Driving R&D for neglected tropical diseases, malaria, and tuberculosis through global cross-sector collaborations

160+ Collaborations Established

145+ Members

40+ Countries

WIPO Re:Search fellows Dr. Rintis Noviyanti, left, and Dr. Indra Wibowo
Dear WIPO Re:Search Members and Friends,

We are pleased to present updates on the WIPO Re:Search Consortium for the first half of 2020. These accomplishments—including new research and development (R&D) collaborations, advances in ongoing collaborations, and launch of a third round of R&D capacity building fellowships—are particularly noteworthy given that they come in the midst of the COVID-19 pandemic.

WIPO Re:Search Members are joining their colleagues around the world to answer the call to action for COVID-19, and we could not be more proud of their efforts. Simultaneously, the battle against diseases of poverty wages on. The COVID-19 outbreak is requiring international stakeholders to make difficult choices regarding allocations of finite resources—raising concerns that progress against neglected tropical diseases (NTDs), malaria, tuberculosis, and other infectious diseases could be reversed. In such contexts, WIPO Re:Search—which is both cost-effective and highly productive—is more important than ever. We applaud the continued engagement of our Members in the Consortium, as they seed new R&D projects and continue to move existing projects forward.

The COVID-19 pandemic has also increased awareness of the importance of robust investments in pandemic preparedness and response—particularly strengthening of global infectious disease research capacity. In this Mid-Year Report, we provide updates on the WIPO Re:Search Fellowship Program, supported by the Government of Australia through WIPO Funds-in-Trust, which is empowering scientists and organizations in low- and middle-income countries (LMICs) to conduct impactful global health R&D.

Additionally, concerns about access to COVID-19 therapies, vaccines, and diagnostics for the world’s poorest populations are reviving longstanding debates around topics such as patent pools and compulsory licensing for global health products. The success of the WIPO Re:Search model—in which intellectual property (IP) rights drive innovation and promote access to lifesaving healthcare products in LMICs—offers important perspectives in such debates.

We thank you for your ongoing support of WIPO Re:Search, and we are eager to continue working with you to make this world a healthier place.

COVID-19 is forcing difficult choices regarding allocations of finite resources—raising concerns that progress against NTDs, malaria, and tuberculosis could be reversed. WIPO Re:Search is more important now than ever.

Jennifer Dent
President & CEO
BIO Ventures for Global Health
BVGH’s targeted partnering approach catalyzes IP sharing across sectors and geographies to accelerate product R&D for NTDs, malaria, and tuberculosis and drive progress toward the United Nations Sustainable Development Goals.

Since 2011, BVGH has catalyzed 162 innovative WIPO Re:Search collaborations – 52 are active, including 8 that are advancing critical solutions for NTDs, malaria, and tuberculosis along the product development pathway.

BVGH established 6 new WIPO Re:Search collaborations in the first half of 2020, spanning:

9 Companies and academic/ non-profit organizations

8 Countries – Brazil, Cameroon, Canada, China, Germany, Nigeria, United Kingdom, and United States

6 Diseases – including WIPO Re:Search’s first leprosy and snakebite collaborations

New Collaboration Highlights

A New Therapy for an Ancient Disease

Leprosy, or Hansen’s disease, is a chronic infectious disease—known to humans since ancient times—that is caused by the same family of bacteria responsible for tuberculosis. Over 200,000 people—including thousands of children—are diagnosed with leprosy each year. If untreated, leprosy can cause permanent damage to skin, nerves, limbs, and eyes, resulting in disability, stigma, and discrimination.¹ The disease is curable if treated early with a three-drug regimen known as multidrug therapy (MDT). However, shorter treatment regimens, particularly for a form of the disease known as multibacillary leprosy, are needed, and patients who cannot tolerate MDT require safe and effective alternatives.

Dr. Tianyu Zhang at Guangzhou Institutes of Biomedicine and Health in China has developed a new antibiotic (TB47) to treat leprosy. He is partnering with Dr. Flavio Lara at Oswaldo Cruz Foundation (Fiocruz) in Brazil through a BVGH-coordinated WIPO Re:Search collaboration to generate preclinical data necessary to advance TB47 into clinical trials. Dr. Lara will assess the efficacy of TB47 against bacterial strains from patients in Brazil, which has one of the highest rates of leprosy in the world and thus a strong need for better treatments.

¹ Source: World Health Organization
Next-Generation Snakebite Treatments

An estimated 5.4 million snakebites occur each year, resulting in as many as 2.7 million cases of life-threatening disease (snakebite envenoming) caused by the injection of toxins. Up to 138,000 people die annually as a result of snakebite envenoming, and as many as 400,000 survivors suffer permanent disability. Young people are particularly vulnerable to the devastating effects of snakebite envenoming.¹

Currently, the only effective treatments for snakebite envenoming are antivenoms, medications made from antibodies against the components of venom. However, different antivenoms are required to treat the bites of different snake species. Additionally, very few countries have the capacity to manufacture and distribute high-quality antivenoms that are effective against the most common snake species in their regions. Prof. Nicholas Casewell at Liverpool School of Tropical Medicine seeks to revolutionize snakebite envenoming treatment by developing small-molecule drugs that inhibit toxins in venom and are less costly to produce than antivenoms. Prof. Casewell identified a specific class of toxic enzymes in snake venom and developed an assay to screen compounds for their ability to inhibit those enzymes. To help advance Prof. Casewell's drug discovery program, BVGH connected him with Johnson & Johnson through WIPO Re:Search. The company shared its enzyme inhibitors—invented for other purposes—and a collection of high-quality compounds with diverse structures and activities for testing in Prof. Casewell's assay.

¹ Source: World Health Organization
Updates on Ongoing Collaborations: Improving Treatment of Malaria and its Life-Threatening Complications

The global community made substantial advances in controlling malaria between 2000 and 2014 (including a 40% decrease in malaria-related deaths), but progress has ground to a standstill in recent years. The World Health Organization’s *World Malaria Report 2019* identified parasite resistance to antimalarial medicines as a key recurring challenge in the fight against malaria. Through WIPO Re:Search, BVGH facilitates R&D collaborations to develop new drugs that attack malaria parasites in different ways than existing therapies, in order to bypass resistance mechanisms. BVGH also coordinates WIPO Re:Search partnerships focused on improving the treatment of the most serious complications of malaria.

New Antimalarial Drug Candidates

A team led by Prof. Adam Renslo at University of California, San Francisco (UCSF) has identified new trioxolane antimalarial compounds with high efficacy in animal models and good drug-like properties. Through a WIPO Re:Search collaboration, Medicines for Malaria Venture (MMV) provided valuable assay support that contributed to a publication in *ACS Infectious Diseases*. Prof. Renslo and his team will continue to optimize the potency and selectivity of the compounds, with an eye toward advancing the most promising candidate into the clinic.

Unleashing the Medicinal Power of Cameroonian Plants to Treat Malaria

Prof. Fabrice Boyom at University of Yaoundé I in Cameroon previously identified indigenous fungi and medicinal plants with promising antimalarial activity. He is partnering with Dr. Bill Baker at University of South Florida through a WIPO Re:Search collaboration to develop the natural products into new treatments for malaria. The investigators co-published a paper in *Parasitology Research* and recently received a National Institutes of Health (NIH) R21 award that will enable them to continue their drug development efforts.

Novel Insights into Cerebral Malaria Therapy

Cerebral malaria is the most severe complication of *Plasmodium falciparum* malaria. Even with treatment, significant numbers of patients die, and survivors have increased risks of serious neurological and cognitive deficits. In cerebral malaria, parasite-infected red blood cells (erythrocytes) adhere to the inner walls of small blood vessels in the brain, resulting in inflammation, blood-brain barrier (BBB) breakdown, and brain swelling. However, the underlying molecular mechanisms are not fully understood. Prof. Alister Craig at Liverpool School of Tropical Medicine previously identified a role for protease-activated receptor (PAR) 1 in promoting BBB disruption. BVGH connected Prof. Craig to Eisai Co., Ltd., which shared its PAR1 inhibitors through WIPO Re:Search. As described in Prof. Craig’s paper in *Wellcome Open Research*, PAR1 inhibitors reversed BBB disruption induced by thrombin (which activates PAR1) in a cell culture model. However, PAR1 inhibitors did not reverse BBB disruption caused by lysates of infected erythrocytes. The results suggest that effective treatment of cerebral malaria may require a combination of PAR1 inhibition and blockade of other molecular pathways.
Welcome, New Members!

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

Four new Members joined the Consortium in the first half of 2020:

- Federal University of Health Sciences of Porto Alegre
- Foundation for Neglected Disease Research
- Jomo Kenyatta University of Agriculture and Technology
- University of Tokyo

Federal University of Health Sciences of Porto Alegre (UFCSPA), Brazil

Located in Porto Alegre, capital city of the state of Rio Grande do Sul, UFCSPA is a federal institute of higher education founded in 1961 as the Catholic College of Medicine of Porto Alegre. In January 2008, it obtained the status of university. The university’s research units include preclinical, clinical, and laboratory aspects of diseases; genetics, molecular biology, biotechnology, and bioinformatics; physiology, pathophysiology, and rehabilitation; pharmacology and toxicology; health and environment; and epidemiology, education, and health technology assessment.

Jomo Kenyatta University of Agriculture and Technology (Jkuat), Kenya

Jkuat is a public university situated northeast of Nairobi. The university was founded in 1981 as Jomo Kenyatta College of Agriculture and Technology by the government of Kenya with assistance from the Japanese government. Jkuat’s mission is to offer accessible quality training, research, innovation, and entrepreneurship to produce leaders in agriculture, engineering, technology, enterprise development, built environment, health sciences, social sciences, and other applied sciences to suit the needs of a dynamic world. Jkuat offers courses in technology, engineering, science, architecture, and building sciences, and has strong research interests in biotechnology and engineering.

WIPO Re:Search Membership Spans the Globe
**WIPO Re:Search Fellowship Program**

BVGH expands the capacity of LMICs to conduct high-quality NTD, malaria, and tuberculosis R&D—and prepare for future pandemics—by coordinating training sabbaticals in advanced laboratories.

Supported by the Government of Australia through WIPO Funds-in-Trust, BVGH and WIPO have organized two rounds of WIPO Re:Search fellowships—totaling 100+ months of training—for 20 scientists from 11 LMICs. Key outcomes and impacts include grant funding (over US $750,000 for one fellow), promotions, international publications and presentations, and research collaborations.

BVGH and WIPO are now coordinating:

- A third round of WIPO Re:Search fellowships for Indo-Pacific and East African researchers

- Short-term placement of second-round fellowship hosts at their fellows’ home institutions to help sustain host-fellow relationships and nucleate new collaborative research projects

**WIPO Re:Search fellowship outcomes and impacts include grant funding, promotions, international publications and presentations, and research collaborations.**

WIPO Re:Search fellow Dr. Deus Ishengoma, center, with American Society of Tropical Medicine & Hygiene (ASTMH) Past President Dr. Chandy John and ASTMH CEO Ms. Karen A. Goraleski
Communications

BVGH shares WIPO Re:Search successes with global audiences to increase program and Member visibility and engage strategic partners.

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

BVGH Publications and Presentations

- Partnership Hub 2019 Annual Report
- Partnership Hub Snapshot newsletter
- Social media promotion (LinkedIn, Twitter)
- Nigerian Diaspora Biomedical Research Think Tank

WIPO Re:Search 10th Anniversary Communications (in development for 2021)

- BVGH publication showcasing the Consortium’s major achievements and highlighting future directions
- Global in-person and/or virtual events (with WIPO)

Peer-Reviewed Publications by WIPO Re:Search Investigators

- Antimalarial Trioxolanes with Superior Drug-Like Properties and In Vivo Efficacy, *ACS Infectious Diseases*
- Testing the Effect of PAR1 Inhibitors on *Plasmodium falciparum*-Induced Loss of Endothelial Cell Barrier Function, *Wellcome Open Research*
Developed in cooperation with our funding Members:

*The healthcare business of Merck KGaA, Darmstadt, Germany
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