI) Centres of Excellence.
Table 6: Summary of 2012 Member Recruitment (Jan 1 through Dec 31)

<table>
<thead>
<tr>
<th>Organization</th>
<th>Recruiting Lead</th>
<th>Member Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Africa Fighting Malaria</td>
<td>WIPO</td>
<td>Supporter</td>
</tr>
<tr>
<td>2. Africa Institute of Biomedical Science and Technology (AiBST)</td>
<td>WIPO</td>
<td>Provider and User</td>
</tr>
<tr>
<td>3. Anacor Pharmaceuticals</td>
<td>BVGH</td>
<td>User</td>
</tr>
<tr>
<td>4. Centre for Malaria Diagnostics (Nigeria)</td>
<td>WIPO</td>
<td>Provider and User</td>
</tr>
<tr>
<td>5. COHRED</td>
<td>WIPO</td>
<td>Supporter</td>
</tr>
<tr>
<td>6. Developing World Health</td>
<td>BVGH</td>
<td>Supporter</td>
</tr>
<tr>
<td>7. European Commission</td>
<td>BVGH</td>
<td>Supporter</td>
</tr>
<tr>
<td>8. Foundation for Innovative New Diagnostics (FiND)</td>
<td>WIPO/BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>9. GALVmed</td>
<td>WIPO</td>
<td>User</td>
</tr>
<tr>
<td>10. Infectious Disease Research Institute (IDRI)</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>11. International Federation of Pharmaceutical Manufacturers &amp; Associations (IFPMA)</td>
<td>WIPO</td>
<td>Supporter</td>
</tr>
<tr>
<td>12. INPI -- National Institute of Industrial Property (Brazil)</td>
<td>WIPO</td>
<td>Supporter</td>
</tr>
<tr>
<td>13. International Vaccine Institute</td>
<td>WIPO</td>
<td>Provider, User and Supporter</td>
</tr>
<tr>
<td>14. Kenya Agricultural Research Institute (KARI)</td>
<td>WIPO</td>
<td>Provider and User</td>
</tr>
<tr>
<td>15. Kenya Medical Research Institute (KEMRI)</td>
<td>WIPO</td>
<td>Supporter</td>
</tr>
<tr>
<td>16. Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR) - Ghana</td>
<td>WIPO/BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>17. Licensing Executive Society International</td>
<td>WIPO</td>
<td>Supporter</td>
</tr>
<tr>
<td>18. Liverpool School of Tropical Medicine</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>19. Massachusetts General Hospital</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>20. McGill University</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>21. Northeastern University</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>22. Public Interest Intellectual Property Advisors (PIIPA)</td>
<td>WIPO</td>
<td>Supporter</td>
</tr>
<tr>
<td>23. Seattle BioMed</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>24. Stanford University</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>25. Tech Transfer Summit Ltd. (TTS)</td>
<td>WIPO</td>
<td>Supporter</td>
</tr>
<tr>
<td>26. Theodor Bilharz Research Institute (TBRI) -- Cairo</td>
<td>WIPO</td>
<td>Provider, User and Supporter</td>
</tr>
<tr>
<td>27. University of Bamako (Mali)</td>
<td>WIPO</td>
<td>Provider and User</td>
</tr>
<tr>
<td>28. University of Buea (Cameroon)</td>
<td>WIPO</td>
<td>Provider and User</td>
</tr>
<tr>
<td>29. University of Calgary</td>
<td>BVGH</td>
<td>User</td>
</tr>
<tr>
<td>30. University of Kansas</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>31. University of Washington</td>
<td>BVGH</td>
<td>Provider and User</td>
</tr>
<tr>
<td>32. Walter Reed Army Institute of Research (WRAIR)</td>
<td>BVGH</td>
<td>Provider, User and Supporter</td>
</tr>
</tbody>
</table>

V. Communication Objectives and Achievements:

Effective communication between the Partnership Hub and WIPO Re:Search member organizations is critical to maintaining program momentum and establishing meaningful collaborations. Awareness of WIPO Re:Search within the neglected disease research community is key to engaging new User Members and expanding the potential for meaningful collaborations.

BVGH communication objectives include developing messaging and materials to support WIPO Re:Search in achieving its objectives. Member feedback on - The Partnership Hub Snapshot – has been extremely positive to date. All 2012 issues are included in Exhibit 1 for your reference and information.

The Monthly Partnership Hub Snapshot highlights ongoing Partnership Hub activities aimed at identifying and facilitating collaborations including; BVGH meetings with Members and presentations; User requests for specific
compounds, libraries or support; new Database contributions; highlighted Provider contributions; new Member announcements; select upcoming Member presentations and upcoming global health conferences; WIPO Re:Search “in the news”, and how the Partnership Hub activities are leading to new collaboration opportunities and partnerships. The Snapshot is intended to maintain high awareness of WIPO Re:Search Partnership Hub activities within Member organizations and to support partnering interest and momentum. Early each month, the Snapshot is delivered electronically to more than 550 contacts, along with a brief cover letter.

BVGH has created a Partnership Hub page on the BVGH website describing our partnering activities and processes. You can visit the site through the link below:


Through the Partnership Hub web page, Members can access Partnership Hub Monthly Snapshots as well as other resources such as information on the WIPO Re:Search Guiding Principles and a link to current consortium members.

**Partnership Hub Brochure**

BVGH developed a print brochure to capture and explain the Partnership Hub activities and our process of establishing collaborations between Members (see Exhibit 8). The Partnership Hub brochure was completed in late October and was distributed widely beginning with the WIPO Re:Search Annual Meeting, in Geneva, Switzerland, and the ASTMH Annual Meeting, in Atlanta, GA. In addition to distribution at meetings, brochures were mailed to 150 key contacts within the 63 Member organizations.

**Press Releases**

In the second half of 2012, several agreements were finalized, including collaborations between AstraZeneca and iThemba Pharmaceuticals, University of California at San Francisco, and the University of Dundee. A press release was issued on August 23, 2012, highlighting the role of WIPO Re:Search and the Partnership Hub in establishing these agreements (see Exhibit 8 for full text).

**Media Kit**

To publicize the WIPO Re:Search Annual Meeting, BVGH prepared a media kit for distribution to journalists, online media outlets, press agencies, bloggers, and radio networks. The kit contained information on the Partnership Hub, WIPO Re:Search consortium Members, and neglected tropical diseases. The Media Kit is attached as Exhibit 9.

**Social Media Update**

In November, in conjunction with the Member Workshop at the ASTMH Annual Meeting, BVGH launched a Twitter account under the @BIOVentures profile. The Twitter feed is used to transmit news updates to followers, highlight funding opportunities, publicize events, and participate in the larger global health community. As of December 31, 2013, @BIOVentures was followed by 12 organizations and had sent approximately 400 tweets. Going forward, the Twitter feed will be an increasingly important tool for interacting with WIPO Re:Search members and increasing awareness of BVGH’s activities within the broader global health community.

To complement the Twitter feed and established website, BVGH will be launching a corporate Facebook page in early 2013. This site will allow for increased engagement with both WIPO Re:Search members and the broader global health community. Site content will include photos and videos from WIPO Re:Search events, articles, feedback surveys, as well as announcements linked to press releases describing new research agreements between WIPO Re:Search members.

VI WIPO Re:Search Publicity in 2012
WIPO Re:Search has generated considerable interest and attention since launch including: media coverage; global health reports; mention on Member websites and reports as well as in public announcements. Publicity coverage and publications generated during 2012 are summarized and captured in Exhibits 2-7.

BVGH will reach out and take a more pro-active approach in pursuing WIPO Re:Search publicity opportunities in 2013. With a number of agreements in place between Members and many in advanced stages of negotiation we anticipate a number of opportunities to present the success of WIPO Re:Search to the larger community.
Exhibit 1. 2012 Snapshot Issues (Jan – Dec)

JANUARY 2012 SNAPSHOT – PAGE 1

Cornerstones of Collaborations

Roopa Ramamoothi (BVGH), Susan Dixon (GSK), Mike Strange (GSK), and Jennifer Dent (BVGH), pictured at the GSK Tree Canyons booth at the 2011 American Society of Tropical Medicine and Hygiene meeting in Philadelphia.

Tom Bombelles from the World Intellectual Property Organization (WIPO), together with Jennifer Dent, Elizabeth (Beth) Ponder, and Roopa Ramamoothi from BIO Ventures for Global Health (BVGH), met with several member representatives from Pfizer, GlaxoSmithKline (GSK), PATH, Emory University, and others at the 2011 American Society of Tropical Medicine and Hygiene (ASTMH) meeting in Philadelphia. Discussions focused on partnership opportunities — which will be further explored — including specific research interests and hosting scientists at various sites.

WIPO and BVGH also met with individuals from organizations interested in joining WIPO Re:Search, and have planned follow-up meetings with several organizations in January and February.

Research Requests

- The Center for World Health & Medicine is seeking Hsp90 inhibitor templates and analogs for malaria drug development, as well as methionine aminopeptidase-1 (MetAP-1) inhibitors for tuberculosis drug development.
  - Center for World Health & Medicine is interested in early stage discovery or preclinical MetAP-1 candidates.
- Pfizer, GSK, and AstraZeneca are taking steps to determine if their portfolios contain relevant compounds that could be shared. BVGH is reaching out to additional providers to explore the possibility of accessing Hsp90 and MetAP-1 inhibitors for the Center for World Health & Medicine.
- Floxruz has expressed interest in collaborations to support capacity building in preclinical drug development, toxicology, drug formulation, scale-up and manufacturing.

If your organization is interested in exploring collaborations around these requests, please contact Roopa at ramamoothi@bvgh.org.

New Contributions

In December, DNDI and Novartis contributed new data sets to WIPO Re:Search, including:
- Genomics Institute of the Novartis Research Foundation (GNF) liver stage dataset and structures
- DNDI Human African Trypanosomiasis (HAT) dataset: assay descriptions, data, and structures
- DNDI Chagas disease dataset: assay descriptions, data, and structures

To submit additional contributions to WIPO Re:Search, please contact Patrick Neff at patrick.neff@wipo.int.

Partnership Hub Central

BVGH is actively exploring partnership opportunities with members, as well as specific compound requests such as Hsp90 inhibitors. Specific requests, like those described in the Research Requests section from the Center for World Health & Medicine could result in new contributions and commitments to WIPO Re:Search.

Anatole Krafftiger (WIPO) and Don Joseph (BVGH) visited Floxruz in December to explore provider and user partnering opportunities.

Jennifer Dent and Roopa Ramamoothi from BVGH are coordinating WIPO Re:Search presentations at Emory University, PATH, Seattle BioMed, and others in early 2012 to increase awareness of WIPO Re:Search and the opportunities it presents among researchers.

Roopa is analyzing contributions in the WIPO Re:Search database to identify research projects that would be of mutual interest to members. Roopa and Jennifer will reach out over the coming months to discuss these opportunities.

If you have a project of interest or a relevant partnering proposal, please contact Jennifer at Jennifer.dent@bvgh.org or 415-446-9443; or Roopa at ramamoothi@bvgh.org or 415-446-9447.

Highlighted Contributions

Kinase inhibitors are in discovery, development, and clinical evaluation to target cancer, inflammation, and central nervous system indications. Novartis’ Gleevec (imatinib) was the first approved kinase inhibitor and is used to treat chronic myelogenous leukemia.

AstraZeneca recently contributed two kinase inhibitors to WIPO Re:Search, which could be applied to Human African Trypanosomiasis (HAT), or sleeping sickness.

continued on page 2

www.wipoReSearch.org

2012 Year-End Report to Funding Members
**Highlighted Contributions** – continued from page 1

- Glycogen Synthase Kinase-3 (GSK3) Inhibitor
  - GSK3 inhibitors recently have been explored in drug development for Alzheimer’s disease.
  - Published literature indicates that T. brucei, the causative agent of HAT, expresses two kinases with homology to GSK3 that can be targeted with selective inhibitors.


- Aurora B Kinase Inhibitor
  - This is a family of kinase inhibitors that has been investigated as potential candidates for cancer therapeutics.
  - *T. brucei* possesses an Aurora kinase that can be targeted with this class of inhibitors.


To learn more, attend the upcoming presentation by Michael Pollastrini, Associate Professor, Northeastern University, on the optimization of a human Aurora kinase inhibitor chemotype for selective anti-trypanosomal activity at the Keystone Symposium on Drug Discovery for Protozoan Parasites, Jan. 19.

**Merck** contributed a lead series of casein kinase I (CK1) inhibitors against leishmaniasis.

- CK1 Inhibitors are being explored for drug development for Alzheimer’s disease, Parkinson’s disease, and Amyotrophic Lateral Sclerosis (ALS).
- Published literature indicates that *T. brucei*, the causative agent of HAT, is sensitive to CK1 inhibitors.


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**Select Upcoming Member Presentations**

**Joseph DeRisi**, Professor, Biochemistry & Biophysics, **UCSF School of Medicine**, “The malaria aepicolect, a mystery resolved,” CEND Symposium, Jan. 13.

**Paul Wyatt**, Professor of Drug Discovery and Head of Drug Discovery Unit, **University of Dundee**, UK, “Validation of N-Myristoyltransferase as a drug target,” Keystone Symposium on Drug Discovery for Protozoan Parasites, Jan. 17.


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**Upcoming Global Health Meetings**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
<th>Attending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 13</td>
<td>CEND Symposium “Fighting the Diseases of Poverty: From Early Discovery to Diagnostics and Vaccines”</td>
<td>Berkeley, CA</td>
<td>Jennifer Dent, Roopa Ramamoorthi (BVGH)</td>
</tr>
<tr>
<td>Jan. 15-20</td>
<td>Keystone Symposium: Drug Discovery for Protozoan Parasites</td>
<td>Santa Fe, NM</td>
<td>Roopa Ramamoorthi (BVGH)</td>
</tr>
<tr>
<td>Feb. 9-9</td>
<td>International Society for Neglected Tropical Diseases (ISNTD)</td>
<td>London, UK</td>
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<tr>
<td>Feb. 16-20</td>
<td>AAAS Annual Meeting</td>
<td>Vancouver, Canada</td>
<td></td>
</tr>
<tr>
<td>Feb. 19-23</td>
<td>Molecular Approaches to Malaria (MAM) 2012</td>
<td>Lorne, Victoria, Australia</td>
<td></td>
</tr>
<tr>
<td>March 12-13</td>
<td>Encouraging Development of Therapeutics for Neglected Diseases</td>
<td>Philadelphia, PA</td>
<td>Jennifer Dent, Roopa Ramamoorthi (BVGH)</td>
</tr>
</tbody>
</table>

Contact Jennifer (jdent@bvgh.org) or Roopa (ramamoorthi@bvgh.org) to set up a WIPO Re:Search-related meeting at one of these events.

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This monthly snapshot is for you!

Please send us feedback and suggestions on how it could be improved by emailing Rianna Stefanakis at r Stefanakis@bvgh.org.

www.wipoReSearch.org

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2012 Year-End Report to Funding Members
Cornerstones of Collaborations

David Waterston and Brioe Campo (Medicines for Malaria Venture) and Paul Wyatt (University of Dundee) pictured at the Keystone Symposium in Santa Fe, New Mexico.

At the Keystone Conference on Drug Discovery for Protozoan Parasites in January, Roopa Ramamoorthi (BVGH) discussed potential WIPO ReSearch collaborations with Paul Wyatt from the University of Dundee, as well as with David Waterston and Brioe Campo from Medicines for Malaria Venture (MMV).

Roopa also spoke with Thierry Diagana, of Novartis Institute of Tropical Diseases (NITD), and various researchers from the Kenya Medical Research Institute (KEMRI) and BIOTech Thailand. Thomas Wallens from National Institutes of Allergy and Infectious Diseases (NIAID) visited the WIPO ReSearch poster and suggested NAI contact.

New Member Announcement

WIPO ReSearch is pleased to announce its newest member, McGill University, Montreal, Canada, which will certainly be a very valuable provider to the consortium.

"My colleagues and I at McGill are enthusiastic about our participation in WIPO ReSearch," Professor Tim Geary said. "We look forward to using this opportunity to build partnerships and advance our research in neglected tropical diseases."

Research Requests

Professor James McKerrow at the University of California, San Francisco has requested cysteine protease inhibitor libraries to screen against T. cruzi, T. brucei, and S. mansoni. The group is also interested in CYP51 inhibitors and other antifungal to be used in chagas and leishmaniasis screens.

Professor McKerrow would like to screen statin libraries and access HMCoA reductase inhibitors that may be effective targeting schistosomes. HMCoA reductase inhibitors have shown early efficacy in schistosomes and could be investigated for selectively inhibiting schistosomiasis targets.

- BVGH has had initial discussions with Novartis, Merck, and AstraZeneca around these requests and they are taking steps to determine if their portfolios contain relevant compounds that can be shared.

If your organization is interested in these requests, contact Roopa at ramamoorthi@bvgh.org.

New Contributions

Center for World Health and Medicine (CWHM) has added new contributions into WIPO ReSearch. These include:
- Evaluation of pharmacokinetic properties of candidate compounds in vitro and in rodent models
- Target-based or phenotypic screens and lead optimization for neglected tropical disease projects
- Consultation around structure based drug design and medicinal chemistry

Partnership Hub Central

BVGH had early conversations with Pfizer and FlowTec about the potential of collaborating on a leishmaniasis project. Follow-up discussions will be held later this month.

BVGH met with colleagues at the University of California, San Francisco and the University of California, Berkeley at a local conference organized by UC Berkeley's Center for Emerging and Neglected Diseases (CEND).

After productive conversations with the Emory Vaccine Center, Jennifer, Roopa, and Don Joseph (BVGH) visited Emory University in Atlanta to present and discuss WIPO ReSearch. Many potential collaborations were discussed individually with Emory faculty members.

Don, Konji Sebatia, and Tom Bomolies (WIPO) represented WIPO ReSearch at the Bill & Melinda Gates Foundation's CEO Roundtable, which focuses on neglected tropical diseases, on Jan. 30 in London.

Jennifer Dent and Roopa Ramamoorthi (BVGH) will present at PATH on Feb. 21 in Seattle.

Please send your projects of interest and relevant partnering proposal to Jennifer (jdent@bvgh.org, 415-446-9443) or Roopa (ramamoorthi@bvgh.org, 415-446-9447).

Highlighted Contributions

Vaccines often contain aluminum adjuvants that can increase the immune system response so that a lower dose of vaccine can be administered. However, vaccines containing the adjuvants aluminum phosphate or aluminum hydroxide can be damaged if accidentally frozen.

PATH has contributed to WIPO ReSearch a formulation technology to protect vaccines with these types of adjuvants from freezing and damage. The excipients used in the formulation are inexpensive, commonly used in pharmaceutical continued on page 2

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Image courtesy of thryongen.com

2012 Year-End Report to Funding Members
Highlighted Contributions – continued from page 1

products, and are included on the FDA list of excipients that are "Generally Regarded as Safe" (GRAS).

This formulation can be used with any vaccine for neglected tropical diseases that contains aluminum-based adjuvant. PATH can share expertise on this contribution beyond what has already been published.


* Pfizer has made intellectual property available around CpG motif-containing oligonucleotide (CpG 10144). This CpG vaccine adjuvant stimulates the immune system by acting as a Toll Like Receptor 9 (TLR9) agonist. It could be applied as an additional adjuvant in combination with aluminum hydroxide in vaccines being developed against neglected tropical diseases such as lymphatic filariasis, soil-transmitted helminthiasis, or onchocerciasis.

Reference: Pending Patent US 2009/0311277

### Select Upcoming Member Presentations

Numerous members will present at the CHI Conference: Encouraging Development of Therapeutics for Neglected Diseases, March 12-14 in Philadelphia, including:

- James Brown, Ph.D., Director Computational Biology, Quantitative Sciences, **GlaxoSmithKline**, "Partnerships in Neglected Disease Research: A Pharmaceutical Industry Perspective," March 12
- Jacqueline B. Fino, Ph.D., CLPTM, Associate Director Global Outlicensing and Asset Management, **Merck**, "Facilitating R&D for Neglected Diseases: Fostering Collaboration and Navigating the Complex Interface among Diverse Stakeholders," March 12
- Ian Gilbert, PhD., Professor, Drug Discovery Unit, **University of Dundee**, "Drug-Discovery for Neglected Diseases: Molecular Target-Based and Phenotypic Approaches," March 12
- Ken Gustavsen, Director Global Health Partnerships, **Merck**, "An End-to-End Corporate Commitment to NTDs: The Merck Model," March 12
- Julie Lotharius, PhD., Associate Director Translational Medicine, **MMV**, "Drug Repositioning: An Opportunistic Approach to Identifying New Drugs for Malaria," March 13

### Upcoming Global Health Meetings

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<th>Date</th>
<th>Event</th>
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<tr>
<td>Feb. 19-23</td>
<td>Molecular Approaches to Malaria (MAM) 2012</td>
<td>Lome, Victoria, Australia</td>
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<tr>
<td>March 12-13</td>
<td>Encouraging Development of Therapeutics for Neglected Diseases</td>
<td>Philadelphia, PA</td>
<td>Jennifer Dent, Roopa Rammamorthi (BVGH)</td>
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<td>April 2-5</td>
<td>Africa IP Forum: Intellectual Property, Regional Integration, and Economic Growth in Africa</td>
<td>Cape Town, South Africa</td>
<td>Konji Sebati (WPO)</td>
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<td>April 2-5</td>
<td>British Society of Parasitology (BSP) spring meeting - 50 years of Parasitology in the UK</td>
<td>Glasgow, UK</td>
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<tr>
<td>April 10-13</td>
<td>World Vaccine Congress Washington 2012</td>
<td>Washington, DC</td>
<td>Don Joseph (BVGH)</td>
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Contact Jennifer (jdent@bvgh.org) or Roopa (rama.mammoth@bvgh.org) to set up a WIPO Re:Search-related meeting at one of these events.

This monthly Partnership Hub Snapshot is for you!
Please send us feedback and suggestions on how it could be improved by emailing Filiana Stefanakis at ratefanakis@bvgh.org.

www.wipoResearch.org

partnershiphub@bvgh.org
Cornerstones of Collaborations

Jennifer Dent (BVGH) attended the Washington Vaccine Forum, where she spoke with Fenton (Lee) Hall, Chief, Parasitology & International Programs Branch, Division of Microbiology & Infectious Diseases at the National Institutes of Health (NIH), about the critical importance of collaborations to advance neglected disease research. Jennifer also had productive conversations with representatives from Novartis, Merck, PATH, and AstraZeneca/MedImmune at the conference.

Rick Millward, Deputy Chief, Walter Reed Army Institute of Research (WRAIR), was enthusiastic about WIPO Re:Search and facilitated Jennifer’s recent visit to WRAIR, where she presented to a broad staff audience. WRAIR has expressed interest in joining WIPO Re:Search.

BVGH CEO Don Joseph met with David Griggs, Director of Cellular and Molecular Biology, and Peter Ruminski, Executive Director, at the Center for World Health and Medicine (CWHM), to discuss CWHM’s requests for MetAP-1 inhibitors and HSP90 inhibitors. GlaxoSmithKline (GSK) has addressed CWHM’s questions about MetAP-1 inhibitors and shared their MetAP-1 experimental data. Pfizer is reviewing CWHM’s request for HSP90 inhibitors and the scientific teams will be sharing insights during an upcoming teleconference.

New Member Announcement

We are pleased to welcome three new WIPO Re:Search members. Stanford University School of Medicine has joined as a provider and potential user, and GALVmed has signed on as a potential user. GALVmed has ongoing collaborations with WIPO Re:Search members, including the University of Dundee and Drugs for Neglected Diseases initiative (DNDi). Additionally, the Biotechnology Industry Organization (BIO) has signed on as an official supporter.

Research Requests

Dennis Liotta, Professor of Chemistry at Emory University, is interested in exploring partnerships with collaborators that have expertise in dengue biology. If your organization is interested in this request or would like to publicize your own requests, email Roopa Ramamoorthi at ramamoorthi@bvgh.org.

Partnership Hub Central

Jennifer Dent (BVGH) and Roopa Ramamoorthi (BVGH) presented to PATH’s vaccine and diagnostics researchers and commercialization officers (pictured above) in Seattle. PATH expressed a desire to see more diagnostic companies join WIPO Re:Search and suggested specific companies to target. They are also interested in accessing vaccine adjuvants, and they emphasized PATH’s capabilities in diagnostic prototype development. PATH is exploring providing additional contributions to WIPO Re:Search.

David Stephen, Vice President of Research at Emory University, facilitated BVGH meetings with neglected tropical disease research leaders, including Professor Dennis Liotta. BVGH learned about Emory’s research, partnering interests, and resources during their recent visit, including their state-of-the-art primate facility. Jennifer and Roopa had targeted discussions with two Emory faculty members, Bali Pulendran and Jyothi Rengarajan, around systemic vaccinomics and tuberculosis drug development.

Many potential collaboration opportunities were identified.

While visiting the National Institutes of Health, Jennifer and Roopa met with John Rogers, Preclinical Parasite Drug Development Project Officer, at NIAID. They also met with Michael Marin, CEO, and Erin Knievel, Resource Development Coordinator, at the Sabin Vaccine Institute to discuss and present several collaboration opportunities. A follow-up phone call has been scheduled to discuss these possibilities with Peter Hotz, President of Sabin, and Maria Elena Bottazzi, who leads product development for the Sabin vaccine development program.

Roopa visited the AstraZeneca Bangalore (India) Research Facility to learn about their tuberculosis research program. Sunitha DeSouza, Associate Director, Manager External Collaborations, Infection Strategy, and Director of Biosciences V. Balasubramanian discussed AstraZeneca’s partnering interests.

Jennifer and Roopa had productive conversations with staff from Infectious Disease Research Institute (IDRI), who has since expressed interest in joining WIPO Re:Search.
**Highlighted Contributions**

New anti-malarial drugs are needed to tackle emerging resistance to existing drugs. Highlighted below are three contributions to WIPO Re:Search that target malaria either by a new mechanism of action or by acting on both the blood and gametocyte stage.

Histone deacetylase (HDAC) inhibitors are approved for the treatment of cutaneous T-cell lymphomas and are in clinical trials for the treatment of other cancers. Merck has contributed lead series compounds of HDAC inhibitors to WIPO Re:Search. These have potential to be optimized as anti-malarial drug candidates. HDAC inhibitors could also be screened against parasites causing leishmaniasis, human African trypanosomiasis (sleeping sickness), and schistosomiasis, since these parasites also possess HDAC homologues.


The National Institutes of Health (NIH) has made available therapeutic tricyclic compounds that kill parasite at the gametocyte stage and thereby block malaria transmission.


HIV protease inhibitors have demonstrated activity against malaria parasites targeting both the blood and gametocyte stage of the parasites. NIH has contributed a series of aspartic protease inhibitors that inhibit the HIV-1 protease and also possess anti-malarial properties.


**WIPO Re:Search in the News**

On January 30, the Bill & Melinda Gates Foundation highlighted WIPO Re:Search as a new R&D collaborative to provide unprecedented access to compound libraries that could lead to new treatments for neglected tropical diseases, malaria, and tuberculosis in its press release, "Private and Public Partners Unite to Combat 10 Neglected Tropical Diseases by 2020."

As an innovative mechanism to spur global health product development, WIPO Re:Search was featured in the 2012 Global Health Technologies Coalition (GHTC) Annual Policy Report released February 28.

**Upcoming Global Health Meetings**

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Contact Jennifer (jdent@bvgh.org) or Roopa (ramemoonthi@bvgh.org) to set up a WIPO Re:Search-related meeting at one of these events.

*This monthly Partnership Hub Snapshot is for you! Please send us feedback and suggestions on how it could be improved by emailing Rianna Stefanakis at rstefanakis@bvgh.org.*

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2012 Year-End Report to Funding Members

Cornerstones of Collaborations

At the Encouraging Development of Therapeutics for Neglected Diseases meeting in Philadelphia, Jennifer Dent and Roopa Ramamoorthi of BIO Ventures for Global Health (BVGH) discussed WIPO Re:Search collaboration opportunities with Merck colleagues David Olesen, Senior Director, External Partnerships, Infectious Diseases, Jacqueline Fine, Associate Director, Asset Management and Out-licensing, External Scientific Affairs, and Deborah Nicoll-Griffith, Scientific Lead, Infectious Diseases Franchise, Discovery and Preclinical Sciences.

At the conference, Jacqueline highlighted WIPO Re:Search during her presentation, “Facilitating R&D for Neglected Diseases: Fostering Collaboration and Navigating the Complex Interface among Diverse Stakeholders.” She chaired a separate roundtable session on developing robust collaborations, during which she described WIPO Re:Search as a new way to approach pharmaceutical companies to explore neglected disease collaboration opportunities.

Jennifer and Roopa met with WIPO Re:Search members in attendance, including Jean-Pierre Paccoud, Business Development Director at the Drugs for Neglected Diseases initiative (DNDi). They also spoke about WIPO Re:Search with conference presenters, including researchers from the U.S. Food and Drug Administration, Johnson & Johnson, and Northeastern University.

Don Joseph, CEO of BVGH, Jennifer, and Roopa met with executives from the Office of Intellectual Property and Industry Research Alliances at the University of California, Berkeley. Jennifer and Roopa also met with Tereña Madin, Executive Director of the UC Berkeley’s Center for Emerging and Neglected Diseases (CEND), and spoke about presenting to a broader audience of faculty in the near future.

New Contributions

A new contribution, “Screening methods to identify inhibitors of mycobacterial adenylate phosphorosulfate (APS) reductase and APS kinase” from the University of California, Berkeley was recently added to the WIPO Re:Search database. This method targets the mycobacterial sulfation pathway and can be used to identify drug candidates for tuberculosis and leprosy.

www.wipoReSearch.org

Partnership Hub Central

Through WIPO Re:Search, James McKenna, professor at the University of California, San Francisco (UCSF), has spoken with scientists at AstraZeneca about gaining access to protease and kinase libraries. An initial conversation between AstraZeneca scientists and the University of Dundee, Drug Discovery Unit was also facilitated recently through the Partnership Hub.

GlaxoSmithKline (GSK) responded to an inquiry from the Center for World Health and Medicine (CWHM) and provided detailed answers to questions about MetAP-1 inhibitors for tuberculosis. GSK also shared some of their own research data in this area with CWHM, which was helpful and informative in determining next steps. Through this type of information and data sharing, WIPO Re:Search members can benefit from significant R&D cost and time savings.

Meetings took place with individuals from the U.S. National Institutes of Health’s (NIH) Technology Transfer Office and Parastiology and International Program Branch to learn more about the resources the NIH could provide to WIPO Re:Search members. Jennifer and Roopa also met with Cristina Cassetti, Program Officer for Acute Viral Diseases at the National Institute of Allergy and Infectious Diseases (NIAID), to learn about programs and in-kind contributions available to researchers working on dengue fever-related projects.

Jennifer and Roopa met with Professor Philip Rosenthal of UCSF to discuss his partnering interests around malaria. Please send your projects of interest and relevant partnering proposals to Jennifer (jdent@bvgh.org, 415-446-9443) or Roopa (ramamoorthi@bvgh.org, 415-446-9447).

New Member Announcements

We are pleased to welcome the Liverpool School of Tropical Medicine (LSTM) to WIPO Re:Search as both a Provider and potential User. With their worldwide reputation for neglected disease research, and their new state-of-the-art facility, LSTM will be an important partner in WIPO Re:Search.

We are also pleased to announce Anacor Pharmaceuticals as a new potential User in WIPO Re:Search. “WIPO Re:Search provides an opportunity for Anacor to further our impact on drug discovery and development of drugs to treat neglected diseases,” said Eric Easorn, Anacor’s Program Leader Neglected Diseases. “We look forward to establishing new relationships through the Partnership Hub.”

Sarita De Sousa (AstraZeneca) and Roopa Ramamoorthi (BVGH) at AstraZeneca’s Bangalore, India-based tuberculosis research site in February.
Highlighted Contributions

Re:Search
Sharing Innovation in the Fight Against Neglected Tropical Diseases

Leveraging Industry RNAi Know-How to Accelerate Drug Development for Neglected Tropical Diseases

RNA interference (RNAi) is a method to knock down or down-regulate gene expression post-transcriptionally. The binding of the small interfering RNA (siRNA) to the target messenger RNA (mRNA) results in degradation of the mRNA. This prevents the protein coded by the mRNA from being produced.

Anylam Pharmaceuticals is a key leader in the field of RNA interference (RNAi). As a contributing partner to WIPO Re:Search, Anylam provides access to their extensive expertise in RNA-related techniques, as well as access to a collection of granted and pending patent applications, including siRNA compositions, methods of using such compositions in a variety of applications, delivery modalities related to direct or systemic delivery of siRNA into diseased tissues, and pharmaceutical formulations and chemical modifications related to siRNA.

Anylam's expertise in RNAi technology can be used in exploring host factors that affect pathogenesis. This process can be applied to elucidate immune response in tuberculosis, dengue fever, and other diseases. RNAi can also be used for target validation in the case of parasitic organisms, which possess RNAi mechanisms. The diseases where RNAi can be applied directly to the parasitic enzyme targets include soil-transmitted helminthes (ascariasis and trichuriasis), schistosomiasis, onchocerciasis (river blindness), leishmaniasis, human African trypanosomiasis (HAT), and fascioliasis. References:

3. BVGH Global Health Primer (www.globalhealthprimer.org)

Research Requests

Professor Peter Hotez from the Sabin Vaccine Institute is interested in collaborating with pharmaceutical companies around pilot scale manufacturing and formulation of schistosomiasis and hookworm vaccines. Jennifer is exploring members' interests in collaborating with Sabin on this request. If your organization is interested in exploring collaborations around these requests, or publicizing your own requests, please contact Roopa at raramaooorthi@bvgh.org.

Select Upcoming Member Presentations

The World Intellectual Property Organization (WIPO) with BIO Ventures for Global Health (BVGH) and the Medical Research Council of South Africa will host a satellite session at Forum 2012 (COHRED) on April 23 in Cape Town, South Africa. The session, "WIPO Re: Search — A New Innovative Approach to Fostering Research Collaborations for African Researchers and Intellectual Property Managers," aims to increase engagement of African research institutions in WIPO Re:Search.

Upcoming Global Health Meetings

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This monthly Partnership Hub Snapshot is for you!

Please send us feedback and suggestions on how it could be improved by emailing Rianna Stefanakis at rstefanakis@bvgh.org.

www.wipoReSearch.org partnershiphub@bvgh.org
Cornerstones of Collaboration

Jenifer Dent, Konji Sebati, Tom Bombelles, Stéphane Droin (Pfizer), Niresh Bhagwandin, Ali Dhansay and Michelle Mulder (Medical Research Council, South Africa) represented WIPO Re:Search at the COHRED, Forum 2012: BEYOND AID... research and innovation as key drivers for health, equity and development, conference in Cape Town, South Africa. The conference presented an opportunity to increase awareness of WIPO Re:Search in Africa and recruit developing world members to the consortium. WIPO, together with the Medical Research Council (MRC), South Africa, organized a satellite symposium to present WIPO Re:Search to a targeted group of neglected tropical disease (NTD) research organizations.

WIPO provided financial support to several participants from the African Network for Drugs and Diagnostics Network (ANDI) which enabled them to attend the session and conference. Stéphane Droin, Head of International Patents, Pfizer presented a Provider company perspective on participation and commitment to WIPO Re:Search.

All of the participating ANDI Centers of Excellence and many others expressed a desire to join WIPO Re:Search. We anticipate several new members will be on board in the coming months.

New Contributions

Professor Jianzhu Chen leads the Singapore MIT Alliance for Research and Technology (SMART) Center Infectious Disease Program. His group is investigating host pathogen interactions. Accessing this expertise could be valuable to WIPO Re:Search members to identify and study drug targets and vaccine candidates.

Professor Sanjeeet Bhatia directs the MIT Laboratory for Multiscale Regenerative Technologies. Her expertise and liver stage malaria models could be useful to WIPO Re:Search members studying and screening drugs in liver stage malaria.

Partnership Hub Central

Through the Partnership Hub, early discussions were facilitated between Dennis Liotta of Emory University and Cristina Cassetti, Program Officer Acute Viral Diseases, NIAID to explore in-kind support from the NIH for a dengue research program.

Anacor recently joined WIPO Re:Search and the Partnership Hub is responding to their requests. Specifically, Anacor expressed interest in accessing pharmaceutical company data from previously-conducted anti-bacterial research to move their shigellosis program forward. Even though diarrhea caused by Shigella is not included on the WIPO Re:Search list of diseases, members have been responsive and are exploring within their organizations to support information sharing with Anacor.

Highlighted Contributions

The Walter Reed Army Institute of Research (WRAIR) brings strong capabilities to WIPO Re:Search, including a pilot bioproduction facility, veterinary facilities for preclinical studies, and capability in conducting global clinical trials. Pilot BioProduction Facility (PBF): The WRAIR PBF can provide phase I/II cGMP bacterial and viral vaccine material. PBF is a BSL-2 facility and provides cell seed/bank production, fermentation, purification, formulation /filing /freeze-drying. PBF has worked with recombinant subunit vaccines, live-attenuated viral vaccines, live-attenuated bacterial vaccines, inactivated bacterial and viral vaccines.

Veterinary Medicine Facility: WRAIR has an established Veterinary Medicine Facility that offers collaborations for preclinical studies in non-human primates and other animals.
WRAIR has a Pathogen Free Colony of Indian Origin Rhesus Macaques available for collaborative studies in tropical disease research, testing vaccines and therapeutics for malaria, leishmaniasis and dengue fever.

Clinical Trials Center: The Clinical Trials Center (CTC) was established as a clinical research unit in 1992 to support military, Federal, and industrial partners in their mission to develop new vaccines, drugs, and diagnostic systems that will benefit not only the military, but all people. Services include design and implementation of clinical protocols and support in all aspects of study design. WRAIR also provides regulatory services, including development of regulatory strategies for new product submissions, and preparation of regulatory documents and their submission to the FDA.

New Member Announcements

We are pleased to announce that the Infectious Disease Research Institute (IDRI) has joined WIPO Re:Search as a Provider and User. "IDRI's emphasis on developing products to address the burden of disease in the developing world fits nicely with WIPO Re:Search and BVGH’s mission of facilitating public-private partnerships", said Stewart Parker, CEO, IDRI. "We anticipate that WIPO Re:Search and BVGH will play a valuable role in identifying collaborators."

Research Requests

The Infectious Disease Research Institute (IDRI) has an active program in tuberculosis drug discovery and is interested in expanding its collaborations to include Chagas disease, leishmaniasis, human African trypanosomiasis (HAT), lymphatic filariasis, onchocerciasis, schistosomiasis, trachoma and other neglected diseases. IDRI has a modern screening facility, expertise in assay development, chemistry, and microbiology. They are interested in gaining access to additional chemical diversity, as well as fostering collaborations with researchers who have compound libraries, targets, and/or expertise in disease-specific assay development.

Select Upcoming Member Presentations

Don Joseph (BVGH) will be chairing a WIPO Re:Search panel session at the upcoming Biotechnology Industry Organization’s (BIO) annual international Convention on June 21, 2012 from 10 – 11:30am. The session, "Thinking Outside the Box: A New IP-Sharing Model Brings Biopharma, Government Agencies, and Non-profits Together to Accelerate R&D Collaborations for Neglected Tropical Diseases."

Panelists representing WIPO Re:Search member organizations include: Steve A. Bossone, Vice President, Intellectual Property, Amyline; Steven Ferguson, Deputy Director, Licensing & Entrepreneurship, NIH Office of Technology Transfer; Peter Ruminiski, Executive Director, Center for World Health & Medicine. St. Louis University and Roy Waldron, Senior Vice President & Associate General Counsel, Chief Intellectual Property Counsel, Pfizer.

Upcoming Global Health Meetings

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<td>Seattle Parasitology Conference</td>
<td>Seattle, WA</td>
<td>Jennifer Dent (BVGH)</td>
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<td>21-26 May</td>
<td>World Health Assembly</td>
<td>Geneva, Switzerland</td>
<td>WIPO</td>
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<td>12-14 June</td>
<td>Pacific Health Summit</td>
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partnershiphub@bvgh.org
Cornerstone of Collaboration

Jennifer and Roopa presented WIPO Re:Search and the role of the Partnership Hub at McGill University. They also met with faculty members working in neglected tropical diseases to learn about their research and to explore partnering interests. Several ideas will be explored further with WIPO Re:Search Members.

Earlier in May, Jennifer attended the 24th Annual Seattle BioMed Parasitology Conference. There she met with Ken Stuart, President and Founder of Seattle Biomed and Wes Van Voorhis, Head of Allergy and Infectious Diseases, University of Washington, and had discussions regarding WIPO Re:Search, the Partnership Hub and becoming a Member.

New Member Announcements

We are delighted to welcome Northeastern University as the newest Provider and potential User WIPO Re:Search Member. “Neglected tropical diseases are an area of significant interest at Northeastern,” said Michael Poliastr, Associate Professor of Chemistry & Chemical Biology at Northeastern University. “We are currently expanding our NTD faculty and core capabilities, and the Partnership Hub will provide opportunities to identify new and innovative collaboration opportunities, access diverse compound libraries and expand our partnering network with other WIPO Re:Search members.” We look forward to exploring potential collaboration opportunities on Northeastern’s behalf.

We are also pleased to welcome three new Supporters, who have expressed their endorsement of the WIPO Re:Search guiding principles this past month: COHRED, Africa Fighting Malaria, and the Tech Transfer Summit Ltd. (TTS).

New Contributions

McGill University has contributed a rapid malaria detection diagnostic. Hemozoin is a waste product produced in red blood cells infected by malarial parasites. The diagnostic approach relies on the detection of a strong third harmonic signal generated when hemozoin is excited with ultra-short laser pulses. More details can be obtained from the WIPO Re:Search Database (http://www.wipo.int/research/en/data/mcgill_07116_wiseman.pdf)

Partnership Hub Central

Jennifer and Roopa visited Stanford University and had discussions with Kevin Grimes, Co-Director of SPARK and Clinical Assistant Professor at the Stanford School of Medicine. Kevin provided them with a summary of projects that SPARK researchers are pursuing in neglected diseases and invited them to present WIPO Re:Search to a broader Stanford audience. Jennifer and Roopa also had the opportunity to meet with Amy Lockwood, Deputy Director, Center for Innovation in Global Health, and Nancy Federspiel, Program Officer, Institute for Immunity, Transplantation and Infection.

Niresh Bhagwandd (South African MRC) speaking at the COHRED, Forum 2012 meeting in South Africa last month

Jennifer introduced Stanford researchers to leading scientists at Kumasi Center for Collaborative Research in Tropical Medicine (KCCR) and the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana. The researchers are in discussions about obtaining fecal samples from Ghana to test a point of care diagnostic being developed for soil-transmitted helminthes.

Roopa facilitated an initial discussion between Rafi Ahmed and Jens Wrammert (Emory University) with Stephen Thomas and Robert Putnak of the Walter Reed Army Institute of Research (WRAIR). They discussed potential collaborations around understanding immunity in dengue fever and are planning an in person meeting at WRAIR to explore this further.

Jennifer presented WIPO Re:Search and the Partnership Hub at the recent 12th Annual BIO Dundee Conference, held in Scotland. While at the University of Dundee, Jennifer met with Paul Wyatt, Ian Gilbert, Michael Ferguson, Diane Taylor and others to discuss WIPO Re:Search and collaboration opportunities. Jennifer toured the Dundee Drug Discovery Unit which was impressive and looked more like a biotech or small pharma discovery unit.
Highlighted Contributions

**Vaccine Delivery** – There is growing interest in using DNA-based vaccines in prime boost strategies for tuberculosis and other neglected diseases. Pfizer has contributed technology to WIPO Re:Search around nucleic acid-coated particles to deliver these DNA-based vaccines. These particles are obtained by precipitating nucleic acid on inert metal carrier particles in the presence of specific nucleic acid condensing and metal chelating agents.³

**Vaccine Expression**: Pfizer has also shared IP related to a nucleic acid construct for expressing vaccine antigens. This construct includes a human cytomegalovirus (hCMV) promoter for transcription of the inserted gene sequence.³

References:

1. Lu J. et al. (2011) “Immunogenicity and protective efficacy against murine tuberculosis of a prime-boost regimen with BCG and a DNA vaccine expressing ESAT-6 and Ag85A fusion protein.” Clinical and Developmental Immunology Article ID 617862


WIPO Re:Search in the News

WIPO Re:Search has been included in the Methodology Report for the upcoming Access to Medicines Index 2012. The program is recognized as an indicator in the subcategory on "IP sharing for research and development". Participation in WIPO Re:Search will be considered as a metric for pharmaceutical company scoring of Access to Medicines ratings.

The IFPMA, a WIPO Re:Search Supporter, featured the initiative in their recent report, “Assembling the pharmaceutical R&D puzzle for needs in the developing world”. The report highlights WIPO Re:Search, including tables that capture the type and number of contributions, as well as WIPO Re:Search contributions by disease and contributing entity.

Select Upcoming Member Presentations

Representatives from Pfizer, the U.S. National Institutes of Health (NIH), Aflatym Pharmaceuticals, and the Center for World Health and Medicine (CWHM) will participate in an interactive panel about WIPO Re:Search at the upcoming BIO International Convention in Boston. Jennifer Dent will also represent the Partnership Hub on a separate panel titled, "Intellectual Property and Biotechnology – The Way Ahead", also at the BIO Convention.

The Institute for Science, Innovation and Society at the University of Oxford invited Jennifer to speak about WIPO Re:Search at their workshop on June 13th.

The program is titled, ‘Partners in Innovation: PDPs and the Future of Public-Private Collaborations’.

Representatives from Oxford, GlaxoSmithKline, DFID, Swiss Tropical Institute will speak about neglected tropical disease research and partnerships and discuss the present and future of global product development partnerships.

Upcoming Global Health Meetings

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<th>Date</th>
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<tbody>
<tr>
<td>13-16 June</td>
<td>15th International Congress on Infectious Diseases (ICID)</td>
<td>Bangkok, Thailand</td>
<td>WIPO Re:Search Members and BVGH Representatives</td>
</tr>
<tr>
<td>13-16 June</td>
<td>Annual Meeting of the American Society of Parasitologists</td>
<td>Richmond, VA</td>
<td>WIPO Re:Search Members and BVGH Representatives</td>
</tr>
<tr>
<td>18-21 June</td>
<td>BIO International Convention</td>
<td>Boston, MA</td>
<td>WIPO Re:Search Members and BVGH Representatives</td>
</tr>
<tr>
<td>8-10 July</td>
<td>2nd Infectious Diseases World Summit</td>
<td>San Francisco, CA</td>
<td>WIPO Re:Search Members and BVGH Representatives</td>
</tr>
</tbody>
</table>

Contact Jennifer (jdent@bvgh.org) or Roopa (rnamasandhi@bvgh.org) to set up a WIPO Re:Search-related meeting at one of these events.

This monthly Partnership Hub Snapshot is for you!
Please send us feedback and suggestions on how it could be improved by emailing partnershiphub@bvgh.org.

www.wipoReSearch.org

partnershiphub@bvgh.org

2012 Year-End Report to Funding Members
On June 21 at the 2012 Biotechnology Industry Organization (BIO) International Convention in Boston, WIPO Re:Search was featured in a well-attended session. Panelists presented their WIPO Re:Search contributions and experiences at the largest global gathering of biotech industry professionals. Don Joseph (BVGH) introduced and moderated the panel. Panelists included Roy Waldron, Senior VP & Associate General Counsel, Chief IP Counsel, Pfizer; Peter Runinski, Executive Director, Center for World Health and Medicine, Steve Bossone, VP of Intellectual Property, Aynlam Pharmaceuticals; and Steven Ferguson, Deputy Director, Licensing & Entrepreneurship, National Institutes of Health Office of Technology Transfer.

Jennifer Dent (BVGH) represented WIPO Re:Search on another panel session at BIO titled, Intellectual Property and Biotechnology - The Way Ahead. This session was hosted by The Pugatch Consilium.

WIPRe:Search Members Peter Runinski (CWHI), Roy Waldron (Pfizer), Steven Ferguson (NIH), and Steve Bossone (Aynlam) share their experiences in WIPO Re:Search at BIO 2012.

The Institute for Science, Innovation and Society at the University of Oxford invited Jennifer Dent to present WIPO Re:Search at their workshop, Partners in Innovation: PDPs and the Future of Public-Private Collaborations on June 13th in Oxford. Jennifer presented alongside WIPO Re:Search Members Nick Cammack, GlaxoSmithKline; Jean-Pierre Paccoud, Drugs for Neglected Diseases Initiative; Anya Ramalho, Medicines for Malaria Venture, and representatives from the EU Commission, Policy Cures and DFID.

Following the event in Oxford, Jennifer presented and discussed WIPO Re:Search with Ole Olesen, Scientific Officer for Global Health and Line Matthiessen-Guyader, Head of Unit Infectious Diseases and Public Health at the EU Commission. Follow-up discussions are underway to explore synergies between the EU Commission and WIPO Re:Search.

The BIO 2012 International Convention presented an opportunity to connect with many WIPO Re:Search Members and potential new members. Jennifer and Don met with Jorge Bermudez, Vice President of Health Production and Innovation, Fundação Oswaldo Cruz (Fiocruz) and his colleague Rosciel Baetas to discuss and explore partnership opportunities of interest to Fiocruz. Jorge and Rosi expressed a strong commitment and enthusiasm in working with the WIPO Re:Search Consortium to establish collaborations. Jennifer also met with Wim Degraeve, Coordinator, Program for Technological Development of Health Products at Fiocruz and Ana Paula Oliveira Brum, Management Coordinator Technological Development and Innovation, Fiocruz.

WIPO and BVGH are extremely pleased to welcome the University of Washington as WIPO Re:Search's newest Provider and User Member. The Partnership Hub has already begun exploring potential partnerships on behalf of Wesley Van Voorhis, Head, Allergy and Infectious Diseases. "We're pleased to be on board as a member of WIPO Re:Search," said Wesley Van Voorhis. "I'm looking forward to working with Jennifer and Roopa to identify promising new collaboration opportunities through the WIPO Re:Search Consortium and we've already gotten off to a great start."

Developing World Health (DWH), a Scottish-based organization, has joined WIPO Re:Search as a Supporter of the initiative. We are pleased to have DWH on board and look forward to exploring opportunities to collaborate and support our common objectives.

Following the BIO Conference, Jennifer presented WIPO Re:Search to representatives from South Africa's Technology Innovation Agency (TIA) and leaders at the National Institutes of Health (NIH). TIA expressed interest in joining WIPO Re:Search as a Provider, User, and Supporter Member.

www.wiporesearch.org

2012 Year-End Report to Funding Members
The meeting, organized by Bonny Harbinger, Deputy Director, Office of Technology Transfer, NIH included NIH directors Michael Mowatt, NIAID; Thomas Stackhouse, National Cancer Institute at Frederick; Rashmi Gopal-Srivastava, Office of Rare Diseases Research; Steven Ferguson, Office of Technology Transfer, and Judith Hedge, Regional Program Officer Sub-Saharan Africa.

Nirjes Bhagwandin, Executive Manager Strategic Research Initiatives at South African Medical Research Council (MRC) visited BVGH during his trip to the Bay Area. Nirjes and Roopa discussed MRC South Africa’s interest in collaborating on specific projects around Tuberculosis and Malaria.

Merck and UCSF held an initial discussion to explore a project around Schistosomiasis involving sharing of compound libraries.

Research Requests

Professors Armando Jardim and Momar Ndai from McGill University have been investigating the antitumor compound containing the cyclopropylpyrroloindole (CPI) pharmacophore. In vitro studies showed that a panel of these were extremely effective and exhibited a picomolar EC50 against *T. brucei* procyclic and bloodstream forms. The effectiveness of these drugs was further validated in animal models which showed that a single drug dose reduced the parasite burden by four orders of magnitude. Further development of these compounds as potential antiparasitic agents requires a detailed genetic toxicity and pharmacokinetic/pharmacodynamic analysis.

The Partnership Hub will be reaching out to Members who have the capabilities and are interested in collaborating to move this project forward.

New Contributions

Northeastern University is sharing its expertise in hit-to-lead and lead optimization medicinal chemistry for protozoan diseases (primarily) and other NTDs. They have established internal programs and are looking for collaborators who wish to share early chemistry data to initiate optimization programs.

Highlighted Contributions

DNA gyrase is a validated drug target for a variety of bacterial infections, including tuberculosis. Bacterial DNA gyrase is highly divergent from the equivalent enzyme in humans, eukaryotic topoisomerase II, which allows selective targeting by antibiotics.

GlaxoSmithKline has contributed a family of patents to WIPO Re:Search describing small molecules with antibacterial activity targeting DNA GyrA subunit. (See Figure for general scaffold)


AstraZeneca has also contributed a family of compounds that target bacterial DNA gyrase along with biological data of their efficacy in tuberculosis. An important aspect of the AstraZeneca DNA gyrase inhibitors is that they utilize a unique mode of action involving inhibition of the ATPase function of the GyrB subunit. They are based on the pyrrolidine scaffold (patent publication WO2010067125) and thiadiazylpyridine scaffold (patent publication WO2009147431).

The bacteria that cause leprosy and Buruli ulcer are related to the bacteria that cause tuberculosis. This similarity can be leveraged to screen and optimize DNA gyrase inhibitors to target these two diseases as well.

However, as a cautionary note it should be mentioned that safety issues have generally been a relatively common hurdle to progression of gyrase inhibitors into successful marketed agents. Hence only organizations or collaborations with significant toxicology infrastructure and expertise should embark on projects with gyrase inhibitors as starting points.

Reference: BVGH Global Health Primer (www.globalhealthprimer.org)

Upcoming Global Health Meetings

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<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>9-12 September</td>
<td>52nd International Conference on Antimicrobial Agents &amp; Infectious Diseases</td>
<td>San Francisco, CA</td>
<td>Woods Hole, MA</td>
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<tr>
<td>22-26 September</td>
<td>Molecular Parasitology Meeting</td>
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Contact Jennifer (jennifer@bvgh.org) or Roopa (roopa.memon@bvgh.org) to set up a WIPO Re:Search related meeting at one of these events.

This monthly Partnership Hub Snapshot is for you! Please send us feedback and suggestions on how it could be improved by emailing partnershiphub@bvgh.org.
Cornerstones of Collaboration

Jennifer and Roopa met with the University of Washington faculty members Wesley Van Voorhis, Wim Hol and Erkang Fan to learn about their research and partnering interests. Discussions have been initiated between the University of Washington and GlaxoSmithKline (GSK) to explore potential collaborations in the malaria field.

Simon Collier, Head of Government Relations at Eisai and Konji Sebati of WIPO presented WIPO Re:Search at the Japan Pharmaceutical Manufacturers Association (JPMA) Asia Partnership Conference in Tokyo. Eisai’s presentation highlighted the company’s contributions and made a strong case for companies in attendance to join the consortium.

New Member Announcements

We are delighted to announce that three Centers of Excellence from the African Network for Drugs and Diagnostics Innovation (ANDI) have joined WIPO Re:Search as both Providers and Users - the University of Buea, in Cameroon, the Kenyan Agricultural Research Institute, Trypanosomiasis Center and the Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR) in Ghana. “Collaboration is a critical component of KCCR’s strategy,” said Ellis Owusu-Dabo, Scientific Director at KCCR. “Membership in WIPO Re:Search provides KCCR with an opportunity to catalyse partnerships with this worldwide network of impressive neglected disease researchers and pharmaceutical companies. We have already initiated our first collaboration with Stanford and are currently engaged in talks with PATH; we anticipate more exciting partnering opportunities in the near future.”

The Partnership Hub looks forward to engaging all three ANDI centers in meaningful neglected disease collaborations.

We are also extremely pleased to welcome the University of Calgary as a User Member to WIPO Re:Search.

Partnership Hub Central

AstraZeneca (AZ) and Anacor Pharmaceuticals have initiated scientific discussions and exchanged some data and compound structures to support Anacor’s shigellosa drug development efforts.

The Partnership Hub continues to facilitate communication between the Center for World Health and Medicine (CWHO) and GlaxoSmithKline (GSK) to support knowledge-sharing around MoaAP-1 Inhibitors.

Gerd Pluschke, Professor at the Swiss Tropical and Public Health Institute, has spoken with AstraZeneca to explore leveraging their tuberculosis drug discovery program to support his Buruli ulcer research. The Partnership Hub has also facilitated a discussion between Gerd and Alnylam to assess how RNAi may be relevant to his work.

Nrihsh Bhagwanand from the Medical Research Council (MRC) of South Africa introduced the Partnership Hub to Peter Folb, Professor Emeritus, University of Cape Town, to learn about anti-malarial compounds developed at the MRC. The Partnership Hub is reaching out to Members with relevant core capabilities to explore advancing these compounds.

Jim McKerrow of UCSF had initial discussions with AstraZeneca about gaining access to protease inhibitor libraries. Roopa met with Professor McKerrow to follow-up on these discussions and to help advance this collaboration. Roopa also met with Conor Caffrey, research scientist at UCSF to learn about his research and interest in accessing samples from Africa for a schistosomiasis diagnostic that he is developing.

Roopa Ramamorthi (BVGH) and James McKerrow (UCSF) during a recent Partnership Hub meeting.
Research Requests

Professor Gerd Piuschke, Head of the Department of Medical Parasitology and Infection Biology, Swiss Tropical and Public Health Institute is interested in obtaining pharmaceutical preclinical and clinical compounds targeting tuberculosis to test for efficacy against Buruli ulcer.

Highlighted Contributions

Highlighted this month are two of Eisai’s contributions in the WIPO Re:Search Database.

**Squalene Synthase Inhibitor**

Eisai’s preclinical compound E5700 is a quinuclidine-based inhibitor of squalene synthase that was originally developed to inhibit mammalian cholesterol biosynthesis. This oral inhibitor has demonstrated efficacy in the nanomolar range against *T. cruzi*, the causative agent of Chagas disease. The compound also inhibited growth of *L. amazonensis*, the parasite that causes cutaneous leishmaniasis. Blocking squalene synthase in these parasites prevents ergosterol biosynthesis leading to loss of viability.


**Phosphodiesterase Inhibitor**

Eisai’s preclinical compound E4010 is a phosphodiesterase (PDE) 5 inhibitor initially developed to treat pulmonary hypertension. A number of other pharmaceutical companies have developed PDE 5 inhibitors for erectile dysfunction. PDE is a validated target in the malarial parasite *P. falciparum* and in *T. brucei*, the causative agent for Human African Trypanosomiasis.

Reference

Seaback, T. et al. (2011) ‘Phosphodiesterase inhibitors as a new generation of antiprotozoan drugs: exploiting the benefit of enzymes that are highly conserved between host and parasite’ Future Med. Chem. 3(10): 1286-1308

Researchers interested in evaluating either of Eisai’s compounds against parasite targets please contact the Partnership Hub for additional information.

References


Upcoming Global Health Meetings

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<tbody>
<tr>
<td>September 19-21</td>
<td>RSTMH Biennial Meeting: Discovery and Delivery of New Paradigms in Global Health</td>
<td>University of Warwick, UK</td>
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<tr>
<td>September 23-27</td>
<td>XVII International Congress for Tropical Medicine and Malaria</td>
<td>Rio de Janeiro, Brazil</td>
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<tr>
<td>October 30</td>
<td>IPMA General Assembly</td>
<td>Geneva, Switzerland</td>
<td>WIPO, BVGH</td>
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<tr>
<td>November 11-15</td>
<td>American Society of Tropical Medicine &amp; Hygiene (ASTMH) Annual Meeting</td>
<td>Atlanta, GA</td>
<td>BVGH</td>
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</table>

Contact Jennifer (jennifer@bvg.org) or Reena (reenah@bvg.org) to set up a WIPO Re:Search related meeting at one of these events.

This monthly Partnership Hub Snapshot is for you!
Please send us feedback and suggestions on how it could be improved by emailing partnershiphub@bvg.org.

www.wipoReSearch.org

2012 Year-End Report to Funding Members
First WIPO Re:Search Agreements Announced!

On August 23rd, WIPO issued a press release announcing the First Agreements Concluded under WIPO Re:Search for Research on Neglected Tropical Diseases. AstraZeneca (AZ) concluded the first three research partnerships established under the WIPO Re:Search initiative with the South African company iThembu Pharmaceuticals, the University of Dundee, and the University of California, San Francisco. These collaborations will focus on developing new treatments for schistosomiasis, kinetoplastid diseases, and tuberculosis. See WIPO’s press release for further details: [www.wipo.int/pressroom/en/articles/2012/article_0018.html](http://www.wipo.int/pressroom/en/articles/2012/article_0018.html)

Cornerstones of Collaboration

Jennifer and Roopa met with scientific leaders at the Infectious Disease Research Institute (IDRI) in Seattle. IDRI scientists expressed interest in exploring a number of the collaboration opportunities presented.

While in Seattle, Jennifer and Roopa also visited the University of Washington where they reconnected with Professors Wesley Van Voorhis and Wim Hof to follow up on previous collaboration opportunities discussed. They also met with Professors Fred Buckner, Gregory Crowther and research fellow Kayode Ojo to learn about their research and partnering interests.

New Member Announcements

We are pleased to announce that the International Vaccine Institute (IVI) has joined WIPO Re:Search as a Provider, User and Supporter. IVI brings expertise in vaccine research and development for a number of the WIPO Re:Search targeted diseases, as well as a focus in capacity-building, education and sustainable delivery of vaccines.

Anacor’s boron technology and commitment to neglected tropical diseases (NTDs), and tuberculosis present some unique opportunities for collaboration. Eric Easom, Program Leader, Neglected Diseases at Anacor Pharmaceuticals met with Jennifer and Roopa and expressed interest in developing new partnerships around novel NTD targets. Discussions are underway to explore a collaboration leveraging Anacor’s boron-based chemistry and compounds along with AstraZeneca’s tuberculosis targets and drug development expertise.

In support of PATH’s capacity building programs, the Partnership Hub introduced PATH to a few of our WIPO Re:Search contacts in Ghana and Nigeria. PATH plans to build upon these relationships and others to explore the development of new programs in Africa.

University of California, Berkeley’s Center for Emerging and Neglected Diseases (CEND) invited Roopa to attend their retreat. She met with faculty members, discussed research programs and interests, and provided a brief introduction to WIPO Re:Search. The Partnership Hub has been invited to present WIPO Re:Search to a broader audience at UC Berkeley in the Fall.

Important WIPO Re:Search Announcements

WIPO Re:Search Members are invited to attend a Workshop, organized by the Partnership Hub, and co-located with the upcoming American Society of Tropical Medicine and Hygiene (ASTMH) meeting. The WIPO Re:Search Workshop will take place on Sunday, November 11th, from 9am-4:30pm at the Marriott Marquis Hotel in Atlanta, Georgia, United States. Please email rramamoorthy@bvgh.org to RSVP.

All Members are invited to attend the WIPO Re:Search Annual Meeting, hosted by WIPO at WIPO’s new headquarters building in Geneva, Switzerland on October 30th. There will be a welcome reception on the evening of October 29th.

BVGH will be representing WIPO Re:Search at the IFPMA Assembly on October 31st, as part of the “Innovation Hub” panel focused on addressing key research gaps.

[www.wipoReSearch.org](http://www.wipoReSearch.org)  partnershiphub@bvgh.org
Research Requests

Tanya Parish, Vice President Drug Discovery at the Infectious Disease Research Institute (IDRI) is interested in accessing a diverse collection of serine, cysteine and metalloproteases to screen against Mycobacterium tuberculosis to support IDRI’s efforts in tuberculosis drug discovery.

Highlighted Contributions

Lymphatic filariasis, commonly known as elephantiasis is caused when filarial parasites are transmitted to humans through mosquito bites. Over 120 million people are currently infected in Asia and Africa. The U.S. National Institutes of Health (NIH) has contributed a diagnostic assay to the WIPO Re:Search database for detecting Wuchereria bancrofti, the main causative agent of lymphatic filariasis. This diagnostic detects the larval stage of the parasite in blood or saliva samples. A larval stage specific protein is used to detect antibodies to W. bancrofti in infected patients. The detection at this initial stage of infection is important for disease elimination and for obtaining early treatment for patients so that they do not suffer permanent disfigurement.

Highlighted Contributions——Continued

References:

BGH Global Health Primer (www.bghglobalhealth.org)

WIPO Re:Search In The News

WIPO Re:Search was featured in a recent Guardian article titled, Crowdsourcing reveals life-saving potential in global health research. Posted on August 15th, the article references WIPO Re:Search as an important example of the growing trend in collaborative health research initiatives, which aim to drive global partnerships among pharmaceutical companies, academic researchers, disease advocates, and even the general public.

Upcoming Global Health Meetings

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<tr>
<td>October 1-3</td>
<td>Infectious Disease Genomics and Global Health</td>
<td>Churchill College, Cambridge, UK</td>
<td>All members welcome</td>
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<tr>
<td>October 10-12</td>
<td>BioMed Central Conference: Challenges in Malaria Research</td>
<td>Basel, Switzerland</td>
<td>All members welcome</td>
</tr>
<tr>
<td>October 14-16</td>
<td>6th Vaccine &amp; ISV Annual Global Congress</td>
<td>Shanghai, China</td>
<td>All members welcome</td>
</tr>
<tr>
<td>October 30</td>
<td>WIPO Re:Search Annual Meeting</td>
<td>WIPO Headquarters Building, Geneva, Switzerland</td>
<td>All members welcome</td>
</tr>
<tr>
<td>November 11</td>
<td>Partnership Hub Member Workshop (co-located with the ASTMH Annual Meeting)</td>
<td>Atlanta, Georgia</td>
<td>All members welcome</td>
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<tr>
<td>November 21-23</td>
<td>Singapore International Conference on Dengue and Emerging Infections</td>
<td>Grand Copthorne Waterfront Hotel, Singapore</td>
<td>All members welcome</td>
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Contact Jennifer (jifent@bvgh.org) or Roopa (rmanojoo@bvgh.org) to set up a WIPO Re:Search related meeting at one of these events.

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www.wipoReSearch.org partnershiphub@bvgh.org
Cornerstones of Collaboration

Jennifer represented BVGH and WIPO Re:Search at Foundation Merieux’s 5th Moving Forward in Diagnostics Forum in Annecy, France. She met with Members, presented WIPO Re:Search to potential new Members and learned about a number of promising point-of-care diagnostic products in development.

While attending the meeting, Jennifer met with Philippe Jaco, CEO of Foundation for Innovative New Diagnostics (FIND), and briefed him on WIPO Re:Search. Tom and Jennifer followed up and met with Philippe and his colleagues at FIND to present a more detailed overview of WIPO Re:Search and to encourage FIND’s membership.

Don Joseph and Jennifer met with WIPO colleagues, Konj Sebati, Anatole Krattiger and Tom Bombelles at their offices in Geneva to plan for the WIPO Re:Search annual meeting and to align on 2013 objectives. While visiting WIPO Don and Jennifer met with Francis Gurry, Director General of WIPO. Francis congratulated the WIPO Re:Search consortium on its achievements and success to date.

New Member Announcements

We are pleased to welcome the Theodore Bilharz Research Institute (TBRI) of Giza, Egypt and the University of Kansas to WIPO Re:Search! TBRI is an ANDI Centre of Excellence and has expert researchers in many neglected diseases including schistosomiasis.

Sanaa Botros, Head of Anti-Trematodal R&D and the TBRI-IRB said, “We are pleased to be joining WIPO Re:Search and look forward to exploring and establishing many meaningful collaborations as both a Provider and User member of the consortium.”

Paul Terenova, Vice Chancellor of Research at University of Kansas, said “The University of Kansas is thrilled to participate in WIPO Re:Search. We look forward to contributing our expertise and resources in drug discovery, formulation, and development to this impressive consortia.”

Partnership Hub Central

BVGH is facilitating communication and access to Eisai compounds for Ian Gilbert’s malaria research at the University of Dundee.

Pfizer is in discussions with Philippe Gros at McGill University to explore sharing of a compound to test in his cerebral malaria model.

A non-clinical Evaluation Agreement and compound submission form have been put in place between Emory University and the NIH. The NIH will provide in-kind support for screening of compounds synthesized at Emory against dengue virus.

BVGH was invited to present at Stanford’s Fall Speaker Series “Access and Delivery of Essential Medicines.” Jennifer presented an overview of WIPO Re:Search to the audience of first year medical students. Michele Barry, Senior Associate Dean of Global Health, Director of Global Health Initiatives in Medicine, and the Director for the Center for Innovation in Global Health, attended the session and expressed her enthusiasm around Stanford’s participation in WIPO Re:Search.
Research Requests and Open Calls

GlaxoSmithKline's Tres Cantos Open Lab Foundation has initiated an InnoCentive challenge, which involves inviting up to 4 “Solvers” to conduct research projects using the facilities and resources of GSK's Tres Cantos Medicines Development Campus in Spain. A requirement is that any intellectual property developed as a result of any funding (max $100,000/project) be made broadly available to further research in Neglected Tropical Diseases; therefore, “Solvers” will be required to make their results available through WIPO Re:Search. Projects are to focus on groundbreaking research in malaria, tuberculosis and kinetoplastid diseases (Chagas Disease, Leishmaniasis or Sleeping Sickness).

The deadline to apply is 29 October 2012. For more information, please see: https://www.innocentive.com/.

Highlighted WIPO Re:Search Contributions

Highlighted below are two contributions from the Walter Reed Army Institute of Research (WRAIR) that were recently uploaded to the WIPO Re:Search database.

Dengue Virus Detection Kit

WRAIR has designed a one-step dengue RT-PCR universal and serotype specific diagnostic kit. It is a fluorogenic detection system which demonstrated that universal dengue RT-PCR is capable of detecting all 4 dengue serotypes with excellent linearity. It was also confirmed that dengue type specific RT-PCR can specifically detect each specific serotype with little or no cross reactivity toward other serotypes. This diagnostic has been contributed to the WIPO Re:Search database and can be developed further adapting the technology for developing world needs.

Quantitative Analysis from Dried Blood Spots

WRAIR has contributed a method for the quantification of small molecules from dried blood spots to accurately measure single nanogram/mL amounts of material from 15 microl of dried blood or plasma. Dried blood spots can be stored and shipped easily, facilitating measurements in conjunction with drug compliance studies or clinical trials conducted in austere environments where the collection, separation, and shipment of frozen plasma is not logistically feasible.

If you are interested in learning more about either of these contributions please contact Roopa Ramamoorthi at rramamoorthi@bvg.org.

Important Announcements

BVGH launched a test version of a new tool for WIPO Re:Search Members called the Funders Database. This webbased tool is meant to provide insight into potential funding sources that may serve to accelerate and/or enable collaborative NTD research activities. The test version of the database is currently under review; a full version will be released soon.

WIPO Re:Search in the News

An article authored by Tom Bombelles (WIPO) was published in the October 2012 issue of European Biopharmaceutical Review (EBR) highlighting the WIPO Re:Search consortium. Check out the October issue of EBR online at: http://www.ebiomedicine.com/cooperation/current12

Upcoming Global Health Meetings

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<tr>
<td>Nov 11-15</td>
<td>61st Annual American Society of Tropical Medicine and Hygiene (ASTMH) Meeting</td>
<td>Atlanta, GA</td>
<td>Jennifer, Roopa</td>
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<tr>
<td>Nov 19-19</td>
<td>7th Meeting of the Global Alliance for Elimination of Lymphatic Filariasis</td>
<td>Washington, DC</td>
<td>TBD</td>
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<td>Dec 2-5</td>
<td>The 9th Conference of the Federation of African Immunological Societies</td>
<td>Durban, South Africa</td>
<td>TBD</td>
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<tr>
<td>Dec 13-14</td>
<td>Lives in the Balance: Delivering Medical Innovations for Neglected Patients and Populations</td>
<td>New York, NY</td>
<td>Hosted by MSF and SNID</td>
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<tr>
<td>Dec 1-3-18</td>
<td>Keystone Symposium: Immunological Mechanisms of Vaccination</td>
<td>Ottawa, Canada</td>
<td>TBD</td>
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Contact Jennifer (jdenet@bvg.org) or Roopa (rramamoorthi@bvg.org) to set up a WIPO Re:Search related meeting at one of these events.

This monthly Partnership Hub Snapshot is for you!
Please send us feedback and suggestions on how it could be improved by emailing partnershiphub@bvg.org.

www.wipoReSearch.org partnershiphub@bvg.org
Cornerstones of Collaboration

In early October, Francis Gurry, Director General of WIPO, met with Paulo Gadelha, president of the Oswaldo Cruz Foundation (Fiocruz) and Jorge Avila, Head of INPI Brazil (a new WIPO Re:Search Member). Dr. Gadelha presented Fiocruz’s mission and described the organizational structure. Mr. Gurry and Dr. Gadelha discussed Fiocruz’s participation in the WIPO Re:Search consortium, including the possibility of establishing partnerships with WIPO and INPI in the context of the recently signed South-South Agreement.

New Member Announcements

We’re pleased to announce the EU Commission has joined WIPO Re:Search as a Supporter. Dr. Ruxandra Draghia-Akli, Director of the Health Directorate at the Research Directorate General of the European Commission, said “The principles reflected in WIPO Re:Search are aligned and complementary with the European Commission’s initiatives in neglected tropical diseases. We look forward to a fruitful relationship in which we can work together to accelerate the research and development of new products to improve global health.”

Seattle BioMed has joined as both a Provider and User. “I recently contacted Jennifer Dent, at the suggestion of a WIPO Re:Search member, to learn how BVGH could support our partnering needs,” said Ken Stuart, Founder, Seattle BioMed. “We have already had a productive discussion with Sanofi and are looking forward to collaborating with members to advance neglected disease research and development.”

The University of Bamako in Mali has come on board as a User and Provider.

National Institute of Industrial Property (INPI) Brazil and Public Interest Intellectual Property Advisors (PIIPA) have joined WIPO Re:Search as Supporters.

Partnership Hub Central

Wesley Van Voorhis, University of Washington (UW), and GlaxoSmithKline (GSK) will collaborate to develop compounds originally selected in a screen of GSK’s TCAHS library at UW. This collaboration was facilitated by the Partnership Hub.

Jennifer and Konji represented WIPO Re:Search on a panel at the 2012 World Health Summit, chaired by Carel Jusselmeiden, CEO of COHRED. The WHS provided a forum for interactive discussion around global research and innovation (R&I) for development. Specific topics included increasing R&I investments and addressing growing gaps in health equity.

Following the summit, both Konji and Jennifer participated in the Fair Research Contracting (FRC) workshop—hosted by COHRED—at the Rockefeller Foundation’s Bellagio Centre in Italy. The workshop brought together scientists, researchers, policymakers, NGOs, and private industry representatives together to discuss the benefits of fair research contract models. FRC guidelines are needed to support the work of institutions and researchers in low and middle income countries (LMICs).

At both meetings, WIPO Re:Search was presented as a unique platform that enables results-driven R&D collaborations and capacity development in parallel.

continued on the next page...
Partnership Hub Central, cont.

UC-Berkeley, a member of WIPO Re:Search, invited BVGH to present information on WIPO Re:Search and the Partnership Hub to a group of public health students. Roopa spoke about the mission of WIPO Re:Search and highlighted a few established collaborations.

BVGH was invited to attend the Tech Transfer Summit North America Meeting on October 22-23 at Johns Hopkins University in Maryland. At the meeting, Roopa had an opportunity to connect with many current WIPO Re:Search Members and also met potential new Members.

Special Member Requests

Merck has developed a special form to facilitate WIPO Re:Search User requests.

The Merck Access Request form ensures that the necessary information is captured up front so the inquiry can efficiently be evaluated internally at Merck. If your organization is interested in viewing the form, please contact Roopa (ramamoorthi@bvgh.org).

WIPO Re:Search in the News

On Thursday, October 11th, the Financial Times (FT) released a multi-page special report entitled "Combating Neglected Disease." In the report, FT journalist Andrew Jack writes:

"[WIPO] Re:Search is the latest in a series of such multibillion bilateral initiatives designed to 'crowd source' and pool international expertise in the effort to boost neglected disease research. Companies share information and agree to license any compounds, charging no royalty in their use in research and none or their eventual commercialization in the world's least developed countries."

The FT report contains several full-length articles, describing the challenges and successes in the battle against neglected disease. Merck's donation of "praziquantel tablets for schistosomiasis" and GlaxoSmithKline (GSK)'s pledge to provide "unlimited supplies of albendazole from new production lines to treat helminths and lymphatic filariasis", were both highlighted within Mr. Jack's 'Corporate Efforts' article. A PDF copy of the report can be found here: http://ft.com/T8D7Y.

Upcoming Global Health Conferences & Events

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<td>11-14 Nov</td>
<td>American Society of Tropical Med &amp; Hygiene (ASTMH) Annual Meeting</td>
<td>Atlanta, GA</td>
<td>Jennifer (<a href="mailto:jdemet@bvgh.org">jdemet@bvgh.org</a>)</td>
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<td>Roopa (<a href="mailto:ramamoorthi@bvgh.org">ramamoorthi@bvgh.org</a>)</td>
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<tr>
<td>13-14 Dec</td>
<td>Lives in Balance: Delivering Medical Innovations for Neglected Patients and Populations</td>
<td>New York, NY</td>
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Are you attending a global health event that you'd like us to highlight? Have a great idea for a Snapshot article? We want to hear from you! Please send feedback and suggestions via email to: inelson@bvgh.org

www.wipoReSearch.org  www.bvgh.org
Cornerstones of Collaboration

Jennifer presented along-side Michael Strange, GSK, and a number of other global health experts at the University of Edinburgh’s Neglected Diseases Research Symposium. The Welcome Trust-funded Centre for Immunity, Infection and Evolution at Edinburgh University is seeking to combat infectious disease and translate fundamental research discoveries into tangible new vaccines, drugs and treatment regimens to eradicate neglected diseases. The aim of the event was to bring together researchers across University, Pharma and funders to learn about how collectively this goal can be achieved. Keith Matthews, professor of parasite biology and African trypanosomes expert chaired the program and expressed his interest in joining WIPO Re:Search.

Jennifer and Tom Bombelles (WIPO) visited FIND in Geneva to recruit FIND to WIPO Re:Search and to learn about FIND’s partnership interests and programs.

New Member Announcements

Foundation for Innovative New Diagnostics (FIND) headquartered in Geneva, Switzerland joined WIPO Re:Search as a Provider and User Member. BVGH and WIPO are pleased to have FIND on board as their aim is to address the urgent need for better diagnostic tests for poverty-related diseases and partnerships are a key component of FIND’s work.

Centre for Malaria Diagnostics, an ANDI Centre of Excellence, located at the University of Lagos, Nigeria joined WIPO Re:Search as a Provider and User Member. The centre has expertise in testing and development of malaria diagnostics.

Partnership Hub Central

Jennifer and Roopa met with Peter Hotaz, President of the Sabin Vaccine Institute and Professor at Baylor College of Medicine and Erin Knievel, Resource Development Associate at Sabin and discussed how best to leverage pharmaceutical expertise to support process development and manufacturing of GMP lots for clinical trials for neglected disease vaccines.

Jennifer and Roopa also met with Frederick Duncanson, Senior Director and Michael Everson, Senior Clinical Research Scientist at Eisai. They discussed collaboration opportunities of potential interest to Eisai including collaborations around adjuvants and product formulation.

Roopa had discussions with Michael Hsieh, Stanford Professor and postdoctoral researcher Nir Qvit from Stanford around schistosomiasis and cutaneous leishmaniasis respectively. Access to relevant samples, formulation support and testing compounds in suitable animal models were some of the collaboration opportunities discussed as well as capacity building arrangements.

Roopa met with Sushant Sahastrabuddhe, Associate Research Scientist at the International Vaccine Institute (IVI) at ASTMH and learned about IVI’s capabilities around dengue vaccines. Sushant highlighted the weeklong vaccinology course offered at IVI including access to scholarships for researchers from the developing world. BVGH will be sharing this information with members who may be interested in participating.

Alex Debrah, Faculty Member in Allied Health Sciences and Linda Basta, Graduate Student at Kwame Nkrumah University in Ghana discussed their research and interests with Roopa at ASTMH. Roopa proposed the possibility of collaborating with another ANDI center to explore aspects of host difference causing varied severity of disease. Follow-up is underway to facilitate discussions between members.
The BVGH Funder's Database is now available!
Thank you to our members who provided valuable feedback to BVGH on the beta version of the database. We are continually working to improve the web-based version of this important new source of neglected disease funding information. In the meantime, we hope you find an Excel spreadsheet version helpful.

If you would like access to the database, please email Lisa Nelson at lnelson@bvgh.org

Research Request

Michael Pollasti, Associate Professor of Chemistry & Chemical Biology at Northeastern University, is developing a model of "Hybrid-Open Drug Discovery." With this approach, participants in the model would opt into a mutual confidentiality agreement that would allow participants to deposit their data (structures, screening data, and computational models) into a "knowledge store".

This sharing model should retain the ability to file patents (since sharing in this way would not be a "public" disclosure), and control and knowledge of who has access to the data should help provide reassurances about data leakage. Eventually, the database will pull in publically-available data, so that members can see, in one place, both private and public data relevant to their projects.

If you are interested in learning more or becoming involved, please contact Mike Pollasti (m.pollasti@neu.edu).

View the project website at: http://www.northeastern.edu/pollasti/?page_id=444

Highlighted Contributions

Novartis-GNF Malaria Box Dataset (hits from P. falciparum whole-cell screening)

Novartis has contributed structures and screening data for more than 5,000 compounds tested at dose response and confirmed to inhibit growth of the malaria parasite by more than 50% at the highest screening concentration (1.25 or 12.5 μM). These compounds are from GNF's non proprietary libraries. Activity against the multidrug-resistant strain W2 is also available. Data is also provided for a human cell cytotoxicity selectivity screen using the Huh7 human hepatocellular carcinoma cell line. Click here to view the complete WIPO Re:Search database entry.

Novartis-GNF anaerobic Mycobacterium tuberculosis (MTB) dataset (based on whole cell screening)

Data is provided for 150 non cytotoxic scaffolds targeting the mycobacterial respiratory functions and ATP (adenosine triphosphate) homeostasis. This collection can serve as valuable tool compounds to decipher the biology of persistent mycobacteria. Click here to view the complete WIPO Re:Search database entry.

Click here for more information on Novartis' corporate responsibility programs and their WIPO Re:Search contributions.

WIPO Re:Search in the News

On November 12, 2012 PharmWeb published an article entitled “Shaking the Balance: Why intellectual property and market competition are so vital to pharmaceutical R&D.” Within the article, WIPO Re:Search is highlighted as a rare example of open innovation within the biotech and pharma industries. The authors suggest that such IP sharing approaches “greatly encourage innovation” and “promote development of new treatments. To view the full-length article, please visit: http://bit.ly/550X06

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www.wipoReSearch.org
www.bvgh.org
Report from the WIPO Re:Search Member Workshop
November 11, 2012

Participants

Workshop Highlights

On November 11th, BVGH hosted the first WIPO Re:Search Member Workshop in Atlanta, Georgia. The event was timed to coincide with the American Society of Tropical Medicine and Hygiene (ASTMH) Annual Meeting. Thirty participants attended the day-long workshop, representing WIPO Re:Search Members pharmaceutical companies, government and non-profit organizations, and academic institutions.

The overall objective of the workshop was to bring Member representatives together to share their experiences and stories of partnering within the WIPO Re:Search consortium. Morning sessions included presentations by representatives from the NIH, Merck, and UCSF. After a networking lunch, participants had the opportunity to discuss specific topics (Chagas disease, vaccines, and tuberculosis) in smaller break-out groups.

Highlights from those discussions can be found on Page S2 of this Special Edition.

Workshop Participants had an opportunity to network during lunch.

Workshop Chair, Menas Perros, Vice President and Head of Infection & Innovative Medicines at AstraZeneca.

Workshop participant survey — summary of results

According to survey responses, the participant's primary reason for attending the Member Workshop was to network with other Members (50%) and to learn more about the WIPO Re:Search consortium (50%). Attendees felt networking during breaks and meals (35%) and the morning presentations were the most valuable (31%) parts of the workshop.

All respondents said that scheduling the workshop to coincide with the ASTMH Annual Meeting was helpful. The survey data suggested that the Member Workshop was equally valuable compared to similar events Members have attended in the past. In terms of constructive feedback, suggestions included focusing on the process of forming and nurturing collaborations rather than project management of existing partnerships, and perhaps changing the length of the event (half-day versus full-day). There was unanimous support for additional workshops.
Highlights from Breakout Sessions

**Vaccine Group**
- Participants agreed that success factors for collaborations include clear upfront definition of goals, roles and responsibilities, good governance and frequent communication.
- Compatibility of organizational cultures also contributes to success. Collaboration negotiations break down when there is lack of flexibility and sometimes if the parties cannot align it is important to terminate the discussions early.
- It would be helpful to have standardized assays in a precompetitive space for comparability of results.
- WIPO Re:Search could act as a third party to broker and facilitate relationships and develop standardized MTA templates. The Partnership Hub should identify and propose new collaboration opportunities beyond those that have already been considered.

**Chagas Group**
- Chagas clinical trials are very expensive and for this reason predictive and reliable animal models are even more critical to provide important information. There is a need for a "true chronic model" for proof-of-concept for drug development against Chagas.
- Drug development is challenging and to-date candidates have been disappointing. A combination of compounds to limit severe skin adverse events might be the answer. All participants agreed that considering two courses of therapy or a combination would be important.
- Serum biomarkers are important for Chagas disease. A study is ongoing in Brazil to identify Chagas biomarkers. Outcomes of biomarker studies will be meaningful.
- Convening more experts, including non-Chagas experts, together to look at Chagas animal models as well as at drugs, biomarkers, and approaches to address Chagas would be very helpful.

**Tuberculosis Group**
- There is not enough investment in academia and industry to bridge the gap between these two stakeholders. How can WIPO Re:Search help researchers bridge that gap between research and product development?
- Several unanswered questions exist about TB disease state, for example, why is there no sterilizing immunity? Why is there no natural immunity, leading to re-infection?
- With the emergence and spread of TB drug resistance, the Centers for Disease Control and Prevention (CDC) should be involved.
- Governments, beyond the US, should be increasing their funding for TB.

Key Takeaways
- Share the activities and success of WIPO Re:Search with a broader community
  - Avoid or minimize duplication of efforts and foster more sharing
  - Enable anyone who wants to do something similar to get in touch with or know who to speak with about their interests
- Move toward one place where scientists can link out to one source of resources including funding and in-kind offerings.
- With changes in pharma, as a research community, need to become more efficient.
- Leverage Merck request form by making it available for other members to access
- Form multi-partner collaborations
- Identify and engage collaborators with different capabilities
- Need more brainstorming around PK/PD and animal models

"WIPO Re:Search brings us something that we don't already know about"
Exhibit 2. WIPO Re:Search Publicity Summary and Publications

January 2012
The Bill & Melinda Gates Foundation highlighted WIPO Re:Search as a new R&D collaborative to provide unprecedented access to compound libraries that could lead to new treatments for neglected tropical diseases, malaria, and tuberculosis in its press release, “Private and Public Partners Unite to Combat 10 Neglected Tropical Diseases by 2020.”

June 2012
The International Federation of Pharmaceutical Manufacturers & Associations (IFPMA), a WIPO Re:Search Supporter, featured the initiative in their recent report, “Assembling the pharmaceutical R&D puzzle for needs in the developing world”. The report highlights WIPO Re:Search, including tables that capture the type and number of contributions, as well as WIPO Re:Search contributions by disease and contributing entity.

August 2012
WIPO Re:Search is highlighted in a recent Integrated Regional Information Networks (IRIN) global article titled, “HEALTH: Sharing “open innovation” risks and rewards”.

October 2012
An article authored by Tom Bombelles (WIPO) was published in the October 2012 issue of European Biopharmaceutical Review (EBR) highlighting the WIPO Re:Search consortium. See Exhibit 6 for full text article.

November 2012
On November 12, 2012 PharmiWeb published an article entitled “Striking the Balance: Why intellectual property and market competition are so vital to pharmaceutical R&D.” Within the article, WIPO Re:Search is highlighted as a rare example of open innovation within the biotech and pharma industries. The authors suggest that such IP sharing approaches “greatly encourage innovation” and “promote development of new treatments. See Exhibit 7 for full text article.

Posted on 23/04/2012 by Rosemary Wallis, Dr Tim Stirrup, and Dr Katherine Hebditch

A new programme has been set up with the aim of encouraging pharmaceutical companies and the global health research community to share intellectual property (IP) assets and expertise. The programme is being promoted by the World Intellectual Property Organisation (WIPO) and aims to foster the development of drug treatments, vaccines and diagnostics for malaria, TB and neglected tropical diseases.

The new initiative, called WIPO Re:Search, will allow qualified researchers access to IP assets owned by selected pharmaceutical companies and research organisations. The assets will be made available under royalty-free licences to qualified researchers anywhere in the world in a drive to develop more effective treatments. The assets are publicly available for view here and they include patents, lead compounds and associated data, unpublished results, regulatory data and dossiers, screening technologies and expertise/know-how in pharmaceutical research and development. The programme, which is administered by the non-profit organisation Bio-Ventures for Global Health (BVGH) will also offer the opportunity for researchers to work directly with scientists at pharmaceutical companies to advance R&D on these diseases.

The initiative includes the establishment of a “Partnership Hub” to be run by BVGH. This hub will foster collaboration between the organisations while BVGH will provide licensing support to the collaborators. As WIPO Re:Search moves forward, it is hoped that offerings from current partners will continue to grow while new providers join and contribute further to the information, compounds, and services available.

WIPO Re:Search is open to all organisations that agree to allow a selection of their IP relating to neglected tropical diseases to be licensed on a royalty-free basis for research and development in any country. The participating organisations must also offer medicines covered by the shared IP assets to be sold on a royalty-free basis in, or to, least developed countries.

The impressive list of industry backers means that there exists real potential to open up the research vaults of some of the big players to allow access to research institutions and NGOs keen to develop new treatments. Alnylam Pharmaceuticals, AstraZeneca, Eisai, GlaxoSmithKline, Merck Sharp & Dohme, Novartis, Pfizer, and Sanofi have signed up to collaborate with a number of research organisations including the U.S. National Institutes of Health (NIH), California Institute of Technology, the Center for World Health & Medicine, the Drugs for Neglected Diseases initiative, Fundação Oswaldo Cruz (Fiocruz), Massachusetts Institute of Technology, Medicines for Malaria Venture, PATH, the South African Medical Research Council, the Swiss Tropical and Public Health Institute, the University of California, Berkeley, and the University of Dundee (UK). It is hoped that the initiative will facilitate new partnerships to develop treatments for the diseases that are often prevalent in very poor populations.

The development of treatments for malaria and tuberculosis is mentioned specifically but other diseases classified as “neglected tropical diseases” are also to be targeted. This term encompasses less well known tropical diseases and conditions including Buruli ulcer, Chagas disease (American trypanosomiasis), cysticercosis, dengue/dengue hemorrhagic fever, dracunculiasis (guinea-worm disease), echinococcosis, endemic treponematoses (yaws), foodborne trematode infections (clonorchiasis, opisthorchiasis, fascioliasis, and paragonimiasis), human African trypanosomiasis (African sleeping sickness), leishmaniasis, leprosy, lymphatic filariasis, malaria, onchocerciasis, rabies, schistosomiasis, soil transmitted helminths, trachoma, tuberculosis, podoconiosis, and snakebite.

The provision of free medicines to poorer populations appears to be a growing facet of pharma company behaviour and the WIPO Re:Search programme fits well with these strategies as well as potentially providing a new perspective on shelved research programmes.

Exhibit 4. BusinessWorld: Global Collaboration vs Tropical disease – The WORLD Health Organization (WHO) has set a new target that would control, eliminate, and eradicate a group of disease that affects about one billion people living in poor tropical and subtropical countries.

 Posted on 05:34 PM, February 09, 2012 by Reiner W. Gloor

By year 2020, the WHO announced its vision to end the misery caused by neglected tropical diseases (NTDs) that kill or disable millions of adult and children worldwide. Since these illnesses affect poor countries, they likewise remain a contributor to a vicious cycle of poverty. NTDs often lead to stigmatization and prevent children from developing to their fullest potential. Given their impact on patients, NTDs can no longer be ignored. The WHO said that despite the complexity of NTDs, the targets are achievable. The health agency is confident that nine of 17 NTDs can be eliminated or controlled with adequate supply and distribution of medicines. This bold vision, according to WHO, requires further commitment to achieve the targets for control and elimination of NTDs.

Specifically, the WHO has set the global elimination of lymphatic filariasis (LF), blinding trachoma, human African trypanosomiasis (HAT or sleeping sickness), leprosy, and fascioliasis. On the other hand, onchocerciasis (river blindness) has been listed for regional elimination. Elimination of the said diseases means that incidence of a disease in a geographical area is reduced to zero but continued intervention measures are still needed.

The control of soil transmitted helminthiasis (STH), and Chagas disease are, likewise, expected through continued intervention measures. Schistosomiasis, on the other hand, is set for elimination by at least 75% of school-age children. Apart from the availability of safe and effective medicines, success relies on a multi-stakeholder approach that integrates elements such as environmental improvements, capacity-building efforts, effective health policies, better screening, and in some cases, further research and development.

On the part of the research-based pharmaceutical industry, it recognizes that addressing such major global health issues like NTDs requires collective action from a range of partners. Until recently, these diseases were eclipsed by the global health community’s focus on HIV, malaria and tuberculosis, among others.

With leadership from the WHO, concerted efforts are under way to reduce suffering caused by NTDs, announced the International Federation of Pharmaceutical Manufacturers & Associations (IFPMA). The global pharmaceutical industry is participating in the fight against NTDs by donating 14 billion treatments for 10 years to support the elimination or control of the nine key NTDs, representing more than 90% of the international burden. Averaging 1.4 billion treatments annually, the donations build upon companies’ existing medicine donation programs, which already reach millions of people around the world.

The donations come in conjunction with NTD collaboration among pharmaceutical companies, the Bill & Melinda Gates Foundation, the US and UK governments, international organizations, and endemic countries’ national governments, added IFPMA. Apart from the medicine donations, the pharmaceutical industry supports capacity-building efforts in developing countries and medical innovation. The last includes research-and-development programs for new NTD treatments and the so-called WIPO [World Intellectual Property Organization] Re:Search initiative.

WIPO Re:Search enables broad access to clinical trial data, knowledge and expertise, compound libraries and intellectual property assets to encourage innovation for treating NTDs. Researchers are also working to develop treatments and vaccines for NTDs while clinical trials are under way for NTDs that need new treatments (schistosomiasis and hookworm, for example). Furthermore, several vaccines for NTDs are in various stages of advanced development. The second WHO report on NTDs confirms the important progress made in fighting NTDs and the significant role played by pharmaceutical companies that provide quality medicines.

Web link: http://www.bworldonline.com/weekender/content.php?id=46457

*E-published in January 2012 by Frantz, S. Nature Reviews Drug Discovery 11, 5 (January 2012) | doi:10.1038/nrd3642*

**WIPO Re:Search** aims to encourage drug discovery for neglected diseases by broadening the scope of the assets members are willing to share.

A consortium of private and public organizations launched in October 2011 by the World Intellectual Property Organization (WIPO) aims to accelerate the discovery and development of new drugs, vaccines and diagnostics for neglected tropical diseases, malaria and tuberculosis. Because much of the knowledge and data essential for efficient drug discovery are not patented, patentable or publicly available, the new initiative — called WIPO Re:Search — intends to pool not just intellectual property (IP) but also intellectual capital, including screening hits, expertise and know-how.

“What we're trying to do is to take out some of the error from the trial-and-error process of drug discovery, so that neglected tropical disease researchers, many of whom may be coming from the developing world, can have the same level of expertise or resources that big companies have at their disposal,” says Donald Joseph, COO of **BIO Ventures for Global Health (BVGH)**, the non-profit organization that is administering the initiative.

“Knowing what's worked before, what hasn't worked, that's the kind of access we're trying to provide and make available.”

The initiative reflects a growing trend towards openness in tackling global health challenges. The Medicines Patent Pool, launched last year, focuses on making products that are already approved for HIV/AIDS available on favourable terms to developing world markets. WIPO Re:Search, however, has grown out of **GlaxoSmithKline (GSK)**'s Pool for Open Innovation for Neglected Tropical Diseases (POINT), which was launched in 2009 to bolster the early-stage neglected disease pipeline by providing a platform to share IP.

POINT, which is now absorbed into the new initiative, was to some extent limited in that it was perceived to be a GSK-only initiative, says Joseph. It led to only one publicly disclosed partnership, in which GSK, iThemba Pharmaceuticals and the **Emory** Institute of Drug Discovery started working together to develop inhibitors of malate synthase and isocitrate lyase as targets for latent-stage tuberculosis. “It wasn’t as though [POINT] was doing anything wrong or ineffectively, but simply that [WIPO Re:Search] turbo-charges the effort, and gets more scale, more depth, more scope,” says Joseph. WIPO Re:Search has already signed up major pharmaceutical companies — including **AstraZeneca, GSK, Novartis, Pfizer** and **Sanofi** — academic institutes and non-profit organizations like the **Drugs for Neglected Diseases initiative (DNDI)**.

One lesson Joseph says they learned from administering POINT is the constraints of restricting assets to IP. “Scientists don't typically think in terms of IP, they think in terms of the knowledge that they have, and the knowledge that they need for the experiments that they want to generate and the clinical trials that they want to run,” he says. “I'm not saying patent pools are a bad model. It's more the idea of broadening the scope beyond pure IP to reach what actually happens in the labs and what happens in relationships, and so it was a conscious part of WIPO Re:Search to engage expertise and services.”

Some companies, for instance, intend to host neglected disease researchers in their facilities. “We'll be opening up access to AstraZeneca labs and will consider requests from neglected disease scientists wishing to work on their targets,” says Manos Perros, Vice President and Head of Infection Innovative Medicines at **AstraZeneca**. “Guest scientists will benefit from scientific mentoring and access to innovative technologies including cheminformatics support, and it's also an opportunity for us to learn from other researchers how they are thinking about diseases and mechanisms of actions for treating those diseases.”

Spotlight

Open Innovation

Thomas Bombelles of the World Intellectual Property Organization explores the role of the recent consortium WIPO ReSearch in fostering advances in R&D into neglected tropical diseases through the creative use of intellectual property.

The public health challenges facing developing and least developed countries (LDCs) are complex and require multiple approaches. One priority is the development of new and better medicines and vaccines for diseases that predominantly affect the poor. As stated by the World Health Organization (WHO) in its 2010 report, “Working to overcome the impact of neglected tropical diseases,” “neglected tropical diseases (NTDs), malaria and tuberculosis blight the lives of more than a billion people worldwide and threaten the health of millions more.” NTDs are largely a symptom of poverty and disadvantage. Those most affected are the poorest populations who are often living in remote rural areas, urban slums and shanty towns, or in conflict zones. In addition to their negative impact on health, NTDs contribute to perpetuate a cycle of poverty and stigma that often leaves people unable to work, go to school or participate in community life. The WHO report called for more R&D to develop better interventions as a key component of an overall strategy to combat these diseases.

The system of intellectual property rights primarily, but not exclusively, supports investment in innovation that yields new inventions, such as life-saving medicines. The World Intellectual Property Organization (WIPO) is the specialized United Nations agency focused on intellectual property.

WIPO ReSearch is founded on the belief that intellectual property and knowledge can be used creatively to stimulate the invention of new health solutions, while also ensuring access for the most disadvantaged populations. Recognizing the need for more progress in neglected disease research, several of the world’s leading pharmaceutical companies, WIPO and BIO Ventures for Global Health joined efforts in 2011 to form WIPO ReSearch. The purpose of WIPO ReSearch is...
to foster collaborations to advance and stimulate research and development for new and better treatment options for those suffering from these conditions.

WIPO ReSearch is a new consortium through which public and private sector organisations around the world are making valuable intellectual property available on a royalty-free basis to qualified researchers anywhere in the world seeking to develop new solutions for NTDs, malaria and tuberculosis. Services, such as access to company research facilities, screening of compounds, as well as the sharing of expertise and hosting of scientists, are also offered through WIPO ReSearch.

The principal implementing tools developed by WIPO ReSearch are the Public Database, to ensure transparency and accessibility of information, and the Partnership Hub, to facilitate collaboration and cross-sector partnerships. The Public Database is composed of intellectual property assets that providers have chosen to make available through WIPO ReSearch. All the information is publicly available and can be accessed without registration. Providers to the database submit summary information relevant to hits, leads, lead series, pre-clinical candidates, clinical candidates, enabling technologies, intellectual property, formulation, diagnostic tools, vaccines, new biological entities, know-how, or other services for the purpose of facilitating R&D. All licenses granted for R&D and manufacture must be royalty-free to any user anywhere in the world. Any products developed for these diseases under a WIPO ReSearch Agreement must be sold on a royalty-free basis in all LDCs. Access terms for other developing countries are subject to agreement between the parties.

Because collaborations are critical to success in science, the Partnership Hub is a key component of WIPO ReSearch. As the Partnership Hub Administrator, BIO Ventures for Global Health (BVGH) actively engages with members – including major pharmaceutical and biotechnology companies, academic and other non-profit research institutions, government, and non-governmental organisations – to facilitate neglected tropical disease research collaborations among members.

Through the Partnership Hub, WIPO ReSearch connects providers and potential users so that assets and knowledge are shared to accelerate the development of products in the fight against NTDs. As WIPO ReSearch develops over time, WIPO and BIO Ventures for Global Health are collecting and analysing feedback in order to ensure that the consortium’s operations, in particular the database and related services, are useful to the global health research community.

Launched in October 2011 with 30 members, today WIPO ReSearch has 50 members and the first collaborative research agreements were announced in August 2012. The first WIPO ReSearch agreements were made by AstraZeneca, which is collaborating with research institutions to study novel treatments for Chagas disease, sleeping sickness, schistosomiasis (snail fever), and tuberculosis. Specifically, the agreements are with:

- **The University of Dundee**
  Researchers will test a selection of glycogen synthase kinase (GSK)-3 inhibitors, which were originally developed for a potential treatment of Alzheimer’s disease, against parasites responsible for Chagas disease, leishmaniasis and sleeping sickness.

- **iThemba Pharmaceuticals**
  AstraZeneca will provide iThemba with computational and medicinal chemistry support for the development of iThemba’s choline esterase inhibitors, compounds intended as a novel treatment for tuberculosis.

In addition to global pharmaceutical companies, members of WIPO ReSearch include universities and research centres worldwide. Of particular importance are the several research centres from the African continent whose participation is an important component to the development of new and better treatments for NTDs.

WIPO ReSearch is a results-oriented project that, through the creative and innovative use of intellectual property, facilitates the research and development and technology transfer needed to find concrete solutions to one of the most challenging issues of global health today. In addition to contributing to finding cures or treatments for neglected tropical diseases, malaria and tuberculosis, WIPO ReSearch provides a new and innovative model of IP sharing and management, demonstrating that intellectual property can and does serve the needs of countries at all levels of development.

www.wipo.int/research
Exhibit 7. PharmiWeb article: “Striking the Balance: Why intellectual property and market competition are so vital to pharmaceutical R&D.” Authors: Nick Beckett and David Marks, CMS Cameron McKenna

November 12, 2012

It is easy to see Intellectual Property (IP) and competition law as opposing forces in a case of patent versus patient. But in reality, both are simply different means of boosting innovation and improving medical treatment. IP rights allow companies to recoup sufficient income to reinvest in the development of new drugs, whilst competition puts pressure on companies to innovate in order to keep stride with market rivals. If the right balance is struck, both work together to drive the R&D necessary to find new drugs and treatments.

IP is vital to the patent-rich pharmaceutical sector. The patent cliff is having a devastating impact on revenues as some of the biggest earning drugs lose out to competitive generic companies, whilst the pervading economic gloom is putting a squeeze on finances. With drugs typically taking 12 to 15 years to develop, costing perhaps a billion pounds – and with no guarantee of success – beleaguered pharmaceutical companies are cutting back on expensive and time-consuming R&D and diversifying into more gainful areas. Without IP rights to reward innovation and provide some measure of security in these tough times, the pipelines may run dry.

Austerity measures may place governments under growing pressure to provide more cost-effective and accessible healthcare, particularly in emerging markets with a poor population. In such circumstances, they can sometimes decide to override IP in favour of encouraging competition and driving down price. One example is the case currently being heard at the Indian Supreme Court between drug-maker Novartis and India’s patent office, which has refused to grant a patent on the company’s cancer drug Glivec. A ruling in favour of Novartis will improve IP protection and encourage companies who have previously been wary of India’s lax IP laws to invest there. But others are concerned that this will jeopardise India’s ability to supply the developing world with affordable generic medicines.

In cases where a government might feel the exercise of IP rights could lead to unfair advantage or run counter to medical need, competition law can come into play. One option is compulsory licensing where a government allows someone else to produce the patented product or process without the consent of the patent owner. One example of this is the landmark decision earlier this year in which India granted its first ever compulsory license for Bayer’s cancer treatment Nexavar. The German pharmaceutical giant was ordered to license the drug to a home-grown generic drug-maker on the grounds that it was failing to make Nexavar accessible to more people. But there are also more positive ways of ensuring that IP is shared. Many companies are now voluntarily agreeing to cross-license patents with one another or even to participate in industry-wide open innovation patent pools such as WIPO Re:Search which aims to promote the development of new treatments for neglected tropical diseases, malaria and tuberculosis. Patent pools are well-established in the telecommunication and electronics industry, but are less common in the life sciences sector. The industry’s steps in this direction, however, are to be welcomed as they greatly encourage innovation and open access, particularly in the area of biotechnology.

Striking the balance between IP competition law is complex and there is no one-size-fits-all answer. Several international organisations – including the European Commission and the World Trade Organisation – have attempted to strike this balance but, despite finding that countries agree that IP and competition law are compatible and should co-exist, there is no consensus as to how this could be achieved. Some tension will always remain between increasing supply in the short-term, by opening up access to generic companies, and in the longer-term, by retaining the incentive to invest but, despite this, it is vital to remember that both drive innovation. The equation is a simple one: without IP and without competition, there would be no incentive for companies to invest in the new drugs and treatments that benefit everybody.
Exhibit 8. WIPO Press Release: “First Agreements Concluded under WIPO Re:Search for Research on Neglected Tropical Disease”

Geneva, August 23, 2012
PR/2012/719

Research to develop treatments for neglected tropical diseases received a boost this month as AstraZeneca concluded agreements through WIPO Re:Search with iThemba Pharmaceuticals (South Africa), the University of California, San Francisco (U.S), and the University of Dundee (UK).

The three agreements are the first partnerships established under the WIPO Re:Search initiative – an unprecedented collaboration to advance the discovery and development of treatments for neglected tropical diseases involving the World Intellectual Property Organization (WIPO), leading pharmaceutical companies, academic and national research institutions, and BIO Ventures for Global Health. The World Health Organization serves as a technical advisor to WIPO for WIPO Re:Search.

“Agreements such as these to transfer technology from one partner to another are an important measure of success for WIPO Re:Search, which we launched less than a year ago,” said WIPO Director General Francis Gurry. “We are very pleased that AstraZeneca - one of the original members of WIPO Re:Search - has successfully concluded these first agreements, and we look forward to more results in the coming weeks and months.”

Dr. Manos Perros, Head of the AstraZeneca Infection Innovative Medicines Unit, said: “As an industry, we have a great opportunity to make a real difference in global health through WIPO Re:Search by addressing the needs of the considerably underserved population suffering from neglected tropical diseases. These three partnerships are only the beginning for AstraZeneca in demonstrating how, by coming together, sharing our proprietary information and collaborating on potential solutions, we can help speed the research and development of treatments for these devastating diseases.”

Since its October 2011 launch WIPO Re:Search has grown from 30 members to 50 - from all five continents – today. Under the terms of WIPO Re:Search, organizations agree to make available intellectual property assets (such as pharmaceutical compounds, drug discovery technologies, regulatory data, and know-how), to qualified researchers anywhere in the world on a royalty-free basis, provided the research is focused on neglected tropical diseases, malaria, and tuberculosis. Any products resulting from this research will also be royalty-free for sales in least developed countries (LDCs).

Neglected tropical diseases are endemic in 149 countries and affect more than one billion people worldwide. By providing a searchable, public database of relevant, available intellectual property assets, information, and resources, WIPO Re:Search facilitates new research partnerships. BIO Ventures for Global Health, as the Partnership Hub Administrator, actively identifies partnership opportunities between members and facilitates collaborations to drive the development of new products for neglected tropical diseases, malaria, and tuberculosis.

This work led to AstraZeneca collaborating with research institutions to study novel treatments for Chagas disease, sleeping sickness, schistosomiasis (snail fever), and tuberculosis, specifically:

- University of California, San Francisco (UCSF): Originally developed for osteoarthritis, AstraZeneca’s mature cathepsin inhibitors will be tested by UCSF researchers for activity in biochemical and phenotypic screens for two parasitic diseases: schistosomiasis and kinetoplastid diseases. Schistosomiasis can damage internal organs, impair growth and cognitive development in children, and the urinary form can increase risk for bladder cancer in adults. Kinetoplastid diseases include sleeping sickness and Chagas disease.
• University of Dundee: Researchers will test a selection of glycogen synthase kinase (GSK)-3 inhibitors, which were originally developed for a potential treatment of Alzheimer’s disease, against parasites responsible for Chagas disease, leishmaniasis and sleeping sickness.

• iThemba Pharmaceuticals: AstraZeneca will provide iThemba with computational and medicinal chemistry support for development of iThemba’s isocitrate lyase inhibitors, compounds intended as a novel treatment for tuberculosis.

“We are thrilled to see the initial results of AstraZeneca’s commitment to WIPO Re:Search,” said Don Joseph, CEO, BIO Ventures for Global Health. “These collaborations are an important achievement for WIPO Re:Search’s Partnership Hub and the first step in accelerating the development of treatments for tuberculosis, schistosomiasis, leishmaniasis, African sleeping sickness and Chagas disease.”

About WIPO
The World Intellectual Property Organization (WIPO) is the leading global forum for the promotion of intellectual property as a force for innovation and creativity to achieve positive change.

A specialized agency of the United Nations, WIPO assists its 185 member states in developing a balanced international IP legal framework to meet society’s evolving needs. It provides business services for obtaining IP rights in multiple countries and resolving disputes. It delivers capacity-building programs to help developing countries benefit from using IP. And it provides free access to unique knowledge banks of IP information.

About WIPO Re:Search
WIPO Re:Search is an initiative led by WIPO in partnership with BIO Ventures for Global Health (BVGH). The consortium includes a number of the world’s leading pharmaceutical companies, research institutions, governmental, and non-governmental organizations. Through WIPO Re:Search, public and private sector organizations make valuable intellectual property and other resources available on a royalty-free basis to qualified neglected tropical disease researchers anywhere in the world. WIPO Re:Search Members are working to develop new products to prevent, diagnose and treat neglected tropical diseases, malaria, and tuberculosis.

About BIO Ventures for Global Health
BIO Ventures for Global Health (BVGH) is a non-profit organization whose mission is to save lives by accelerating the development of novel drugs, vaccines, and diagnostics coming from the biopharmaceutical industry that address the unmet medical needs of the developing world. The organization works at the crossroads of biotechnology and global health to find the common ground between the goals of the global health community and the pragmatic needs of biopharmaceutical companies. For more information, please visit www.bvgh.org.

For further information, please contact the Media Relations Section at WIPO:
• Tel: (+41 22) - 338 81 61
• Fax: (+41 22) - 338 81 40
• E-mail
Background on WIPO Re:Search

Catalyzing collaboration for Neglected Tropical Diseases

Advances in science, medicine, and technology have enabled high-income countries to dramatically reduce the burden of infectious diseases and even eliminate some diseases from their populations. Many developing countries, however, still struggle with high rates of preventable sickness and death.

A key problem has been a lack of market-driven research and development to create products for preventing, diagnosing, and treating a subgroup of infectious diseases that are common in developing nations—especially the least developed countries. This subgroup consists of neglected tropical diseases, malaria, and tuberculosis (TB).

In 2011, the World Intellectual Property Organization (WIPO) and BIO Ventures for Global Health (BVGH) partnered with leading pharmaceutical companies, academic institutions, and research organizations with a common desire to improve the lives of people suffering from neglected tropical diseases, malaria, and TB. The resulting worldwide consortium is known as WIPO Re:Search. The consortium’s primary objective is to catalyze research and development of needed vaccines, diagnostic technologies, and drugs by sharing intellectual property (IP), know-how, technologies, expertise, and related resources.

The WIPO Re:Search Partnership Hub, administered by BVGH, plays a critical role in facilitating collaboration to accelerate innovation among consortium members. The Partnership Hub identifies researchers’ needs for IP and related resources to advance product development, finds organizations that may be able to meet these needs, and then helps to forge mutually beneficial collaborations with clearly defined roles, responsibilities, and objectives.

Addressing diseases of poverty

Neglected tropical diseases, malaria, and TB infect over 1.5 billion people worldwide. This group of diseases primarily affects low-income and politically marginalized populations in rural and urban areas within the world’s developing and least developed countries.

Many of these diseases are transmitted by insect bites or by worms in the soil. Children and adults typically become infected with disease-causing parasites or bacteria simply by engaging in normal daily activities, such as playing outside, collecting water, doing laundry, or planting crops.

Examples of neglected tropical diseases include schistosomiasis, onchocerciasis (river blindness), lymphatic filariasis, dengue fever, trachoma, and soil-transmitted helminths (hookworm, roundworm, and whipworm). These diseases have an enormous impact on individuals, families, and communities. Many can lead to severe disfigurement and disability as well as death. They aggravate poverty and reduce productivity by impairing children’s intellectual development, stunting growth, reducing school enrollment, and limiting the ability of infected individuals to work. They constitute a serious barrier to socioeconomic development and improvement in the quality of life in the world’s poorest countries.

The role of WIPO Re:Search

The WIPO Re:Search consortium includes pharmaceutical companies, academic and non-profit research institutions, product development partnerships, and government agencies. Members join WIPO Re:Search as Providers of IP, know-how, and expertise; as Potential Users of these
resources, or as Supporters of the consortium. In some cases, members enroll in multiple categories. The consortium is truly global, with members from Africa, Asia, Europe, and North and South America.

Through WIPO Re:Search, qualified researchers from around the world receive access to the following types of resources:

- Compounds.
- Compound libraries.
- Unpublished scientific results.
- Regulatory data and dossiers.
- Screening technologies and capabilities.
- Platform technologies.
- Expertise and know-how.
- Patents and patent rights.
- Opportunities to be hosted and mentored by scientists at company facilities.

When joining the consortium, members agree to the following guiding principles:

- Providers of IP will offer royalty-free licenses for products made available to least developed countries.
- Members will consider in good faith the issue of access to these products for all developing countries, including those that do not qualify for least developed status.
- Users of IP shared through WIPO Re:Search may retain ownership of new IP but are encouraged to make their inventions available to other consortium members.
- License agreements are individually negotiated between member organizations in accordance with the consortium's guiding principles.

The work of WIPO Re:Search centers around three main areas of activity:

- A global database. Hosted by WIPO, this is a publicly accessible, comprehensive database of IP assets—including compounds, enabling technologies, know-how, and other information. The database can be searched through keywords or by Provider, disease, or type of data or product. To access the database, visit [www.wipo.int/research/en/search/](http://www.wipo.int/research/en/search/).
- Supporting services. Led by WIPO, these services include general licensing support from WIPO and technical advice provided by WIPO and the World Health Organization.
- Partnership Hub. BVGH is the nonprofit administrator of the Partnership Hub, whose work is described in the following section.

For more information about WIPO Re:Search, please visit [www.WIPOReSearch.org](http://www.WIPOReSearch.org).

**The critical role of the WIPO Re:Search Partnership Hub in the global response to diseases impacting the world’s poorest**

**Facilitating targeted collaboration**

Successful development of vaccines, diagnostics, and drugs requires highly specific expertise and complementary capabilities from a variety of scientific disciplines and organizations. An academic researcher, for example, may not have the expertise, capacity, or resources to conduct preclinical toxicology studies or develop a profile of a compound's pharmacokinetics and pharmacodynamics—capabilities that are available at a large pharmaceutical firm.
The WIPO Re:Search Partnership Hub helps researchers find and partner with organizations that can close gaps in technical expertise and capabilities. The Partnership Hub administrator, BVGH, provides business development and scientific expertise coupled with negotiation and alliance management skills. With this professional support, WIPO Re:Search members can explore new partnership opportunities with confidence that the Partnership Hub will facilitate introductions and communication and then maintain momentum to establish mutually beneficial agreements.

The Partnership Hub facilitates research collaboration by:

- **Actively identifying collaboration opportunities for members.** BVGH reaches out to members to learn about their research programs, capabilities, areas of expertise, and partnering interests. With this information in hand, BVGH explores and identifies collaboration opportunities that strategically match Providers’ contributions with Users’ needs based on complementary research interests.

- **Serving as a scientific expert on WIPO Re:Search contributions and neglected tropical diseases.** BVGH understands how the WIPO Re:Search database contributions can be applied to research and product development for neglected tropical diseases, malaria, and TB. The Partnership Hub proactively matches these contributions with research programs of potential Users.

- **Fielding requests from the Database.** Users are encouraged to search the Database to identify assets that could support or accelerate their research. Once an asset of interest has been identified, the member contacts the Partnership Hub to learn more about the asset and the type of collaboration the Provider is inviting. BVGH then establishes mutual interest between members and connects the interested parties.

- **Fielding special requests.** BVGH welcomes special requests for compounds, compound libraries, or other resources that are not captured in the WIPO Re:Search database. Providers are usually willing to explore any request that supports the development of products for neglected tropical diseases, malaria, or TB. Researchers with specific targets or compounds of interest should contact the Partnership Hub to facilitate inquiries into whether these assets could be available from Providers.

- **Facilitating Member connections around potential collaborations.** BVGH speaks with members to establish interest in exploring research collaborations. Once mutual interest is established, BVGH connects members so scientists can discuss their research and further explore the possibility of working together and sharing assets. BVGH assists members in the initial stages of developing collaboration agreements.

- **Recruiting new Users and supporting recruitment of new Providers and Supporters.** BVGH reaches out to potential new Users based on their research programs and ability and desire to develop vaccines, diagnostics, or drugs for neglected tropical diseases, malaria, or TB. In partnership with WIPO, BVGH identifies and recruits researchers worldwide with an emphasis on those from developing countries. BVGH also supports WIPO to bring on new high-quality IP Providers.

- **Attending meetings to network and stay current on neglected tropical disease research.** BVGH staff attend key conferences, such as the annual meeting of the American Society for Tropical Medicine and Hygiene, to stay abreast of research advances and to meet with existing members and potential new members.
Exhibit 9. WIPO Re:Search Media Kit, cont.

- **Tracking developments in global health and industry.** BVGH staff track developments in global health and industry and review relevant scientific literature to provide evidence-based consultation and service to members.

- **Developing resources to support Members in achieving their research objectives.** Partnership Hub resources include a “Funders Database” summarizing key neglected tropical disease funding opportunities, as well as scientific summaries highlighting WIPO Re:Search contributions and their application to neglected disease research. These resources and others can be found at – [http://www.bvgh.org](http://www.bvgh.org)

**Getting results**

Twenty-four organizations were members of WIPO Re:Search when the consortium was launched in 2011. Since then, BVGH and WIPO have steadily expanded membership. As of October 2012, the consortium has more than doubled in size, with more than 60 members across the globe.

By October 2012, the Partnership Hub had facilitated ten agreements between WIPO Re:Search Members. Many more agreements were in advanced stages of negotiation. And a number of additional collaboration ideas and agreements were in early development.

BVGH staff have presented information on the Partnership Hub and networked with existing and potential consortium members at many scientific conferences and meetings. These include the Biotechnology Industry Association convention, the American Society of Tropical Medicine & Hygiene annual meeting, and the general assembly of the International Federation of Pharmaceutical Manufacturers & Associations.

**Improving health, advancing research, and developing markets**

The WIPO Re:Search Partnership Hub helps to establish promising collaborations to advance research and development of products for neglected tropical diseases, malaria, and TB. It facilitates communication, alignment, and transparency while helping to establish material transfer agreements, confidential disclosure agreements, collaborations, and licenses between consortium members. The Partnership Hub’s work is based on a fundamental belief that collaboration for innovation is critical to improving the health and well-being of people in the world’s least developed countries who have too often been unable to benefit from global progress in science, medicine, and technology.

The Partnership Hub benefits researchers around the world by helping them gain free access to valuable intellectual property and related resources for developing new vaccines, diagnostic technologies, and drugs for diseases affecting the world’s poorest and most vulnerable populations. Pharmaceutical companies and other groups holding these assets benefit by expanding their role in global health and development, by establishing good relationships with researchers around the world, and by helping to develop future markets for health products.

**Quotes from WIPO Re:Search Members**

“WIPO Re:Search provides a novel avenue for Pfizer and other pharmaceutical companies to engage in neglected disease research and development initiatives. The Partnership Hub identifies potential partners and facilitates communication between neglected disease researchers and Pfizer scientists. WIPO Re:Search enables Pfizer to share our intellectual property assets, know-how, ..."
capabilities, and expertise with researchers in the developing world and elsewhere to accelerate the development of products that will ultimately improve health and development in emerging and developing countries. Pfizer is proud to support WIPO Re:Search.”
- Ian Read, Chief Executive Officer, Pfizer, New York City, New York, United States

“Collaboration is a critical component of KCCR’s strategy. Membership in WIPO Re:Search provides KCCR with an opportunity to catalyze partnerships with a worldwide network of impressive neglected disease researchers and pharmaceutical companies. We have already initiated our first collaboration with Stanford and are currently engaged in talks with PATH. We anticipate more exciting partnering opportunities in the near future.”
- Ellis Owusu-Dabo, Scientific Director, Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR), Kumasi, Ghana

“Having already established a broad network of contacts and collaborators interested in our vaccine development work, we did not initially have high hopes that the Partnership Hub would be particularly helpful. But we have clearly benefitted from signing on and have been pleasantly surprised to see how this mechanism has helped open up several promising new opportunities. We have regular discussions with Jennifer and Roopa to ensure a coordinated approach to partnering, and Sabin intends to continue to leverage the WIPO Re:Search network whenever possible.”
- Michael Marine, Chief Executive Officer, Sabin Vaccine Institute, Washington, DC, United States

“The Partnership Hub facilitates our collaboration in a manner that matches the partners’ views and objectives. It identifies relevant partnership opportunities and helps us leverage pharmaceutical expertise from institutions worldwide to build upon our process development and formulation capabilities. In addition to what we gain through our participation in WIPO Re:Search, Fiocruz develops and provides access to a rich reserve of natural products, research expertise, and manufacturing capabilities.”
- Jorge Bermudez, Vice President, Production and Innovation in Health, Fundação Oswaldo Cruz (Fiocruz), Rio de Janeiro, Brazil

“The Partnership Hub provides a unique and necessary service for neglected tropical disease researchers and organizations. Jennifer and Roopa have quickly connected me with partners who have the interest and capabilities to further evaluate our promising lead compounds for malaria. They have reconnected me with prior collaborators and have presented a number of interesting collaboration opportunities to our faculty. We look forward to establishing many relationships and meaningful collaborations with the support of the Partnership Hub.”
- Wesley Van Voorhis, Head, Division of Allergy and Infectious Diseases, Department of Medicine, University of Washington, Seattle, Washington, United States

Selected Partnership Hub Collaboration Case Studies

AstraZeneca and the University of Dundee

The Partnership Hub facilitated an agreement between AstraZeneca and the University of Dundee to enable a university researcher to explore potential new treatments for neglected tropical diseases. The arrangement is enabling the Scottish researcher to test a group of glycogen synthase kinase-3 (GSK-3) inhibitors—originally developed by AstraZeneca for potential treatment...
of Alzheimer’s disease—against parasites responsible for Chagas disease, leishmaniasis, and sleeping sickness.

The stage was set for this collaboration when AstraZeneca contributed 28 compounds to the WIPO Re:Search database in 2011. The Partnership Hub then profiled kinase inhibitors, including GSK-3 beta inhibitors, in its January 2012 newsletter. During the January 2012 Keystone Conference on drug discovery for protozoan parasites, the Partnership Hub’s manager of scientific affairs met with the head of the Drug Discovery Unit at the University of Dundee. His publications suggested a potential interest in a GSK-3 beta inhibitor contributed by AstraZeneca. The investigator subsequently requested access to a library of related compounds to screen for selectivity to parasite targets.

Partnership Hub staff approached AstraZeneca with the researcher’s request and facilitated communication between the pharmaceutical firm and researcher. An experimental plan and timelines were prepared and shared by the researcher. By July, AstraZeneca and the University of Dundee had signed a material transfer agreement to enable the sharing of compounds.

**Stanford University and the Kumasi Center for Collaborative Research in Tropical Medicine**

The Partnership Hub has played a vital role in meeting the needs of Stanford University researchers developing a point-of-care diagnostic kit to detect parasitic worms. Because their approach relies on detecting antibodies to worm proteins in feces from infected individuals, the researchers need stool samples from appropriate populations to evaluate assay performance. The Partnership Hub facilitated collaboration between the US researchers and the Kumasi Center for Collaborative Research in Tropical Medicine (KCCR) in Ghana to advance this work.

The origins of this collaboration can be traced to a meeting of the Council on Health Research and Development, held in April 2012 in Cape Town, South Africa. The World Intellectual Property Organization hosted a session on WIPO Re:Search, and the Partnership Hub presented an overview of its work. A scientist from KCCR was enthusiastic about participating.

Partnership Hub staff held a meeting at Stanford in May to learn about their neglected disease programs. A Stanford researcher subsequently reached out to the Partnership Hub to request support in accessing stool samples containing soil-transmitted helminths. The Partnership Hub then facilitated communication between the researchers and staff at KCCR and Kwame Nkrumah University of Science and Technology in Ghana. By July, KCCR had become a WIPO Re:Search Member, and KCCR and Stanford had agreed on terms of a collaboration agreement. By September 2012, Stanford and KCCR were discussing project protocols and needed approvals from institutional review boards.

**Emory University and the National Institutes of Health**

The Partnership Hub facilitated collaboration between a professor at Emory University in Atlanta, Georgia, and dengue biology experts at the National Institutes of Health to investigate potential new treatments for dengue fever. This work focuses on further exploring and confirming the potential of compounds called RNA-dependent polymerase inhibitors for dengue fever.

The story began when the Vice President for Research at Emory University invited BIO Ventures for Global Health to present information on WIPO Re:Search and the Partnership Hub to faculty. A university chemistry professor and director of The Emory Institute for Drug Discovery said he
believed compounds he was developing might have value for the treatment of dengue, but he needed to consult with an expert in dengue biology.

Partnership Hub staff recommended two WIPO Re:Search members with appropriate expertise, and the professor chose to explore working with biologists at the National Institutes of Health (NIH). After being connected by the Partnership Hub, the professor and the NIH dengue program officer established a Nonclinical Evaluation Agreement so the NIH could provide “in-kind” services leveraging internal expertise in dengue biology to characterize the professor’s compounds and share insights.

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Selected Photos from WIPO Re:Search Launch – 26 October 2011

WIPO Re:Search Launch Press Conference


Exhibit 9. WIPO Re:Search Media Kit, cont.

WHO Director General Margaret Chan (left) and AstraZeneca’s Chief Executive Officer David Brennan (right) joined WIPO Director General Francis Gurry (center) for the launch of the WIPO Re:Search consortium on October 26, 2011. © WIPO 2011. Photo: Emmanuel Berrod.


WIPO Re:Search Launch Press Conference

From left to right: Don Joseph (CEO, BVGH), Muhammad Ali Dhansay (Acting President, Medical Research Council of South Africa), David Brannan (CEO, AstraZeneca), Francis Gurry (WIPO Director General), Matern Yakobo C. Lumbanga (Tanzania’s Ambassador to the UN in Geneva), and Tom Mboya Okeyo (Kenya’s Ambassador to the UN in Geneva). The panel at the press conference for the launch of the WIPO Re:Search consortium on October 26, 2011, at the Palais des Nations included executives of pharmaceutical companies, and representatives of research institutions, international organizations and diplomatic missions. © WIPO 2011. Photo: Emmanuel Berrod.

What makes a disease neglected?

Or are they simply diseases of neglected people?
The World Health Organization (WHO) describes neglected tropical diseases (NTDs) as the silent diseases of poverty. They affect over a billion of the poorest, most marginalized people in the world, often stopping them from working or going to school, and perpetuating a cycle of disease and poverty.

Exhibit 9. WIPO Re:Search Media Kit, cont.
Science is fighting the dengue war on four fronts

Prevention Developing a vaccine against dengue is especially difficult – but potential benefits are enormous, says Denise Poindr

A little effort can produce great strides

Ruining the mosquito’s sex life may pay

Projects need co-ordinated approach
Combating Neglected Diseases

Joint approach is still a dream

Research: The response to endemic parasites may underpin future cancer treatments, writes Clive Goulston

Funds sharpen scientific focus

Poor hit hardest by chronic infections

Not just healthcare, HUMAN CARE

As MSD, we believe the most important thing we make is a difference. We provide people all around the globe with innovative pharmaceutical medicines, vaccines, consumer care and animal health products. We also believe our responsibility includes helping you to know that our products reach people who need them, regardless of whether they have the ability to pay. But we can’t do it alone.

For the last 28 years, we have worked with a network of partners to combat two diseases that affect millions of people in Asia and Latin America. These diseases, leprosy and seasonal influenza, are some of the most common and preventable infectious and parasitic diseases, and impact many lives.

We continue on our journey to help more people around the world.

You can learn more about us here.
Exhibit 9. WIPO Re:Search Media Kit, cont.

Combating Neglected Diseases

Tide may be turning against guinea worm

Eradication Simple, practical steps involving communities have been vital in the fight against this debilitating parasite, says Sarah Murray.

A shared way forward offers hope

Companies strive for better outcomes from donations

Glory days for a plan to reward research hover in the distance

2012 Year-End Report to Funding Members
The public health challenges facing developing and least developed countries (LDCs) are complex and require multiple approaches. One priority is the development of new and better medicines and vaccines for diseases that predominantly affect the poor. As stated by the World Health Organization (WHO) in its 2010 report, “Working to overcome the impact of neglected tropical diseases,” neglected tropical diseases (NTDs), malaria and tuberculosis blight the lives of more than a billion people worldwide and threaten the health of millions more. NTDs are largely a symptom of poverty and disadvantage. Those most affected are the poorest populations who are often living in remote rural areas, urban slums and shanty towns, or in conflict zones. In addition to their negative impact on health, NTDs contribute to perpetuate a cycle of poverty and stigma that often leaves people unable to work, go to school or participate in community life. The WHO report called for more R&D to develop better interventions as a key component of an overall strategy to combat these diseases.

WIPO Re:Search is founded on the belief that intellectual property and knowledge can be used creatively to stimulate the invention of new health solutions, while also ensuring access for the most disadvantaged populations. Recognising the need for more progress in neglected disease research, several of the world’s leading pharmaceutical companies, WIPO and BDO and other global health partners joined efforts in 2011 to form WIPO Re:Search. The purpose of WIPO Re:Search is
Exhibit 9. WIPO Re:Search Media Kit, cont.

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- The University of Dundee
  Researchers will test a selection of glycoprotein kinase (GSK3) inhibitors, which were originally developed for a potential treatment of Alzheimer’s disease, against parasites responsible for Chagas disease, leishmaniasis and sleeping sickness

- IThemba Pharmaceuticals
  AstraZeneca will provide IThemba with computational and medicinal chemistry support for development of IThemba’s investigational tyrosine kinase inhibitors, compounds intended as a novel treatment for tuberculosis

In addition to global pharmaceutical companies, members of WIPO Re:Search include universities and research centres worldwide. Of particular importance are the several research centres from the African continent whose participation is an important component to the development of new and better treatments for NTDs.
Drug Repurposing

Finding new uses for approved drugs and shelved drug candidates is gaining steam as a pharmaceutical development strategy.

By Anne M. Thayer

Department: Business
Keywords: pharmaceuticals, drug discovery, orphan diseases, drug development

This fall, at least three conferences will bring together researchers to discuss how finding new uses for known drug compounds can be a strategy for both clinical development and business growth. A few years ago, no such conferences existed. "The interest level before Re:Search was about the same as it is today, but the level of recent activity is much higher," says Richard D. Harrison, scientific director of business information firm Thomson Reuters. "The cycle times are shorter, the development costs are lower, and the success rates are higher."

Re:Search has grown up because they are working with compounds that have been approved or are already in clinical trials. "We're not doing research and development," Harrison says. "We're looking for new uses for existing drugs."

A few thousand drug candidates are estimated to languish in pharma company cold storage, and the number only grows as more compounds fall in development or get dropped for business reasons. Companies, academics, and nonprofit groups are unveiling drug discovery technologies to get those compounds off the shelf. Commercial groups also have opportunities for profits, and nonprofits may even be able to treat neglected diseases or address unmet medical needs.

But obstacles can drop up along the way, even after the initial challenge of identifying and acquiring good drug prospects. Although others may have completed much of the preclinical work, developers still need to fulfill regulatory requirements. "You have to prove your concept and complete the rest of the development process," Harrison says. "So drug developers have to show that those compounds work in the clinic and are safe."

Repurposing is still drug development, and there is always a large amount of risk associated with it," Harrison says. "It's expensive, and there are regulatory hurdles."

In the United States, the FDA requires that new drug applications include the monograph, or information about the proposed drug. This includes information about the drug's active ingredients, the intended use, and the chemical structure. The FDA also requires a section on the drug's safety and effectiveness. The drug must be shown to be safe and effective for its intended use.

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**Exhibit 9. WIPO Re:Search Media Kit, cont.**

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Selecting the opportunity, two spring annual drug firms signed the **National Center for Advancing Translational Sciences (NCATS)** to create the Discovering New Therapeutic Uses for Existing Molecules program. This company together contributed $50 compendial that advanced clinical studies but were unsuccessful in their original therapeutic indication or not pursued for business reasons. The list of compounds, many of which were long abandoned by science programs, was posted in June.

NCATS, which is part of the National Institutes of Health, hopes the availability of these advanced compounds will encourage researchers to bring them into drugs for diseases that lack treatments. Researchers can submit proposals outlining how they would explore a specific hypothesis related to the use of a compound in a disease area. In 2013, NCATS plans on providing up to $20 million to fund several bi- to three-year cooperative research grants.

The NCATS program has garnered praise but also debate. One issue is around government support of corporate product development. In the program, a research partner will own new intellectual property (IP) that generates, but the company that owns the compound will have the first rights to develop it. Other concerns center on whether funding is always achieved, especially when it involves screening compounds in unrelated diseases.

Radio, which is not on NCATS remember, has taken a different approach to repurposing. As a first step, researchers can compile a small set of more than 350 compounds. By putting them all together, we are making a more realistic list of compound pairs that can be used in a disease area and are more focused on the fact that they are all high-quality compounds that you can repurpose from a rare disease association," Lackey says.

"Many drugs, early biological investigations bring you to understand a disease are nixed by the fact that you don't have good enough quality compounds to do the studies," Lackey adds. "Using advanced compounds to understand the biology means that you take a lot of advantage of the fact, such as those about safety, pharmacology, and availability.

Radio himself wants to find external researchers with skills and expertise on disease biology who can prep well-thought-out experiments. These studies must provide "meaningful answers that could link a compound with a patient population," Lackey says. But rather than trying to match an experiment to target a single compound by hand, "you think it is a better approach that is a product on the whole," she adds.

Lackey believes this less-engineered apptiact approach could lead to more opportunities. Collaboratives will first get the compounds and then molecular weights. If they uncover any interesting findings, more information will be shared. Radio and the partner will then agree to the next steps, which might include continuing results, further experimentation, and a development plan.

"The goal is to actually find projects and products that benefit patients," Lackey says. They may include rare or orphan diseases where potential partners "would have a differentiated enough disease entities in a field that is more certain than those that don't," he says, pointing to the FDA's "Fast-Track" process for development of drugs for rare or orphan diseases.

"It is not known whether NCATS's, Radio's, or another approach to repurposing is superior, but there is feeling that a scientific approach will probably be more effective," Hanrahan says. "Programs that have a well-defined patient population and that understand the treatment is going to be more successful than those that don't," he says, pointing to the Food & Drug Administration approved its 2009.
Exhibit 9. WIPO Re:Search Media Kit, cont.

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Novartis tried to develop the interleukin-16 (IL-16) blocking antibody as a rheumatoid arthritis treatment but stopped in Phase II trials. A couple of years later, researchers found that there was a rare disease called Muir-Torre syndrome in which patients were genetically predisposed to high levels of IL-16. "They were able to show great success," Harrison says. "Novartis got approval for a minor indication and now is going after additional indicators," Harrison says. "Sometimes it takes a good researcher understanding the science behind a disease and really pushing forward to get the repurposing to happen."

While big drug companies repurpose to get their money's worth from the compounds they discover, nonprofit such as the Center for World Health & Medicine (CWHM) at Saint Louis University are pursuing a different goal. Founded in 2010 by former Pfizer scientists, the group sees repurposing as a way to tackle neglected and rare diseases.

CWHM scientists are using their pharma background and knowledge of advanced drug molecules to go after disease targets. Executive Director Peter G. Raminski says, "We have worked with pharma to try to have them provide compounds for us to test in our preclinical models. To access patient populations, CWHM collaborates with academic and disease-focused nonprofit groups.

CWHM scientists were familiar, with cell surface proteins thought to play role in cancer-related pain, and organ damage associated with sickle cell disease. They are now looking to repurpose a mediated angiopoietin drug that targets these same proteins. Working in cooperation with a major company, they hope to use these data for Phase II clinical trials.

Because all small patient populations involved, the best way to interest a big pharma company in repurposing one of its compounds for an orphan application is to come bearing good information, Raminski adds.

"If you present them with something that looks very valid and promising, you might have a potential development partner or they might be willing to share their clinical data," he says. For the pharma company, it's a chance to recoup an investment in a compound. "It is like getting them to rethink something they actually stumbled across an alternative indication," he points out.

CWHM and others repurposing for rare and neglected diseases are looking for access to compound databases and libraries or are creating their own. Unlike the very large investigational compound libraries kept and sometimes shared by pharma companies, the newer libraries are focused on approved or advanced clinical compounds. FDAs Rare Disease Repurposing Database identifies promising approved drugs. And NHAs Pharmaceutical Collection that is available through the Therapeutics for Rare & Neglected Diseases program.

CWHM is among the nonprofit groups, companies, and universities participating in the consortium called WIPO Re:Search. Through the program, the World Intellectual Property Organization has created a database of available IP assets—including compounds, technology, and regulatory data—it support research on neglected tropical diseases. CWHM takes advantage of chemicals and agreements set up by WIPO to work with large pharma companies about sharing data advanced clinical researches or even small diversifed libraries, Raminski says.

Separately, Raminski is trying to get funding to build an international clinical compound repository to house as many compounds as possible in one place. "We're trying to create something that's a one-stop shop," he says. Many neglected and clinical drug compounds can be bought from research chemical suppliers. At the same time, CWHM scientists and collaborators in China and South Africa are synthesizing as many as they can.

"It will take a couple years to get under way, even if it takes seven years," Raminski says. Last year, he reached out to university chemistry departments in a pilot program. As part of their advanced organic chemistry courses, students at Regis University, in Denver, and Gonzaga University, in Spokane, Wash., helped in the compounds. "As soon as we get a critical mass, we'll start making compounds available for researchers to screen," he says.

Another nonprofit that saw promise in repurposing is Cures Within Reach, formerly known as Partnership for Cures. "It's our belief that drug repurposing is the fastest, safest, most affordable way to solve medical problems, especially in those rare and neglected diseases, where the economics of new drug development makes it almost impossible for the for-profit sector," says Bruce E. Bloom, president and chief scientific officer of CWR.

The Chicago-based nonprofit supported by companies, foundations, and private individuals. Partners include more than 50 academic and other research institutions at which it funds $1 million to $2 million in research annually. CWR has helped launch seven drug- or device-based "product development" treatments, has 18 projects in progress, and has 31 new ones ready to start.

CWR focuses primarily on approved compounds because they are already on the market, deemed safe, and plentiful. "It is much easier to do a project where we don't have to get support from a pharma company than when we do," Bloom says. "Getting failed compounds from a pharma company has tremendous legal, intellectual, publication, and other complications built into it."

With an approved drug as its starting point, CWR can often quickly move into a relatively low-cost pilot human clinical trial to see if a drug might work. "We can buy a drug and test it, and the drug company can't stop us," Bloom explains. "We still may need approval from an institutional review board and sometimes from FDA in order to do the repurposing."

A good example of the projects CWR likes to take on involved finding a therapy for autoimmune lymphoproliferative syndrome.
Exhibit 9. WIPO Re:Search Media Kit, cont.

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ALP3 is an often deadly childhood brain disease in which white brain cells accumulate in the organs and lead to death of immune and other problems.

Several years ago, the causative gene was identified, which led to an understanding of the pathways involved and pointed directly to a particularly promising drug, Bebio says. DWRI provided funding for University of Pennsylvania's David T. Liechti to create a mouse model of the disease for testing the transmission effects of drug repertiation. A subsequent that showed that the drug was very effective against ALP3.

The research took about three years, and DWRI spent about $250,000 funding the mouse model and about $150,000 on the clinical trial. At that point, we published the results,” Bebio says. Arriena, with this information, doctors can choose to prescribe the drug “off-label” — that is, for a use other than the one for which it was approved. Although drug companies cannot promote off-label use, physicians can legally prescribe drugs this way. They do so at a rate of roughly 20% of all prescriptions in the U.S., according to Bebio.

“Our main focus is to find a drug, raise the money, test the drug in patients, publish the results, and then give physicians the opportunity to figure out how they might use it in their clinical practice,” Bebio explains. “We primarily, but not always, stop at that point, knowing that we have introduced something into the marketplace that has enough scientific credibility that people can make a good decision.”

To find leads for repurposing, DWRI relies on clinical observations, such as side effects or changes in a patient’s condition when taking a drug for another disease. “We spend far more time thinking of clinical and scientific opportunities,” Bebio says, and reviewing the basic research information in the literature on all possible leads. The information can be available in a reproducible and consistent form at patient to patient, he adds. It also can provide more insight than can be learned in the lab because it comes from actual human experience.

In addition, big pharma and nonpharma, small firms are trying to come through repurposing. All for any small drug discovery program, success depends on attracting investors and partners, says Hermann W. Markl, founder of Vienna-based H.M. Pharma Consultancy.

Small firms offer novel business models, others develop their own drug pipelines, and still others license in drugs or clinical candidates from larger firms, Markl says.

Working in the other direction, some small firms (100 or so) develop projects to license to others, he says. For example, Jaganta Sreed and his Indian partner Venkata developed an antibiotic of a new antifungal drug, gynepiphenyl. They licensed the compound in 2003 and recently got approval in Europe for its use in chronic obstructive pulmonary disease.

Innovations in data screening methods are popular among small firms, as are bioinformatics approaches to identify opportunities. “They have the structure of a target, the drug against a database of known structures, and if they can find and generate that has not been described before,” Markl says. Using information in the public domain, other firms rely on cheminformatics, text analysis, patent landscaping, and other data mining methods alone or in combination with screening.

“Drug repurposing is always to go to the patients first,” Markl says. “Whether one is a small firm or large.” Patients can provide complete information on a compound's chemistry and pharmacology but are an underused resource. “You can immediately exclude what will not work for IP reasons,” he adds, knowing this avoids wasted effort and allows for more focused follow-on search of the scientific literature.

Managing IP is an important aspect of the drug repurposing business. Anyone can patent a new use, dosage, or formulation. But the history of a use patent can still be blocked by a composition of matter patent on the compound itself.

One way around this obstacle is to strike a deal with the holder of the composition-of-matter patent, Bebio says. On the other hand, if the patent is set to run out within a few years, a company can use the waiting time to complete clinical development and launch a repurposed product to compete with the patent expiration.

With limited resources a new drug, the potential holder can pursue others, even to compete overseas, then repurposing its drug for the new indication, Bavarian eParks says. Repurposed drugs can “make money in the same degree as a brand-name drug,” he contends.

Repurposing is a way to open new markets for successful drugs or to ease investments in failed ones, Bavarian says. “It's a very potential growth engine but a cost-intensive strategy as well.” Despite the fact that drug companies may think they know everything about their compounds, he notes, they clearly missed something when a smart person in a virtual garage operation can figure out that a new drug is good in some other disease.

Many firms avoid repurposing generic drugs, even if they can find novel and potential uses. This approach in drug-wasting available formulations and dosages, Spellman says, compounds or lower-cost generics prescribed instead.

“Your compounds can immediately be licensed to more people,” he adds. Numerica! Bavarian says, his firm helps academics, and pharma collaborate with scientific, legal, and business repurposing strategies.

To save where the potential valuable for the industry, others project into different classes based on how unique the drug and target interaction is. The class offering the most benefit is off-patent plasma codes—finding a new target in a new disease with an old drug. When repurposing is done right, you have ready separation between the new indication and the original one,” Bavarian says.
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Exhibit 9. WIPO Re:Search Media Kit, cont.

Although excited about repurposing, at least one small company, Melleri Discovery, is advancing with older technology to find new drug candidates.

As Chief Executive Officer Andrew G. Reamone notes, the drug industry's discovery paradigm has shifted in recent years to identifying targets, finding compounds to hit them, and then optimizing leads. Before this, industry relied more on the pharmacological screening, intuition, and serendipity.

But the industry hasn't gotten any better at predicting valid targets or developing successful new molecules, Reamone argues. An old repurposing strategy, the compound is picked from a target, is now the evidence-driven method, which it seems to avoid an incomplete knowledge about complex biological systems. Instead, he says, "we are using untested in vivo pharmacology screening to find otherwise unpredicted activity.

"It's not a matter of trying to open the door to the wind and say we can't really see how things work," Reamone explains. "It's just that we are starting with the observations and then developing hypotheses afterward." Melleri's phytotaxonomic screening platform incorporates more than 46 in vivo disease models that cover an array of therapeutic areas.

"We work with models that have stood the test of time," Reamone says. By multiplying the models, Melleri can screen safer with less compound, making the overall process more cost-effective than it would be on a stand-alone basis.

"The most important thing in repurposing is an understanding of the drug," he says, "not just the mechanism of the drug." Melleri's approach is to screen many compounds from classes that have already been characterized. "This is a very efficient way to screen," he adds.

Melleri works with phytotaxonomic partners that can provide compounds, which it then screens against a large database of diseases. The company's approach is to screen many compounds from classes that have already been characterized. "This is a very efficient way to screen," he adds.

Melleri's screening approach is inphase, Reamone acknowledges, but he's optimistic because the company is working with high value compounds. "We are not screening thousands of compounds in chemical libraries, but rather compounds that have been in Phase I or II trials with tens of millions of dollars invested in them and, accordingly, are used at high quality, more expensive, and thorough screening modeling.".

Regardless of the specific approach, starting from already studied drugs may prove to be the secret to the low- and even the mid-range benefit. Being able to develop drugs faster and at lower cost could have an economic impact and also deliver new medicines for unmet medical needs.

Repurposing is not all the time, Klicke notes. Although compounds picked for repurposing may have more favorable druglike properties, the risk of safety may be lower than for selected new, because they must still be shown to work. And despite the industry's best efforts, drug candidates — repurposed or not — have the potential to fail in late stage clinical trials and even after meeting the market.

Still, Klicke sees a huge potential to make good use of the otherwise unknown drugs already discovered and not exploited. "There are hundreds of possibilities still open where we don't need to construct, design, identify, or screen anything new," he says. "We just need to go into our chemical libraries, approach animal models and see what's hanging around."

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2012 Year-End Report to Funding Members
Exhibit 9. WIPO Re:Search Media Kit, cont.
First Agreements Concluded under WIPO Re:Search for Research on Neglected Tropical Diseases

Research to develop treatments for neglected tropical diseases received a boost this month as AstraZeneca concluded agreements through WIPO Re:Search with iThemba Pharmaceuticals (South Africa), the University of California, San Francisco (U.S), and the University of Dundee (UK).

The three agreements are the first partnerships established under the WIPO Re:Search initiative – an unprecedented collaboration to advance the discovery and development of treatments for neglected tropical diseases involving the World Intellectual Property Organization (WIPO), leading pharmaceutical companies, academic and national research institutions, and BIO Ventures for Global Health. The World Health Organization serves as a technical advisor to WIPO for WIPO Re:Search.

"Agreements such as these to transfer technology from one partner to another are an important measure of success for WIPO Re:Search, which we launched less than a year ago," said WIPO Director General Francis Gurry. "We are very pleased that AstraZeneca - one of the original members of WIPO Re:Search - has successfully concluded these first agreements, and we look forward to more results in the coming weeks and months."

Dr. Manos Perros, Head of the AstraZeneca Infection Innovative Medicines Unit, said: "As an industry, we have a great opportunity to make a real difference in global health through WIPO Re:Search by addressing the needs of the considerably underserved population suffering from neglected tropical diseases. These three partnerships are only the beginning for AstraZeneca in demonstrating how, by coming together, sharing our proprietary information and collaborating on potential solutions, we can help speed the research and development of treatments for those devastating diseases."

Since its October 2011 launch WIPO Re:Search has grown from 30 members to 50 - from all five continents - today. Under the terms of WIPO Re:Search, organizations agree to make available intellectual property assets (such as pharmaceutical compounds, drug discovery technologies, regulatory data, and know-how), to qualified researchers anywhere in the world on a royalty-free basis, provided the research is focused on neglected tropical diseases, malaria, and tuberculosis. Any products resulting from this research will also be royalty-free for sales in least developed countries (LDCs).
Neglected tropical diseases are endemic in 149 countries and affect more than one billion people worldwide. By providing a searchable, public database of relevant, available intellectual property assets, information, and resources, WIPO Re:Search facilitates new research partnerships. BIO Ventures for Global Health, as the Partnership Hub Administrator, actively identifies partnership opportunities between members and facilitates collaborations to drive the development of new products for neglected tropical diseases, malaria, and tuberculosis.

This work led to AstraZeneca collaborating with research institutions to study novel treatments for Chagas disease, sleeping sickness, schistosomiasis (snail fever), and tuberculosis, specifically:

- **University of California, San Francisco (UCSF):** Originally developed for osteoarthritis, AstraZeneca’s mature cathepsin inhibitors will be tested by UCSF researchers for activity in biochemical and phenotypic screens for two parasitic diseases: schistosomiasis and kinetoplastid diseases. Schistosomiasis can damage internal organs, impair growth and cognitive development in children, and the urinary form can increase risk for bladder cancer in adults. Kinetoplastid diseases include sleeping sickness and Chagas disease.

- **University of Dundee:** Researchers will test a selection of glycogen synthase kinase (GSK)-3 inhibitors, which were originally developed for a potential treatment of Alzheimer’s disease, against parasites responsible for Chagas disease, leishmaniasis and sleeping sickness.

- **IThembac Pharmaceuticals:** AstraZeneca will provide IThemba with computational and medicinal chemistry support for development of IThemba’s isocitrate lyase inhibitors, compounds intended as a novel treatment for tuberculosis.

“We are thrilled to see the initial results of AstraZeneca’s commitment to WIPO Re:Search,” said Don Joseph, CEO, BIO Ventures for Global Health. “These collaborations are an important achievement for WIPO Re:Search’s Partnership Hub and the first step in accelerating the development of treatments for tuberculosis, schistosomiasis, leishmaniasis, African sleeping sickness and Chagas disease.”

**About WIPO**

The World Intellectual Property Organization (WIPO) is the leading global forum for the promotion of intellectual property as a force for innovation and creativity to achieve positive change.

A specialized agency of the United Nations, WIPO assists its 185 member states in developing a balanced international IP legal framework to meet society’s evolving needs. It provides business services for obtaining IP rights in multiple countries and resolving disputes. It delivers capacity-building programs to help developing countries benefit from using IP. And it provides free access to unique knowledge banks of IP information.

**About WIPO Re:Search**

WIPO Re:Search is an initiative led by WIPO in partnership with BIO Ventures for Global Health (BVGH). The consortium includes a number of the world’s leading pharmaceutical companies, research institutions, governmental, and non-governmental organizations. Through WIPO Re:Search, public and private sector organizations make valuable intellectual property and other resources available on a royalty-free basis to qualified neglected tropical disease researchers anywhere in the world. WIPO Re:Search Members are working to develop new products to prevent, diagnose and treat neglected tropical diseases, malaria, and tuberculosis.
About BIO Ventures for Global Health

BIO Ventures for Global Health (BVGH) is a non-profit organization whose mission is to save lives by accelerating the development of novel drugs, vaccines, and diagnostics coming from the biopharmaceutical industry that address the unmet medical needs of the developing world. The organization works at the crossroads of biotechnology and global health to find the common ground between the goals of the global health community and the pragmatic needs of biopharmaceutical companies. For more information, please visit www.bvgh.org.
Catalyzing global health partnerships and accelerating innovation

The critical role of the WIPO Re:Search Partnership Hub in facilitating research and development for neglected tropical diseases
Advances in science, medicine, and technology have enabled high-income countries to dramatically reduce the burden of infectious diseases and even eliminate some diseases from their populations. Many developing countries, however, still struggle with high rates of preventable sickness and death.

A key problem has been a lack of market-driven research and development to create products for preventing, diagnosing, and treating a subgroup of infectious diseases that are common in developing nations—especially the least developed countries. This subgroup consists of neglected tropical diseases, malaria, and tuberculosis (TB).

In 2011, the World Intellectual Property Organization (WIPO) and BIO Ventures for Global Health (BVGH) partnered with leading pharmaceutical companies, academic institutions, and research organizations with a common desire to improve the lives of people suffering from neglected tropical diseases, malaria, and TB. The resulting worldwide consortium is known as WIPO Re:Search. The consortium’s primary objective is to catalyze research and development of needed vaccines, diagnostic technologies, and drugs by sharing intellectual property (IP), know-how, technologies, expertise, and related resources.

The WIPO Re:Search Partnership Hub, administered by BVGH, plays a critical role in facilitating collaboration to accelerate innovation among consortium members. The Partnership Hub identifies researchers’ needs for IP and related resources to advance product development, finds organizations that may be able to meet these needs, and then helps to forge mutually beneficial collaborations with clearly defined roles, responsibilities, and objectives.
Addressing diseases of poverty

Neglected tropical diseases, malaria, and TB affect more than 1.5 billion people worldwide. The groups hit hardest are low-income and politically marginalized populations in rural and urban areas within the world’s developing and least developed countries. These populations often have little influence on administrative and governmental decisions that affect their health and sometimes seem to have no one who can advocate effectively for their interests.

Many of these diseases are transmitted by insect bites or by worms in the soil. Children and adults typically become infected with disease-causing parasites or bacteria simply by engaging in normal daily activities, such as playing outside, collecting water, doing laundry, or planting crops.

“Collaboration is a critical component of KCCR’s strategy. Membership in WIPO Re:Search provides KCCR with an opportunity to catalyze partnerships with a worldwide network of impressive neglected disease researchers and pharmaceutical companies. We have already initiated our first collaboration with Stanford and are currently engaged in talks with PATH. We anticipate more exciting partnering opportunities in the near future.”

ELLIS OWusu-DABO
Scientific Director, Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR)
Kumasi, Ghana
Addressing diseases of poverty

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ELLIS OWUSU-DABO
Scientific Director, Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR)
Kumasi, Ghana
“WIPO Re:Search provides a novel avenue for Pfizer and other pharmaceutical companies to engage in neglected disease research and development initiatives. The Partnership Hub identifies potential partners and facilitates communication between neglected disease researchers and Pfizer scientists. WIPO Re:Search enables Pfizer to share our intellectual property assets, know-how, capabilities, and expertise with researchers in the developing world and elsewhere to accelerate the development of products that will ultimately improve health and development in emerging and developing countries. Pfizer is proud to support WIPO Re:Search.”

IAN READ
Chief Executive Office, Pfizer
New York City, New York, United States

Examples of neglected tropical diseases include schistosomiasis, onchocerciasis (river blindness), lymphatic filariasis, dengue fever, trachoma, and soil-transmitted helminths (hookworm, roundworm, and whipworm). These diseases have an enormous impact on individuals, families, and communities. Many can lead to severe disfigurement and disability as well as death. They aggravate poverty and reduce productivity by impairing children’s intellectual development, stunting growth, reducing school enrollment, and limiting the ability of infected individuals to work. They constitute a serious barrier to socioeconomic development and improvement in the quality of life in the world’s poorest countries.
The role of WIPO Re:Search

The WIPO Re:Search consortium includes pharmaceutical companies, academic and nonprofit research institutions, product development partnerships, and government agencies. Members join WIPO Re:Search as Providers of IP, know-how, and expertise; as Users of these resources; or as Supporters of the consortium. In some cases, members enroll in multiple categories. The consortium is truly global, with members from Africa, Asia, Europe, and North and South America.

Through WIPO Re:Search, qualified researchers from around the world receive access to the following types of resources:

- Compounds.
- Compound libraries.
- Unpublished scientific results.
- Regulatory data and dossiers.
- Screening technologies and capabilities.
- Platform technologies.
- Expertise and know-how.
- Patents and patent rights.
- Opportunities to be hosted and mentored by scientists at company facilities.

When joining the consortium, members agree to the following guiding principles:

- Providers of IP will offer royalty-free licenses for products made available to least developed countries.
- Members will consider in good faith the issue of access to these products for all developing countries, including those that do not qualify for least developed status.
- Users of IP shared through WIPO Re:Search may retain ownership of new IP but are encouraged to make their inventions available to other consortium members.
- License agreements are individually negotiated between member organizations in accordance with the consortium's guiding principles.

The work of WIPO Re:Search centers around three main areas of activity:

- **A global database.** Hosted by WIPO, this is a publicly accessible, comprehensive database of IP assets—including compounds, enabling technologies, know-how, and other information. The database can be searched through keywords or by Provider, disease, or type of data or product. To access the database, visit www.wipo.int/research/en/search/.
- **Supporting services.** Led by WIPO, these services include general licensing support from WIPO and technical advice provided by WIPO and the World Health Organization.
- **Partnership Hub.** BVGH is the nonprofit administrator of the Partnership Hub, whose work is described in the following section.

For more information about WIPO Re:Search, please visit www.WIPOReSearch.org.
AstraZeneca and the University of Dundee

The Partnership Hub facilitated an agreement between AstraZeneca and the University of Dundee to enable a university researcher to explore potential new treatments for neglected tropical diseases. The arrangement is enabling the researcher in Scotland to test a group of glycogen synthase kinase-3 (GSK-3) inhibitors—originally developed by AstraZeneca for potential treatment of Alzheimer’s disease—against parasites responsible for Chagas disease, leishmaniasis, and sleeping sickness.

The stage was set for this collaboration when AstraZeneca contributed
The vital work of the Partnership Hub

Facilitating targeted collaboration

Successful development of vaccines, diagnostics, and drugs requires highly specific expertise and complementary capabilities from a variety of scientific disciplines and organizations. An academic researcher, for example, may not have the expertise, capacity, or resources to conduct preclinical toxicology studies or develop a profile of a compound’s pharmacokinetics and pharmacodynamics—capabilities that are available at a large pharmaceutical firm.

The WIPO Re:Search Partnership Hub helps researchers find and partner with organizations that can close gaps in technical expertise and capabilities. The Partnership Hub administrator, BVGH, provides business development and scientific expertise coupled with negotiation and alliance management skills. With this professional support, WIPO Re:Search members can explore new partnership opportunities with confidence that the Partnership Hub will facilitate introductions and communication and then maintain momentum to establish mutually beneficial agreements.

"Having already established a broad network of contacts and collaborators interested in our vaccine development work, we did not initially have high hopes that the Partnership Hub would be particularly helpful. But we have clearly benefitted from signing on and have been pleasantly surprised to see how this mechanism has helped open up several promising new opportunities. We have regular discussions with Jennifer and Roopa to ensure a coordinated approach to partnering, and Sabin intends to continue to leverage the WIPO Re:Search network whenever possible."

MICHAEL MARINE
Chief Executive Officer,
Sabin Vaccine Institute
Washington, DC, United States

28 compounds to the WIPO Re:Search database in 2011. The Partnership Hub then profiled kinase inhibitors, including GSK-3 beta inhibitors, in its January 2012 newsletter. During a January 2012 Keystone conference on drug discovery for protozoan parasites, the Partnership Hub’s manager of scientific affairs met with the head of the Drug Discovery Unit at the University of Dundee. His publications suggested a potential interest in a GSK-3 beta inhibitor contributed by AstraZeneca. The investigator subsequently requested access to a library of related compounds to screen for selectivity to parasite targets.

Partnership Hub staff approached AstraZeneca with the researcher’s request and facilitated communication between the pharmaceutical firm and researcher. An experimental plan and timelines were prepared and shared by the researcher. By July, AstraZeneca and the University of Dundee had signed a material transfer agreement to enable the sharing of compounds.
The Partnership Hub facilitates research collaboration by:

- **Actively identifying collaboration opportunities for members.** BVGH reaches out to members to learn about their research programs, capabilities, areas of expertise, and partnering interests. With this information in hand, BVGH explores and identifies collaboration opportunities that strategically match Providers’ contributions with Users’ needs based on complementary research interests.

- **Serving as a scientific expert on WIPO Re:Search contributions and neglected tropical diseases.** BVGH understands how the WIPO Re:Search database contributions can be applied to research and product development for neglected topical diseases, malaria, and TB. The Partnership Hub proactively matches these contributions with research programs of potential Users.

- **Fielding requests from the IP database.** Users are encouraged to search the database to identify assets that could support or accelerate their research. Once an asset of interest has been identified, the member contacts the Partnership Hub to learn more about the asset and the type of collaboration the Provider is inviting. BVGH then establishes mutual interest between members and connects the interested parties.

“The Partnership Hub facilitates our collaboration in a manner that matches the partners’ views and objectives. It identifies relevant partnership opportunities and helps us leverage pharmaceutical expertise from institutions worldwide to build upon our process development and formulation capabilities. In addition to what we gain through our participation in WIPO Re:Search, Fiocruz develops and provides access to a rich reserve of natural products, research expertise, and manufacturing capabilities.”

**Jorge Bermudez**
Vice President, Production and Innovation in Health, Fundação Oswaldo Cruz (Fiocruz)
Rio de Janeiro, Brazil

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**CASE STUDY**

**Stanford University and the Kumasi Centre for Collaborative Research in Tropical Medicine**

The Partnership Hub has played a vital role in meeting the needs of Stanford University researchers developing a point-of-care diagnostic kit to detect parasitic worms. Because their approach relies on detecting antibodies to worm proteins in feces from infected individuals, the researchers need stool samples from appropriate populations to evaluate assay performance. The Partnership Hub facilitated collaboration between the US researchers and the Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR) in Ghana to advance this work.
• **Fielding special requests.** BVGH welcomes special requests for compounds, compound libraries, or other resources that are not captured in the WIPO Re:Search database. Providers are usually willing to explore any request that supports the development of products for neglected tropical diseases, malaria, or TB. Researchers with specific targets or compounds of interest should contact the Partnership Hub to facilitate inquiries into whether these assets could be available from Providers.

• **Facilitating member connections around potential collaborations.** BVGH speaks with members to establish interest in exploring research collaborations. Once mutual interest is established, BVGH connects members so scientists can discuss their research and further explore the possibility of working together and sharing assets. BVGH assists members in the initial stages of developing collaboration agreements.

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The origins of this collaboration can be traced to a meeting of the Council on Health Research and Development, held in April 2012 in Cape Town, South Africa. The World Intellectual Property Organization hosted a session on WIPO Re:Search, and the Partnership Hub presented an overview of its work. A scientist from KCCR was enthusiastic about participating.

Partnership Hub staff held a meeting at Stanford in May to learn about its neglected disease programs. A Stanford researcher subsequently reached out to the Partnership Hub to request support in accessing stool samples containing soil-transmitted helminths. The Partnership Hub then facilitated communication between the researchers and staff at KCCR and Kwarase Nkrumah University of Science and Technology in Ghana. By July, KCCR had become a WIPO Re:Search member, and KCCR and Stanford had agreed on terms of a collaboration agreement. By September 2012, Stanford and KCCR were discussing project protocols and the needed approvals from institutional review boards.
- **Recruiting new Users and supporting recruitment of new Providers and Supporters.** BVGH reaches out to potential new Users based on their research programs and ability and desire to develop vaccines, diagnostics, or drugs for neglected tropical diseases, malaria, or TB. In partnership with WIPO, BVGH identifies and recruits researchers worldwide with an emphasis on those from developing countries. BVGH also supports WIPO to bring on new high-quality Providers.

- **Attending meetings to network and stay current on neglected tropical disease research.** BVGH staff attend key conferences, such as the annual meeting of the American Society for Tropical Medicine and Hygiene, to stay abreast of research advances and to meet with existing members and potential new members.

- **Tracking developments in global health and industry.** BVGH staff track developments in global health and industry and review relevant scientific literature to provide evidence-based consultation and service to members.

- **Developing resources to support members in achieving their research objectives.** Partnership Hub resources include a “Funders Database” summarizing key neglected tropical disease funding opportunities, as well as scientific summaries highlighting WIPO Re:Search contributions and their application to neglected disease research. These resources and others can be found at http://www.bvgh.org.

**Getting results**

Twenty four organizations were members of WIPO Re:Search when the consortium was launched in 2011. Since then, BVGH and WIPO have steadily expanded membership. As of October 2012, the consortium has more than doubled in size, with more than 50 members across the globe.

By October 2012, the Partnership Hub had facilitated ten agreements between WIPO Re:Search members. Many more agreements were in advanced stages of negotiation, and additional collaboration ideas and agreements were in early development.

BVGH staff have presented information on the Partnership Hub and networked with existing and potential consortium members at many scientific conferences and meetings. These include the Biotechnology Industry Association convention, the American Society of Tropical Medicine and Hygiene annual meeting, and the general assembly of the International Federation of Pharmaceutical Manufacturers & Associations.

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**CASE STUDY**

**Emory University and the National Institutes of Health**

The Partnership Hub facilitated a collaboration between a professor at Emory University in Atlanta, Georgia, and dengue biology experts at the National Institutes of Health (NIH) to investigate potential new treatments for dengue fever. This work focuses on further exploring and confirming the potential usefulness of compounds called RNA-dependent polymerase inhibitors.

The story began when the vice president for research at Emory University invited BIO Ventures for
“The Partnership Hub provides a unique and necessary service for neglected tropical disease researchers and organizations. Jennifer and Roopa have quickly connected me with partners who have the interest and capabilities to further evaluate our promising lead compounds for malaria. They have reconnected me with prior collaborators and have presented a number of interesting collaboration opportunities to our faculty. We look forward to establishing many relationships and meaningful collaborations with the support of the Partnership Hub.”

WESLEY VAN VOORHIS
Head, Division of Allergy and Infectious Diseases, Department of Medicine, University of Washington Seattle, Washington, United States

Improving health, advancing research, and developing markets

The WIPO Re:Search Partnership Hub helps to establish promising collaborations to advance research and development of products for neglected tropical diseases, malaria, and TB. It facilitates communication, alignment, and transparency while helping to establish material transfer agreements, confidential disclosure agreements, collaborations, and licenses between consortium members. The Partnership Hub’s work is based on a fundamental belief that collaboration for innovation is critical to improving the health and well-being of people in the world’s least developed countries who have too often been unable to benefit from global progress in science, medicine, and technology.

The Partnership Hub benefits researchers around the world by helping them gain free access to valuable intellectual property and related resources for developing new vaccines, diagnostic technologies, and drugs for diseases affecting the world’s poorest and most vulnerable populations. Pharmaceutical companies and other groups holding these assets benefit by expanding their role in global health and development, by establishing good relationships with researchers around the world, and by helping to develop future markets for health products.

Global Health to present information on WIPO Re:Search and the Partnership Hub to faculty members. A university chemistry professor and director of the Emory Institute for Drug Discovery said he believed compounds he was developing might have value for the treatment of dengue, but he needed to consult with an expert in dengue biology.

Partnership Hub staff recommended two WIPO Re:Search members with appropriate expertise, and the professor chose to explore working with biologists at the NIH. After being connected by the Partnership Hub, the professor and the NIH dengue program officer established a Nonclinical Evaluation Agreement so the NIH could provide “in-kind” services leveraging internal expertise in dengue biology to characterize the professor’s compounds and share insights.
For more information

To learn more about the Partnership Hub, please visit www.bvgh.org. This web page includes links to a monthly Partnership Hub newsletter.

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WIPO Re:Search is a worldwide consortium whose primary objective is to catalyze research and development of needed vaccines, diagnostic technologies, and drugs by sharing intellectual property, know-how, technologies, expertise, and related resources.

To learn more about WIPO Re:Search, please visit www.wipo.int/research.