BVGH Partnership Hub
Annual Report 2021
WIPO Re:Search is:

- A global public-private consortium
- A research and development (R&D) network spanning six continents
- Early-stage innovation for neglected tropical diseases (NTDs), malaria, and tuberculosis
- Sharing intellectual property (IP)
- Advancing United Nations (UN) Sustainable Development Goals
- Building R&D capacity in low- and middle-income countries (LMICs)

174 Collaborations Established through 2021
- 50+ Ongoing
- 8 Advanced through key R&D milestones

160 Members
46 Countries

BVGH’s project and alliance management support has helped Members to:

- Achieve **critical early-stage development milestones** for essential products, including
  - Antimalarial, antischistosomal, and antitubercular therapies with novel modes of action
  - Safer NTD treatments
- Secure millions of US dollars in **competitive external funding awards**
- File patents to protect inventions arising from collaborations
- Publish research results in **peer-reviewed publications in high-impact journals**, including *PLOS Neglected Tropical Diseases* and *Cell Host & Microbe*
- Feature their NTD, malaria, and tuberculosis partnerships and programs through BVGH communication channels
- Make **early go/no-go decisions for R&D initiatives unlikely to succeed**, saving thousands of dollars and months of **employee time** that can be reallocated to more promising programs
Dear WIPO Re:Search Members and Friends,

I am pleased to share the 2021 BVGH Partnership Hub Annual Report. In these pages, we look back with great pride at the accomplishments of our Members over the past year—including advancement of public-private antiparasitic drug discovery partnerships and peer-reviewed publications. We welcomed organizations from Latin America, Africa, and North America to the Consortium and facilitated new cross-sector collaborations, the majority of which are Global North/South partnerships.

In response to the COVID-19 pandemic, the third round of the WIPO Re:Search Fellowship Program (supported by the Government of Australia through WIPO Funds-in-Trust) was transitioned into a 15-week virtual R&D and IP training seminar series. Industry, academic, and non-profit leaders—including former fellowship hosts—volunteered their time as expert trainers. In addition to the fellows IP training, BVGH and WIPO conducted a first-of-its-kind four-day virtual IP capacity building workshop for scientists and IP management professionals in Africa, the Asia-Pacific region, and Latin America.

We celebrated the 10th anniversary of WIPO Re:Search with a virtual event showcasing how IP and innovation are driving improved health and economic development in Africa—home to 40+ Member organizations. The event featured a distinguished line-up of African scientists participating in WIPO Re:Search collaborations, additional regional partners, and Member companies committed to advancing research and improving global health.

Looking ahead to 2022, the fight against neglected tropical diseases, malaria, and tuberculosis remains as important as ever. We thank you, our Members and friends—with special acknowledgement to our funding Members Eisai Co., Ltd; GSK; Johnson & Johnson; Merck KGaA, Darmstadt, Germany1; MSD2; Novartis; Pfizer; and Takeda—for your support and partnership.

Jennifer Dent
President & CEO
BIO Ventures for Global Health

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1 The business sectors of Merck KGaA, Darmstadt, Germany operate as EMD Serono in healthcare, MilliporeSigma in life science, and EMD Electronics in the US and Canada
2 MSD is a trademark of Merck & Co., Inc., Kenilworth, NJ, USA
2021 Collaborations

BVGH’s targeted partnering approach catalyzes IP sharing across sectors and geographies—with a focus on LMICs—to advance early-stage product R&D for NTDs, malaria, and tuberculosis and drive progress toward the UN Sustainable Development Goals.

9 new R&D collaborations were catalyzed in 2021, including:

- 6 Global North/South partnerships
- 13 companies and academic/non-profit organizations
- 11 countries (5 LMICs)

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<tr>
<th>Partners</th>
<th>Disease(s)</th>
<th>Assets Shared</th>
<th>Phase</th>
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<td>Merck KGaA, Darmstadt, Germany, Ahmadu Bello University (Nigeria)</td>
<td>Schistosomiasis</td>
<td>Compounds</td>
<td>Screening</td>
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<tr>
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<td>Malaria</td>
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<td>Pfizer, University of Tokyo</td>
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<td>Pfizer, University of Yaoundé I (Cameroon)</td>
<td>HAT, Leishmaniasis, Malaria</td>
<td>Compounds</td>
<td>Screening</td>
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<td>Chagas disease, HAT, Leishmaniasis</td>
<td>Technology/Assay</td>
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<td>Schistosomiasis</td>
<td>Technology/Assay</td>
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HAT Human African trypanosomiasis  
SCRI Seattle Children’s Research Institute  
SSGCID Seattle Structural Genomics Center for Infectious Disease
New Collaboration Highlights

Developing New Schistosomiasis Treatments through Global North-South Partnerships

Schistosomiasis affects hundreds of millions of people worldwide, mostly in the world’s poorest countries. Praziquantel (PZQ) is the only medication currently used in mass drug administration programs, raising the potential risk of drug resistance. There is a critical need to develop new therapeutics that target essential pathways that are not affected by PZQ. BVGH connected Members and forged two new collaborations—driven by African researchers—that are taking different approaches to address this need:

**Dr. Emmanuel Oluwadare Balogun** of Ahmadu Bello University (Nigeria) is screening the Open Global Health Library of Merck KGaA, Darmstadt, Germany to identify antischistosomal compounds with novel mechanisms of action. The Open Global Health Library is a set of compounds targeting diverse pathways, which Merck KGaA, Darmstadt, Germany is making available to scientists worldwide to catalyze infectious disease drug discovery as part of its commitment to Open Innovation.

**Dr. Peter Cheuka** of University of Zambia aims to harness the medicinal power of Africa’s natural biodiversity and synthetic compounds to combat parasitic diseases. **Dr. Conor Caffrey** at the Center for Discovery and Innovation in Parasitic Diseases and the Skaggs School of Pharmacy & Pharmaceutical Sciences at University of California, San Diego is analyzing the antischistosomal activity of natural product derivatives synthesized by Dr. Cheuka to identify hits for further development.

Exploiting Novel Drug Targets to Combat Kinetoplastid Diseases

Chagas disease, human African trypanosomiasis, and leishmaniasis—collectively known as kinetoplastid diseases—disproportionately exact heavy tolls on people living in LMICs. **Dr. Marcelo Comini** at Institut Pasteur de Montevideo (Uruguay) has identified and characterized three promising new drug targets for these diseases. Investigators from Seattle Children’s Research Institute and the Seattle Structural Genomics Center for Infectious Disease (SSGCID) are working to determine the three-dimensional crystal structures of the targets to inform design of new drugs that will bind the targets and inhibit their activity.

Repurposing Pharmaceutical Compounds to Drive Antimalarial Drug R&D

There were an estimated 241 million malaria cases and 627,000 malaria deaths worldwide in 2020—approximately 14 million more cases and 69,000 more deaths than in 2019. As drug resistance represents one of the greatest threats to global malaria control, new medicines are critically needed. **Dr. Tomoyoshi Nozaki** at University of Tokyo is screening compounds provided by Pfizer against certain potential targets in malaria.

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3 The business sectors of Merck KGaA, Darmstadt, Germany operate as EMD Serono in healthcare, MilliporeSigma in life science, and EMD Electronics in the US and Canada

4 SSGCID is funded in whole or in part with Federal funds from the National Institute of Allergy and Infectious Diseases, National Institutes of Health, Department of Health and Human Services, under Contract No. HHSN272201700059C
Collaboration Updates

Profiling Antimalarial Drug Resistance Markers in Nigeria

Dr. Jun-Hu Chen at the National Institute of Parasitic Diseases (NIPD; China) uses PCR assays and sequencing to identify resistance-causing mutations in malaria parasite genes. With funding from NIPD, Dr. Uche Igbasi, then a graduate student in the laboratory of Prof. Wellington Oyibo at University of Lagos (Nigeria), spent two months at NIPD to receive training in molecular genotyping and to apply this technique to identify resistance marker genes to sulfadoxine-pyrimethamine (SP) in isolates of Plasmodium falciparum from Nigerian patients. The World Health Organization recommends SP for prophylactic use in pregnant women to protect the fetus from the devastating effects of the malaria parasite in the womb. SP is also widely used in the Nigerian general population as a partner drug for artemisinin combination therapy (ACT). The collaborators published their results in Infectious Diseases of Poverty (High multiple mutations of Plasmodium falciparum-resistant genotypes to sulphadoxine-pyrimethamine in Lagos, Nigeria). This work reported a high prevalence of SP-resistant haplotypes five to eight years after the introduction of ACT. These findings highlight the need for continuous monitoring of resistance to SP. This is the second of three joint publications resulting from Dr. Chen’s and Prof. Oyibo’s partnership, which began in 2014.

“Jump-stARt”ing Drug Discovery for Parasitic Diseases

As part of its global public health commitment, Johnson & Johnson shares its 80,000-compound Jump-stARter library broadly to catalyze drug R&D for NTDs, malaria, and tuberculosis. Two peer-reviewed journal articles were recently co-published by Johnson & Johnson (Dr. Paul Jackson) and collaborators at the Walter and Eliza Hall Institute of Medical Research (WEHI; Prof. Alan Cowman and Dr. Brad Sleebs) and University of Melbourne (Labs of Prof. Robin B. Gasser and Prof. Abdul Jabbar; supported by the Australian Research Council [ARC], Phylumtech [Dr. Sergio Simonetta] and Oz-omics [Dr. Bill Chang]).

WEHI
Each year, over 200 million people worldwide contract malaria. New therapies are needed to treat drug-resistant Plasmodium parasites. Prof. Alan Cowman and Dr. Brad Sleebs identified several compounds with antiplasmodial activity in screens of the Jump-stARter library. Together with Johnson & Johnson, the researchers are chemically optimizing the molecular structures of the hits to increase their potency. Their joint publication in Bioorganic Chemistry (Optimisation of 2-(N-phenyl carboxamide) triazolopyrimidine antimalarials with moderate to slow acting erythrocytic stage activity) describes a novel class of antimalarial compounds with activity against multidrug-resistant P. falciparum (prevalent in sub-Saharan Africa) and P. knowlesi (prevalent in Southeast Asia). This compound class could potentially be suitable as a partner drug for malaria treatment or prophylaxis in combination with a fast-acting antimalarial. The collaboration continues as additional hits are being analyzed.

University of Melbourne
Parasitic worms (helminths) cause substantial morbidity and mortality worldwide. Effective vaccines are not available for most species of worms, and heavy reliance on current drugs has led to development of resistance. Dr. Aya Taki and colleagues in the Gasser Lab screened the Jump-stARter library and identified multiple hits with anthelmintic activity for further investigation. These results, published in Pharmaceuticals (High-throughput phenotypic assay to screen for anthelmintic activity on Haemonchus contortus), also demonstrate the benefits and promise of the team’s high-throughput assay format to identify compounds targeting other parasitic worms.
Welcome, New Members!

BVGH strategically recruits new Members to expand the breadth and impact of collaborations, with targeted recruitment in Latin America and Africa.

Membership grew to 160 Members across 46 countries—including our first Members in Peru and Rwanda:
- Anchor University Lagos
- Global Healthcare Innovation Alliance Accelerator
- Institute of Science and Technology
- Medical College of Wisconsin
- National Hansen’s Disease Program
- University of Nebraska Medical Center
- Universidad Peruana Cayetano Heredia
- University of the Republic of Uruguay
- University of Rwanda

Universidad Peruana Cayetano Heredia (UPCH) is a leading higher education institution in Lima, Peru. For 60 years, UPCH has contributed to world-class knowledge in tropical medicine, high-altitude medicine and physiology, public health, and basic sciences with the highest research standards and ethics. Research and innovation are fundamental pillars, and the university consistently ranks among the top Peruvian institutions in research and international partnerships. UPCH’s Instituto de Medicina Tropical Alexander von Humboldt studies diseases including tuberculosis, leishmaniasis, malaria, and HIV, in Lima as well as at field sites such as Iquitos, Cuzco, and La Merced.

University of Rwanda, established in 2013, is committed to graduating the next generation of leaders who are prepared and dedicated to building a more just and sustainable society locally, nationally, and globally. The university is a multi-campus institution, consisting of six academic entities, including the College of Science and Technology and the College of Medicine and Health Sciences. University of Rwanda is recognized for its innovative approaches to teaching, learning, research, and connections with the community, and aims to become a world-class university empowering national economic and social transformation through active participation in the global knowledge economy. The university has extensive experience conducting infectious disease research and experimental medicine to develop improved interventions and strengthen access and community acceptance.
Capacity Building

BVGH and WIPO expand the capacity of LMICs to conduct high-quality NTD, malaria, and tuberculosis R&D—and manage the resulting IP—by coordinating in-person and virtual training experiences.

**WIPO Re:Search Fellowship Program**
Supported by the Government of Australia through WIPO Funds-in-Trust (FIT), BVGH and WIPO coordinate and manage capacity building fellowships with a focus on our LMIC Members. In addition to empowering LMIC scientists to advance their own R&D programs, fellowships also nurture the research enterprises at the scientists’ home institutions through knowledge exchange and collaborations.

Following two rounds of in-person fellowship placements in advanced laboratories, during the COVID-19 pandemic BVGH developed and implemented a **15-week virtual training seminar series**—taught by leading industry, academic, and nonprofit experts—for a third cohort of fellows. The series focused on R&D and IP management topics identified as high priorities by the fellows. All survey respondents were satisfied or very satisfied with the series.

- **26** Fellowships completed
- **46** Percent of fellows are women
- **100+** Months of training conducted
- **12** LMICs benefitted

Notable achievements of Fellowship alumni include:
- US $8.2 million+ in competitive external grant funding
- High-profile awards (e.g., ASTMH Alan J. Magill Fellowship)
- Promotions
- International publications and presentations
- New research collaborations

**Virtual IP Capacity Building Workshop**
BVGH and WIPO conducted a first-of-its-kind workshop—spanning **4 days of virtual training** across **11** topics for **60** professionals from **19** LMICs—to empower LMICs to strategically manage their IP assets. Sessions were taught by experts from WIPO, pharmaceutical companies (including Pfizer’s retired Chief IP Counsel and subject matter experts from Merck KGaA, Darmstadt, Germany), and academic and nonprofit organizations. The majority of post-seminar survey respondents were satisfied or very satisfied with all sessions.

**Pilot Virtual IP Mentorship Program**
Following the virtual IP capacity building workshop, BVGH (in consultation with WIPO) facilitated **3** mentoring relationships for mentees based in Africa, Latin America, and South Asia.
Communications

BVGH shares Consortium successes with international audiences to expand recognition of positive impacts of IP on global health.

BVGH’s communications are amplified by Members and external stakeholders.

BVGH WIPO Re:Search Publications

- IP to Beat TB: How Efforts to Curb Tuberculosis are Being Fueled by a Collaborative IP Ecosystem (with US Chamber of Commerce; IP Watchdog)
- Canadian Investigators Partner through WIPO Re:Search to Improve Diagnosis of Chagas disease—a Significant Public Health Problem in Latin America (McGill Perspectives on Global Health)
- Partnership Hub 2020 Annual Report
- Monthly Partnership Hub Snapshot newsletter
- Social media promotion (LinkedIn, Twitter)

10th Anniversary Communications and Events (with WIPO)

- The First 10 Years of WIPO Re:Search: Catalyzing Global Collaboration and Innovation to Fight Neglected Tropical Diseases, Malaria, and Tuberculosis
- Africa Regional Event

Peer-Reviewed Publications by Members

- High-Throughput Phenotypic Assay to Screen for Anthelmintic Activity on Haemonchus contortus (Pharmaceuticals)
- Optimisation of 2-(N-phenyl carboxamide) triazolopyrimidine antimalarials with moderate to slow acting erythrocytic stage activity (Bioorganic Chemistry)
- Small Molecule Drug Discovery for Neglected Tropical Snakebite (Trends in Pharmacological Sciences)

World NTD Day

BVGH joined Members and other partners around the globe throughout January 2021 to commemorate the second annual World NTD Day. Activities included social media campaigns, virtual events, and feature articles. On January 30, more than 60 landmarks across 24 countries and 40 cities—including BVGH’s and WIPO’s hometowns of Seattle and Geneva, respectively—lit up to draw international attention to NTDs.