



Discovery

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Institute of Human Virology Leadership Contributes to Global Virus Network Analysis Suggesting Measles, Polio, and Tuberculosis Vaccines May Boost Immunity to Coronavirus

Innate Immunity Created by Live Attenuated Vaccines Like Measles and Polio May Provide Some Protection Against Future Pandemics—Idea Needs To Be Tested, Scientists Say

In May 2021, the [Institute of Human Virology](#) at the University of Maryland School of Maryland scientists, who are also members of the [Global Virus Network](#) (GVN), a coalition comprised of human and animal virologists from 63 Centers of Excellence and 11 Affiliates in 35 countries, and colleagues today published a perspective proposing that live attenuated vaccines (LAVs), such as those for tuberculosis, measles, and polio, may induce protective innate immunity that mitigate other infectious diseases, triggering the human body's natural emergency response to infections including COVID-19 as well as future pandemic threats.



GVN Map of Centers of Excellence and Affiliated Institutions

The scientists suggest that LAVs prospectively might offer a vital tool to bend the pandemic curve, averting the exhaustion of public health resources and preventing needless deaths, and merit being studied. The perspective was published in the [Proceedings of the National Academy of Sciences of the United States of America \(PNAS\)](#).

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Director's Message: Anti-Asian/China Sentiment Further Fueled by Pandemic



Robert C. Gallo, MD

In the last newsletter, I reflected on the importance of China-U.S. scientific relations for solving worldwide challenges, as well as addressed the unfair discrimination of Chinese-American scientists by the U.S. government. Since that time, the COVID-19 pandemic has made the world a different place. However, the anti-Asian sentiment has only increased more due to unfounded speculation about the virus' origin and some biased political sentiment, further resulting in assaults on private citizens, as well as smear campaigns against well-respected Chinese scientists. It is imperative that unfounded claims and government and politics not interfere with science, and that my Chinese and American colleagues, who have a long history of collaborating together and contributing scientific breakthroughs to protect humanity from global health threats, continue to have the freedom to do so and to grow these collaborations.

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Institute of Human Virology Leadership Contributes to Global Virus Network Analysis

Suggesting Measles, Polio, and Tuberculosis Vaccines May Boost Immunity to Coronavirus *(continued)*

“A review of epidemiological, clinical and biological evidence suggests that induction of innate immunity by existing LAVs, that is, the broadly effective vaccines, can protect against unrelated infections such as coronavirus, and could be used to control epidemics caused by emerging pathogens,” said **Dr. Robert Gallo**, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder & Director of the Institute of Human Virology at the University of Maryland School of Medicine, and Co-Founder & Chairman of the International Scientific Leadership Board of the Global Virus Network.



Robert C. Gallo, MD

Dr. Gallo said, *“This approach is worthy of prompt further study due to the probability of future pandemics. This could be a stop-gap before specific vaccines are made. But even in the current pandemic they may be of use in non-affluent nations where the specific vaccines are not available.*

“Our innate immune response is the first line of defense against invading, new pathogens. The outcome of any infection

depends on the race between the pathogen and the host defense systems. The innate immunity and enhancing defense pathways provided by widely-used and well-recognized vaccines could substantially mitigate, or even prevent, infection from other pathogens such as SARS-CoV-2. This is especially valuable because LAVs can fill the gap until specific vaccines are available and in particular when they have not reached certain countries globally.”

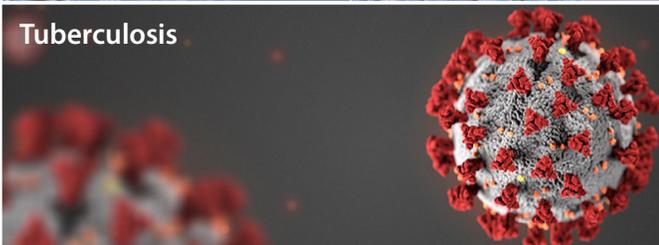
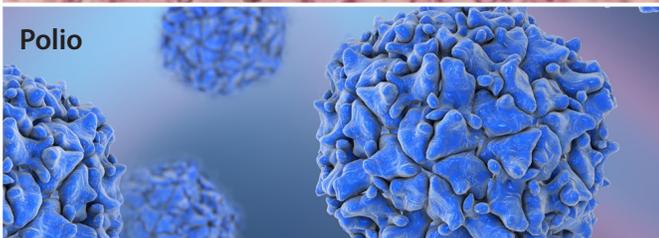
“We very actively support the marvelous COVID-19-specific vaccines, and nothing in this publication conflicts with the development and use of these effective vaccines,” said **Dr. Michael Avidan** of the Department of Anesthesiology, Washington University, St Louis, MO. *“We are suggesting that in the absence or availability of pathogen-specific vaccines, particularly in the beginning phase of a pandemic, that LAVs be rigorously tested to determine whether they can control infection and disease progression.”*



Shyam Kottlil, MBBS, PhD

“LAVs are safe, cheap and proven effective strategy to curtail the COVID-19 pandemic in two ways,” said **Dr. Shyam Kottlil**, Professor of Medicine and Director, Division of Clinical Care and Research, Institute of Human Virology at the University of Maryland School of Medicine, GVN Center of Excellence. *“By offering immediate protection against infection with SARS CoV-2 mediated by enhanced innate immunity and boosting immune response to traditional vaccine against COVID19 working as an adjuvant.”*

“Even in the case of a microorganism such as SARS-CoV-2, for which we have been able to develop vaccines fairly quickly, it is still a minimum of one and a half to two years until a safe and effective vaccine can be produced, tested, distributed, and delivered globally,” said **Dr. Dean Jamison**, a leading global health economist of the Institute for Global Health Sciences, University of California, and the GVN. *“In this period, countless lives have been lost and economic havoc has been unleashed in the world economy. This could be even more tragic in the case of a future pandemic for which the development of a vaccine is more challenging, transmission is more rapid, or herd immunity more difficult to achieve. LAVs that stimulate innate immunity could serve as a stop-gap until an effective vaccine is widely available.”*

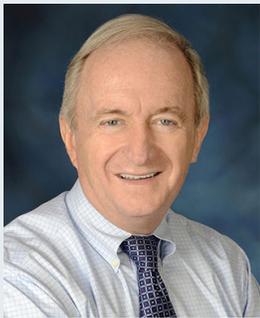


Director's Message *(continued)*

Lobbying the Feds

IHV Co-Chair Terry Lierman penned a letter to U.S. Representative Jamie Raskin, the Chair of the House Subcommittee on Civil Rights and Civil Liberties, requesting House Hearings to address racial profiling and investigations of Chinese and Asian descent scientists and scholars.

The letter was undersigned by hundreds of people from academic institutions and 18 organizations.



Terry Lierman

“The overzealous, broad, unchecked, and overreaching activities fueled by a xenophobic and toxic political climate have not only led to mistakes in investigations or prosecutions and civil rights violations, but also have crippled America’s ability to develop medical innovations that can enhance the quality of and save lives, especially during this

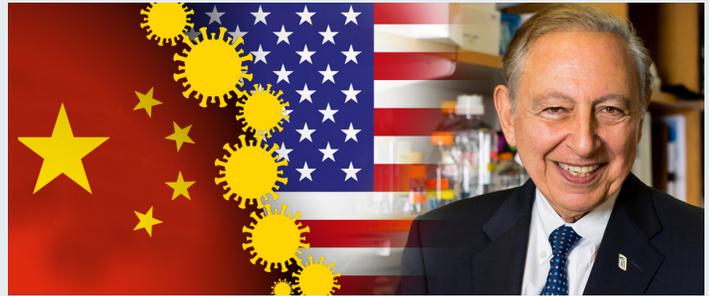
COVID-19 pandemic,” said Terry. *“We need the committee to shine light on any discriminatory policies being employed by those agencies to ensure there is fairness, transparency, and accountability.”*

The U.S. House of Representatives held hearings in late-March to address the racial profiling and hate crimes against people of Asian descent, although specific instances from the scientific community weren't addressed. Terry says Congress is reviewing the materials and will decide whether or not to hold a future hearing addressing the issue.

I want to take a moment to strongly encourage our U.S. political leaders to investigate and re-examine policies harmful to our nation's standing in science and technology, while strengthening those policies that elevate inclusivity, liberty and opportunity.

Reinforcing Scientific Relationships Abroad

Throughout my long career, I have worked with many renowned Chinese and Chinese-American scientists who greatly contributed to advancing medical science and human health. Recently, I published a commentary in the [China CDC Weekly](#), reinforcing the importance of Chinese partnerships and the valuable contributions from



Robert C. Gallo, MD

collaboration and information-sharing between Chinese and other researchers worldwide.

Without China sharing its early pandemic findings such as the SARS-CoV-2 genetic sequence, the method of transmission and more, we wouldn't have been able to develop the necessary vaccines as quickly.

We need to strengthen connections between China and the rest of the world, and a way to do this is through the Global Virus Network (GVN). GVN's mission includes bridging the world through scientific proven data without political influence. Its network now consists of 62 Centers of Excellence and 11 affiliates in 34 countries, including China. We look forward to continuing to expand our network and collaborations with our Chinese viral experts.

As I said in my statement, the world expects this of China and America; the world needs this; the world deserves this. We can accomplish almost anything working together, such as ending the COVID-19 pandemic and preparing for any future viral threats.

Institute of Human Virology Leadership Contributes to Global Virus Network Analysis

Suggesting Measles, Polio, and Tuberculosis Vaccines May Boost Immunity to Coronavirus *(continued)*

“Besides protecting against infection, innate immunity stimulation also has the potential to be used therapeutically in the early stages of disease, as well as to boost the effectiveness of vaccines that promote a specific adaptive immune response. This potential, while theoretical, is also worthy of further study,” said **Dr. Konstantin Chumakov**, Associate Director for Research for the U.S. Food and Drug Administration’s (FDA) Office of Vaccines Research and Review, and a GVN Center Director. *“As we wrote last year in a perspective published in Science, studies with the oral poliovirus vaccine (OPV) from the 1960s and 1970s demonstrated nonspecific immune protection and found that OPV reduced the incidence of seasonal influenza and acute respiratory disease.”*

In 2014, a World Health Organization (WHO)-commissioned review at the recommendation of the Strategic Advisory Group of Experts on vaccines (SAGE) concluded that LAVs reduced child mortality by more than expected. The same patterns were observed in high-income settings, including in the U.S., as having a live vaccine as the most recent vaccine being associated with a halving of the risk of hospitalization for non-targeted infections. The WHO review advised more research regarding the beneficial heterologous effects of LAVs; to date, no such WHO studies have been conducted.

The authors said that because of the huge toll that the current pandemic has taken on a global basis, looking into all possible options is essential. Despite the unprecedented brief time that it took to develop, test and deliver the current vaccines, it still took a year and a half and if LAVs could help stimulate innate immunity, they could help delay the global impact of a new pandemic while a new vaccine is being developed.

“LAVs against tuberculosis and smallpox have been associated with better long-term survival,” said **Dr. Christine Benn** of the Department of Clinical Research, GVN Center of Excellence, University of Southern Denmark. *“For example, OPV campaigns in West Africa have been associated with a 25% reduction in all-cause mortality, with each additional dose reducing mortality by a further 14%.”*

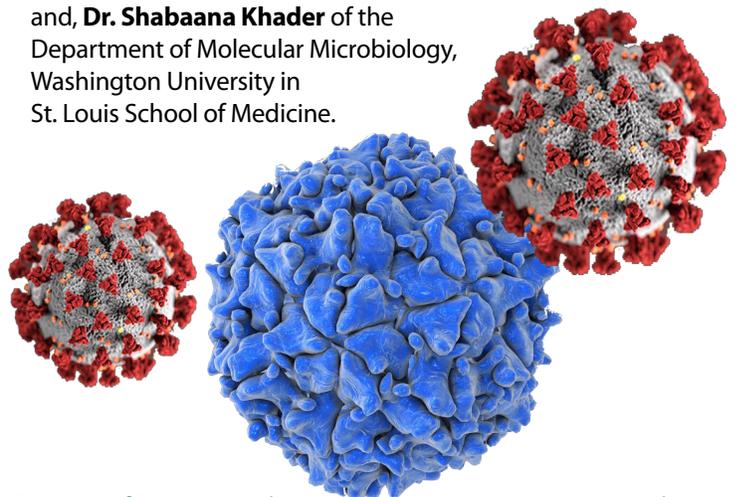
“Several basic science observations make clear the central importance of innate immunity in controlling coronaviruses including SARS-1, SARS-CoV-2, and MERS,” said **Dr. Mihai Netea** of the Department of Internal Medicine and Radboud Center for Infectious Diseases, Radboud University Medical Center, a GVN Center of Excellence. *“Further, control of coronaviruses by bats is largely associated with an appropriate balancing of innate immune responses between resistance and tolerance.”*

“It is critically important from both scientific and public health perspectives that we complete rigorous trials evaluating the effectiveness of LAVs in preventing COVID-19 or mitigating its severity,” said **Dr. Annie Sparrow** of the Department of Population Health Science and Policy, Icahn School of Medicine at Mount Sinai. *“The findings from these trials will inform if, and how, we could incorporate LAVs into our toolkit against future pandemics.”*

“There is immense readiness and massive financial support to develop and deliver the novel specific vaccines, but very little to test LAVs for use during a pandemic, despite their potential to prevent needless suffering and help mitigate social and economic carnage in any future pandemic. There are even some advantages in that they work very promptly, are low cost and likely to be readily available. Furthermore, their safety profile is often well-established. But we must acknowledge there are likely limitations because they do not last very long, perhaps only a few months,” said Dr. Gallo.

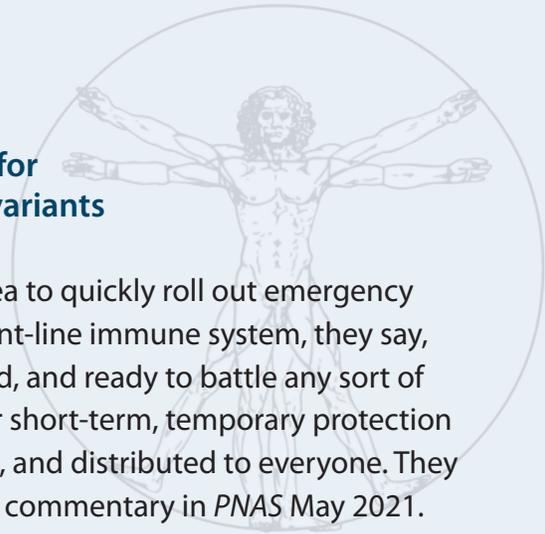
“My esteemed colleagues and I are urgently calling on governments, philanthropy and non-profit foundations to support testing of an LAV strategy to determine whether LAVs can protect high-risk populations such as healthcare workers and the elderly as well as low-income populations worldwide, thereby reducing social and economic inequities.”

In addition to **Dr. Robert Gallo, Dr. Konstantin Chumakov, Dr. Michael Avidan, Dr. Shyam Kottlilil, Dr. Dean Jamison, Dr. Christine Benn, Dr. Mihai Netea, and Dr. Annie Sparrow**, the authors of the *PNAS* viewpoint include **Dr. Stefano Bertozzi** of the School of Public Health, University of California at Berkeley and the GVN; **Dr. Lawrence Blatt** of Aligos Therapeutics and the GVN; **Dr. Angela Chang** of the Danish Institute for Advanced Study, University of Southern Denmark; and, **Dr. Shabaana Khader** of the Department of Molecular Microbiology, Washington University in St. Louis School of Medicine.



Awakening the body's innate immune system for rapid protection against emerging COVID-19 variants and future pandemics

Dr. Gallo and his colleagues at the Global Virus Network proposed an idea to quickly roll out emergency protection against highly contagious pathogens. Rousing the body's front-line immune system, they say, primes the body into a hypervigilant mode, in which it's alerted, prepped, and ready to battle any sort of pathogen it encounters. The idea being that using this strategy can offer short-term, temporary protection until a specific vaccine or booster shot can be developed, manufactured, and distributed to everyone. They published their idea in a commentary in *Science* June 2020, and another commentary in *PNAS* May 2021.



Q: What's the story behind this idea?

Gallo: This idea was revived in discussion during one of our international calls of the Global Virus Network early in the pandemic, but the story of how this came about starts much earlier.

Back in the 1970s, one of our members Konstantin Chumakov, who is now a director of vaccine research at the FDA, told me a story about work his parents did in Russia. The Chumakovs worked with the late, great virologist Albert Sabin, who developed the first polio vaccine before Jonas Salk. Chumakov's mother discovered—but didn't get enough credit for it—that when they vaccinated people against polio that the flu disappeared in adults.

In Singapore, researchers observed the same phenomenon with a 4-fold reduction in flu cases after polio vaccines—stronger than what you get with the flu vaccine. This was followed by studies in tuberculosis, measles and cow pox vaccines, as well.

After the topic came up in our call, I started to read a lot on innate immunity, which I didn't know enough about frankly. The common denominator between all these cases was that they used live viruses for vaccines.

Q: So, why do these vaccines provide protection against other infectious diseases that they weren't designed to target?

Gallo: It's the action of the innate immune system. This primitive immune system is what we inherited from invertebrates like worms, insects, mollusks and 95% of all multi-cellular life. It's the only immune system these creatures have and they thrive with it.

The way it works is that we have sensors in our cells that detect molecules indicative of an infection from viruses or

bacteria, such as RNA—the genetic material of many viruses. Those sensors give rise to an emergency response that leads the body to start making all the different kinds of white blood cells that fight infections, such as macrophages, granulocytes, neutrophils and monocytes. The sensors also cause the body to make interferon, which awakens other body cells to boost their anti-viral defenses. These live virus vaccines prepare the immune system to fight when it does come in contact with any invader like the influenza virus.

There are animals who make very good use of their innate immune systems, such as bats. Bats keep a reservoir of several coronaviruses in their bodies at all times. They keep these and other infections in check by using these viruses to constantly stimulate their innate immune system.

Q: You mentioned that this immune system awakening occurs with live virus vaccines. Are those still in use these days, and if so, how do you suppose these could be used in times of crisis?

Gallo: There are three live virus vaccines still in use today: the oral polio, measles and tuberculosis vaccines. They use weakened versions of the virus and are called live attenuated viruses or LAVs by those of us in the field. There are three strains of polio, so there are three different polio vaccines. These are cheap at only about 15 cents a dose and are taken by mouth via a couple drops of sugar water. The measles and tuberculosis vaccines are given as shots.

As these vaccines already exist, it would be feasible create stockpiles for emergency use. Alternatively, we propose that we could include one of these vaccines as an extra immune system activator with the COVID-19 booster shot. Another idea to try would be to see if deliberately infecting someone with a harmless virus like a cold virus could be protective.

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Q: How long would this temporary immunity last?

Gallo: Our best guess is a couple of months, but we don't know for certain. It could be weeks, months or a year. If the protection is only a couple of months, then each person may need a new dose every couple of months until a vaccine or booster shot is ready that can provide specific immunity.

People given the tuberculosis vaccine have claimed they get results lasting one year. That's a surprise. They observed this through something called molecular imprinting that entails modifications of the chromosomes in the immune system's cells.

Q: Being the devil's advocate here: if we have the COVID vaccines already, why still pursue this idea?

Gallo: Although we have multiple vaccines available, the COVID-19 viral variants have added another hurdle and the pandemic isn't over yet. We don't quite know how well the current vaccines will be able to get us to herd immunity, particularly if even newer variants emerge. If a booster shot is needed, that will take time to develop. Vaccines need time to go through clinical trials, then time for ramping up manufacturing and distribution. We may need something to bridge the gap until the booster arrives.

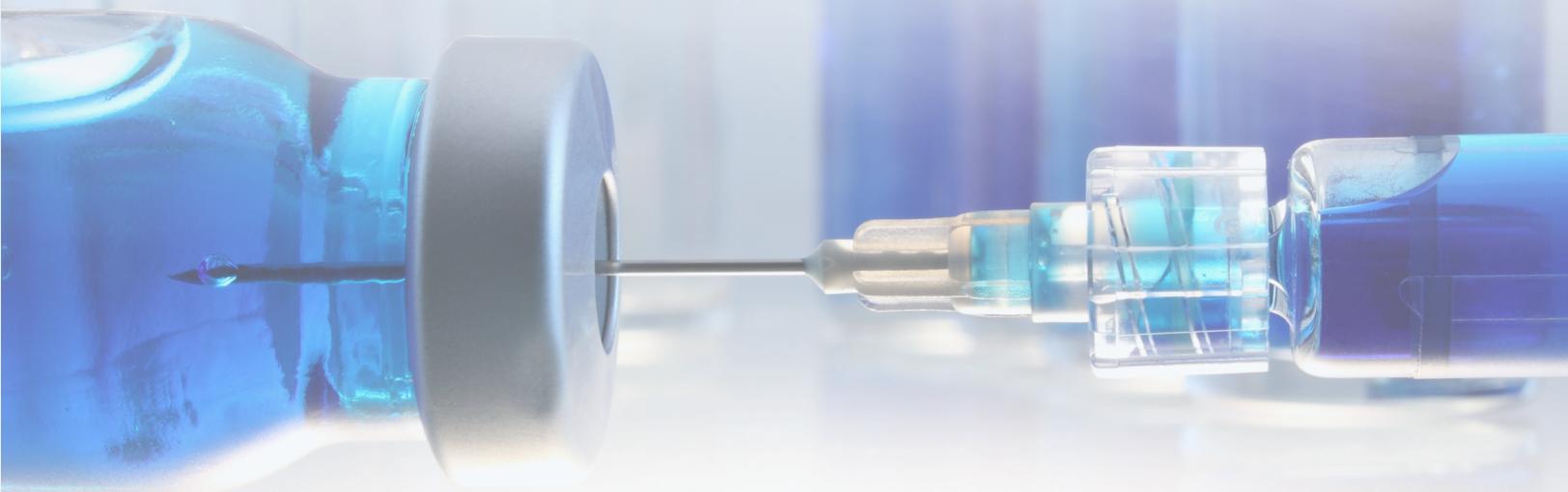
Furthermore, this won't be the last outbreak that the world experiences. We've had SARS, MERS and Ebola just recently, so it's only a matter of time when we'll need to move quickly again before a treatment or vaccine can be developed.

Q: What is needed to get this idea off the ground?

Gallo: Right now, the biggest need is for funding of Phase III clinical trials. The oral polio, measles and tuberculosis vaccines have decades of safety data. We know they are safe. However, we need to determine how long each of these vaccines provide a boost to the innate immune system. Does one work better than the other in strength or duration? And to what extent can the innate immune system protect against COVID-19?

The National Institutes of Health has dedicated many funds towards a vaccine, and about a billion dollars to studying the aftereffects of COVID-19 infection, which is and will remain important work. But, we need to think about this logically and realize that vaccines aren't a panacea, and we need creative, nimble solutions and we need to think about the future. If we can't get the government to commit, an incredibly gracious donor or group of donors could help to make a real difference in protecting human lives either later in this pandemic or during the next one.

Also, live attenuated vaccines might be of great help in nations with financial difficulties, who consequently may not receive the earliest and most effective vaccines.



IHV takes on COVID-19 Clinical Trials

When the pandemic hit in early March 2020, all in-person basic and clinical research shut down at IHV and the University of Maryland, Baltimore campus. Over the next couple of months, essential research on SARS-CoV-2 and COVID-19 got off the ground, while other research projects remained paused. IHV researchers went on to run nearly two dozen clinical trials in response to the pandemic crisis investigating potential treatments, vaccines, and post-exposure preventatives in both inpatient and outpatient settings.

Trials and Tribulations



Shyam Kottilil, MBBS, PhD

“Even though most of us in IHV have not experienced an active pandemic, the fact that we are infectious disease researchers poised us to be essential for our expertise during the current pandemic,” says **Shyam Kottilil, MBBS, PhD**, Professor of Medicine and Director, Division of Clinical Care and Research, Institute of Human Virology, University of Maryland School of Medicine. *“It was our reputation as an active clinical trials unit with the*

NIH and industry that enabled us to conduct many of the trials here at IHV.”

“Our primary goal was to contribute to the fight against this novel virus and save lives,” says **Joel Chua, MD**, Assistant Professor of Medicine, Division of Clinical Care and Research, Institute of Human Virology, University of Maryland School of Medicine, and Chief of Surgical Infectious Disease at University of Maryland Medical Center. *“We were not studying coronaviruses yet at IHV, so we had to pool our resources to be part of the solution.”*

Prior to the pandemic, the Institute’s research mainly focused on the infrastructure for blood-borne viruses, such as HIV or hepatitis viruses, and not necessarily respiratory viruses. Initially, IHV did not have negative pressure rooms up and running, which were required to see and treat patients with, or suspected to have, COVID-19—a highly contagious air-borne virus.

IHV was able to modify its facilities to get six negative pressure patient treatment rooms up and running relatively quickly in its building.

“The contractors were backed up,



Joel Chua, MD

so we had to be innovative in a sense and use the smoke test to be sure the negative pressure rooms were working,” says Dr. Chua. The test works by putting a smoke capsule at the bottom of a door and if it is sucked under the door into the room, then this indicates the room is under negative pressure.



Jennifer Husson, MD, MPH

These tests are performed prior to COVID-19 related study visits.

Now with the infrastructure in place, they could begin to design trials. *“As a community we set up a way to review and approve protocols to ensure they were feasible and that we were operating in the patient’s best interests,”* says **Jennifer Husson, MD, MPH**, Assistant Professor of Medicine, Director of the Clinical Research Unit, Institute of Human

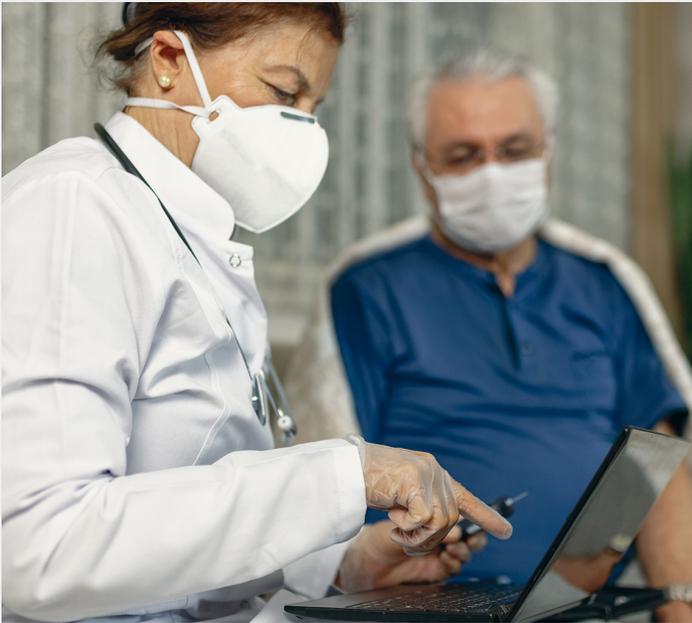
Virology, University of Maryland School of Medicine. She says since this was completely new, it required a lot of coordination to establish a process within the university, but once it was operational, everyone was able to work together.

The next logistical hurdle was recruiting patients for individual studies. *“It was a little challenging at first because there were different groups at the university doing COVID-19 research, and we did not want patients to be bombarded by many different investigators over and over, particularly if they weren’t interested in participating in a trial,”* says Dr. Husson.

“There was a golden window for patient enrollment. Most of the studies wanted a similar patient profile — someone hospitalized and on oxygen, but not too sick.”

Between various university departments, centers and institutes, the researchers launched a morning huddle to review the current patients admitted and see which trials would be the best fit or would provide the most benefit. Then, the group running that trial could approach the patient to give them information that would allow them to decide whether to

IHV takes on COVID-19 Clinical Trials *(continued)*



participate or not.

“Prior to COVID many of these university groups did not cross paths like we do now,” says Dr. Husson. *“The integration and communication between teams really improved through the pandemic.”*

Even getting patient consent for these studies required a new process. *“As study investigators, we did not want to get in the way of the people delivering clinical care and we did not want to use more PPE than was needed, especially early in the pandemic when the nation was facing PPE shortages,”* says Dr. Chua. He says they developed a way to e-consent, in which they could take photos through glass and upload them into a patient’s electronic health record without having to enter the patient’s room.

Many research projects, such as those performed by the lab of **Mohammad Sajadi, MD**, Associate Professor of Medicine, Division of Clinical Care and Research, Institute of Human Virology, University of Maryland School of Medicine, required analyzing patient samples. However, multiple research groups could not be traipsing through patient rooms. So, the Department of Medicine at the university set up a single team that would collect samples and store them with an assigned principle investigator to lead and distribute the samples to different labs, including those in IHV.

Because of research and building occupancy restrictions, the number of people in the building was limited for outpatient studies. Although, it has since climbed back up to 75% capacity, for many months it was capped at 50%.

“On the fly, we had to navigate the logistics of how to bring patients in safely, which is a constantly evolving process,” Dr.

Husson says. *“People had to come in on set schedules, and we had to come up with creative solutions, like using the parking lot so people could get nasal swabs from their car. This way we wouldn’t have to do extensive cleaning between patients like we would have to do if they came into the building, which helps with flow and convenience.”*

Trial Launch

Some of the COVID projects were initiated by IHV faculty and others by biotech and pharmaceutical companies reaching out for partnerships. *“We had to be selective and take on studies that we thought were at that point in time the most promising and within the capacity of our research unit to conduct,”* says Dr. Chua.

He says early in the pandemic studies focused mostly on using existing drugs to treat or lessen the severity of COVID infection, such as hydroxychloroquine or remdesivir. CD24Fc, was originally developed by IHV researchers Drs. Yang Liu and Pan Zheng to prevent complications associated with bone marrow transplantation. IHV partnered with Oncoimmune to test CD24Fc for treating severe and critical COVID-19.

IHV researchers invested in studies looking at monoclonal antibodies as both treatments and preventatives after an exposure. First, they tested delivery through IV, then through injection into a muscle and soon they hope to test a version that can be taken by mouth.

“When given early, virus neutralizing monoclonal antibodies have shown promising results in preventing and treating COVID-19 and I think will eventually get FDA approval. Though the COVID-19 landscape keeps evolving with new COVID-19 variants becoming a huge concern,” says Dr. Chua. *“We currently are unsure if the variants will reduce the effectiveness of these antibody treatments. We think the best way to move forward is to focus on studies using combination of two or more virus neutralizing antibodies to hopefully continue to work and overcome the pressure of evolving variants.”*

While the School of Medicine’s Center for Vaccine Development and Global Health was ground zero for initiating most of the university’s vaccine trials, IHV participated in some as well, such as the work of **Rohit Talwani, MD**, Associate Professor of Medicine, Division of Clinical Care and Research, Institute of Human Virology, University of Maryland School of Medicine, with the Johnson & Johnson vaccine.

Other investigators have initiated investigations of convalescent COVID-19 patients and the so-called **“Long COVID”** or, as it has been newly designated, the Post-Acute Sequelae of SARS-CoV-2 infection (PACS) Syndrome. **Eleanor Wilson, MD, MHS**, Associate Professor of Medicine, Division of Clinical Care and Research, Institute of Human Virology, University of Maryland School of Medicine, in collaboration

IHV takes on COVID-19 Clinical Trials *(continued)*

with Linda Chang, MD, Professor of Neurology and Diagnostic Radiology, University of Maryland School of Medicine, received an exploratory research development grant from the National Institute of Neurological Disorders and Stroke (NINDS) to complete immunologic, radiographic, and behavioral assessments of convalescent COVID patients, with a focus on those with persistent neurologic symptoms. ***“Many of our recovered COVID patients are health care providers, who were at an unusually higher risk of exposure to this disease,”*** says Dr. Wilson. ***“Their generosity in contributing to our knowledge of the aftermath of this disease has been inspirational.”***



Dr. Kottiril predicts in the next 6 months to a year that the trials on therapeutics will be ramping down as much of the population is vaccinated. Many of the trials on the seriously ill inpatients have already begun winding down as there are not many critically ill patients hospitalized. IHV's researchers are slowly resuming non-COVID projects that have been paused for a year or more. ***“Most non-COVID studies are active again, but not at 100%,”*** says Dr. Kottiril. ***“We anticipate being back at 100% to pre-COVID levels sometime in the summer.”***

Dr. Husson specializes in infectious diseases among organ transplant recipients. She says initially they did not see many transplant patients in the first wave of COVID. However, now more have been affected as the pandemic has persisted. Transplant recipients are at higher risk for severe disease both because their immune systems are suppressed and they are likely to have other conditions as well, such as diabetes, which have been shown to be a factor that makes COVID infection worse.

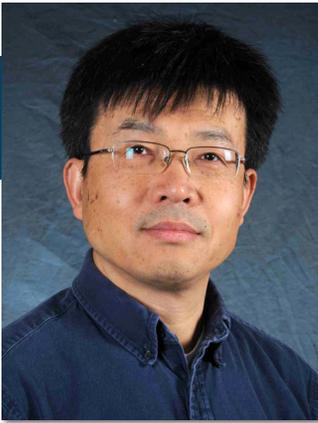
“Now the field is looking at the timing of receiving an organ transplant or donating an organ after recovering from COVID infection,” says Dr. Husson. ***“We do know that the immunosuppressed can shed virus***

longer than a healthy person who is infected, but we don't know if this shed virus is as infectious. We also do not know how robust the vaccine response will be in our immunosuppressed patients, and how that might impact transplant.”

Her team is investigating how organ transplant recipients respond to COVID vaccination and how well it offers protection.

Dr. Chua is starting work again on dengue virus by developing humanized mice models as a platform for evaluating antivirals. ***“For me switching my efforts over to COVID research was a responsibility to look for a cure or treatment to figure out a way to get back to normal,”*** he says. ***“Although it seems that U.S. vaccination will progress us back to normal by the year's end, other places in the world, such as my country of birth, the Philippines, may not reach herd immunity until 2023. For this reason, we will still need to work on developing more therapeutic options to get people protected.”***

Once this pandemic is in the past, Dr. Chua says that the IHV's negative pressure rooms will allow the Institute to do more work on respiratory viruses, including influenza, which is still a threat to very young and older adults. ***“We had some growing pains, but we learned how to be resilient and innovative during the pandemic which will make us better prepared for the next one,”*** he says.



Lishan Su, PhD

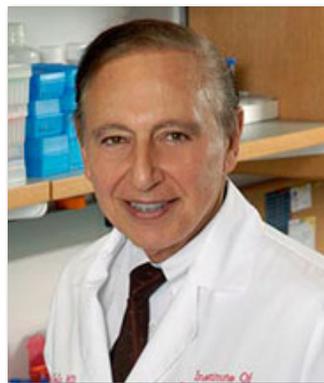
IHV Recruits Leading Human Immunology and Infectious Disease Expert Dr. Lishan Su

Lishan Su, PhD, started at IHV October 1, 2020, with the Charles Gordon Smith Endowed Professorship for HIV Research and a faculty appointment in the Department Pharmacology.

“Dr. Su is one of the most successful active basic

researchers in America,” said **Robert Gallo, MD**, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director of the Institute of Human Virology at the University of Maryland School of Medicine. *“His research is groundbreaking, and we are so pleased to have him join the Institute of Human Virology and lead our Division of Infectious Agents and Cancer, which under his sound leadership, will flourish.”*

In addition to leading the IHV’s Division of Virology, Pathogenesis and Cancer, Dr. Su is also Interim Director for the Division of Immunotherapy.



Robert C. Gallo, MD

“Dr. Su’s continuing groundbreaking work in HIV and Hepatitis B will be a huge asset to the Department of Pharmacology,” says Margaret M. McCarthy, PhD, the James & Carolyn Frenkil Dean’s Professor, Chair of the Department of Pharmacology. *“I look forward to working with him on advances that could open the door to new therapeutics.”*



Margaret McCarthy, PhD

Dr. Su’s appointment was granted through the Maryland E-Innovation Initiative Fund (MEIF), in which Maryland state through the Department of Commerce matches private funds to bring innovators to Maryland’s higher education institutions.

Trained in virology and immunology, Dr. Su spent the last three decades using HIV to figure out how the human immune system works. His IHV team will include about

12 members in the Laboratory of Viral Pathogenesis and Immunotherapy with four researchers from Dr. Su’s former lab—two of which with new faculty appointments.

Dr. Su received his BS degree in Microbiology from Shandong University and his PhD degree in Virology from Harvard University. He did his post-doctoral training in Stem Cell Biology & Immunology at Stanford University.

He left academia to develop a treatment for HIV, working as a senior research scientist at the biotech startup SyStemix/Sandoz (now owned by Novartis). While focusing his research on how HIV caused disease, his team developed a stem cell-based gene therapy in humanized mice and tested it in patients. However, he says the immunity the therapy bestowed only lasted a few months.

“After that I decided we didn’t know enough about how HIV interacted with the immune system, so I realized I had to go back to the basics and resume my career in academia,” says Dr. Su.

He spent the next 25 years at the University of North Carolina-Chapel Hill as a faculty member in the Lineberger Comprehensive Cancer Center and Professor in the Department of Microbiology & Immunology. He made important contributions to several areas of human immunology and infectious diseases, particularly in studying human immunology and pathology of chronic viral infections, such as HIV-1 and hepatitis B and C viruses. His lab established humanized mouse models using both human immune and human liver cells with hepatitis B and C infections, in which his team could observe human immune responses and liver damage.

Recently, Dr. Su’s group discovered critical components of the host immune system that HIV dysregulates to cause disease. His team then developed therapeutics to target this process. These same pathogenic cells and molecules used by HIV are used in some cancer and autoimmune diseases, meaning his findings have much broader implications than just in infectious diseases.

Last month, he published in *Nature Immunology* on work with Dr. Jenny Ting’s team at UNC that showed the diabetes drug metformin suppressed HIV replication. He plans to continue this line of work in his IHV lab.

Since the move in October, his lab has initiated cell culture studies and just recently the institutional review board approved mouse research experiments, as well.

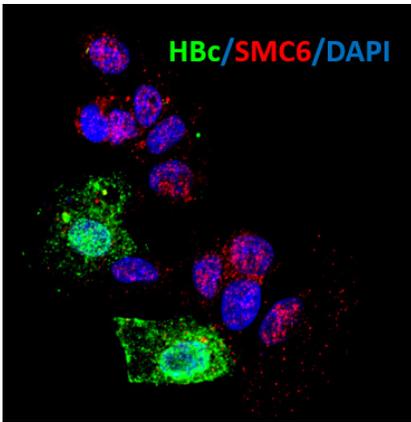
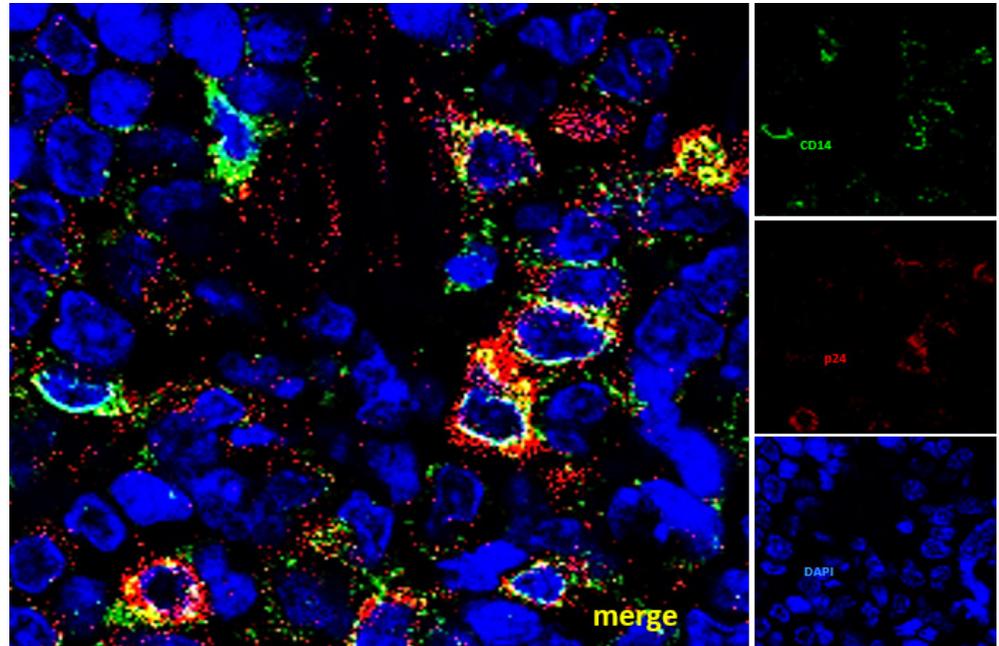


Photo on left—Hepatitis B viral infected human and mouse liver cells. The viral protein HBx degrades the human/mouse protein SMC6. Credit: Dr. C. Murphy, Dr. N. Reszka-Blanco, and Dr. L. Su

Photo on the right—Using a drug to activate HIV reservoirs in immune system cells. Credit: Dr. G. Li and Dr. N. Reszka-Blanco



“His work advances the mission of the School of Medicine, which is to provide important new knowledge in the area of immunology and chronic disease to discover new approaches for treatments,”



E. Albert Reece, MD, PhD, MBA

said Dean Reece, who is also University Executive Vice President for Medical Affairs and the John Z. and Akiko K. Bowers Distinguished Professor. “Dr. Su’s stellar research capabilities will provide vital opportunities for collaboration across our Institutes and Departments.”

As to his experience at IHV thus far he says, “It just reaffirms that this place is great with amazing

combination of basic, clinical, and epidemiological research. We are positioned to make such a great impact on virology and infectious diseases in general. I’ve already found many people to establish collaborations and to translate research to develop novel therapeutics.”

Dr. Su says his initial move was spurred because he wanted to expand his research in a new environment. ***“I slid into these leadership positions through the force of nature and a confluence of coinciding events,”*** he says.

“As for division leadership, I am still in the learning and information gathering stage bringing myself up to speed on the division and institution in a greater context, getting to know the people—which has been a bit unconventional during the pandemic—and understanding what they are doing,” says Dr. Su.

He says the IHV plans to do a national search advertising both division leadership positions (Immunotherapy, Virology, Pathogenesis and Cancer). If they find a good candidate to lead one division, he will take on leadership of the other one. ***“If we find two outstanding candidates that are a better fit, I would step aside and allow them to lead if it would be in IHV’s best interest,”*** Dr. Su says. ***“We will have to see what comes out of the search and what the future holds.”***

MKM Fellow Rises to Public Health Challenges in Zambia



The Maeve Kennedy McKean Global Public Health Fellowship is named in honor of Ms. Maeve Kennedy McKean, who tragically passed away in an accident in April 2020

As the first recipient of the **Maeve Kennedy McKean (MKM) Global Public Health Fellowship**, **Mona-Gekanju Toeque, MD, MPH**, has been involved in patient management at the **University Teaching Hospital** in Lusaka, Zambia. In addition to participating in a wide range of clinical activities, from diagnosing and treating common and atypical disease presentation, she is providing regular COVID-19 updates to UMB and Ciheb Zambia staff in the area of technical support by building capacity among the staff in understanding COVID-19 infection prevention.



Mona-Gekanju Toeque, MD, MPH

Though it has been approximately seven months since she began her fellowship, Dr. Toeque indicates that she has already developed a much deeper understanding of the public health and clinical challenges facing populations in low-resource countries such as Zambia.

“Many times you may not have the diagnostics due to out-of-pocket cost to the patient for some services or they may not be able to afford the medications versus lack of availability, and alternatives have to be sought that are appropriate in managing the patients effectively;” she explains.

Other challenges include being able to overcome language and cultural barriers to obtain a patient’s history.

She recently was presented with a patient being managed for multidrug-resistant *Pseudomonas putida* meningitis, a unique clinical presentation typically associated with a history of

trauma, soil or water or neurosurgical procedures. This case was exceptional in that neither the patient nor his family could provide a history of any procedure or other trauma that would have led to the condition. “So the question is, how did he get the pseudomonas without any trauma?” she explains. It is a question that will require further investigation.



Team members at the Mchini DREAMS center safe space location in Chipata, Eastern Province.

Assisting Adolescent Girls and Young Women

Beyond her clinical responsibilities, Dr. Toeque has also taken on teaching and research immersion as part of Ciheb’s education programs. “I have had a plethora of opportunities to get involved with over the seven months,” she said. “I’m really grateful for that.”

Dr. Toeque recently visited three new DREAMS centers in Zambia’s Eastern Province. The centers only opened late last year, and Dr. Toeque has been working under the supervision of Dr. Cassidy Claassen, Assistant Professor of Medicine and Technical Director/Chief of Party of CIRKUIITS, on grantsmanship and programmatic aspects of the CIRKUIITS project, which is part of Ciheb.

DREAMS—which stands for determined, resilient, empowered, AIDS-free, mentored, and safe—is a global, public-private partnership that was launched in 2014 on World AIDS Days to



Team members at the Mchini DREAMS center in Chipata, Eastern Province. Dr. Toeque stands on the right

empower adolescent girls and young women and reduce HIV risks, while strengthening families and mobilizing communities to reduce gender-based violence by providing safe spaces, counseling, and other interventions. Among its objectives, DREAMS seeks to reduce new HIV infections in adolescent girls and young women between 10–24 years in Zambia and nine other sub-Saharan African countries.

During her visit, Dr. Toeque observed a sensitization session conducted in a DREAMS safe space in Mchini in the Chipata District among a group of young girls. The subject was HIV, sexual health, and safe sex. Dr. Toeque was impressed that the girls were forthcoming and engaged despite the hardships they had endured. *“The fact that they were asking questions showed that they were listening and picking up points,”* Dr. Toeque said. *“It was such a great experience to see these girls—they are underserved, mostly married at young ages, some pregnant at very young ages.”*

HIV Research

A third component of Dr. Toeque’s work in Zambia involves research that centers on the treatment of HIV, specifically on how drug regimens impact health outcomes. In Zambia, people living with HIV are typically treated on a first-line, second-line, and third-line progressive drug regimen based on immunological, virological, and clinical status. The third-line regimen, which is prescribed when the second line fails, often includes drugs with higher barriers to resistance and is used when treatment is beyond

antiretroviral therapy providers’ reach. Dr. Toeque has been investigating the outcomes, tolerability, and symptoms of patients on a third-line regimen. She recently submitted an abstract on the topic to the 2021 International AIDS Society conference and is collecting more data as she works toward a full journal manuscript.

UMB and Ciheb Mentorship

Dr. Toeque credits her positive experience in Zambia to the Ciheb mentors that have supported her. **David Riedel, MD, MPH**, Associate Professor of Medicine, Director of the Infectious Disease Fellowship Program, Division of Clinical Care and Research, Ciheb, Medical Director, in particular helped shepherd her through the fellowship process.

“I expressed my interest in global health and in working in infectious disease in sub-Saharan Africa, and this has been a long-standing interest of mine, and Dr. Riedel has been instrumental in creating a path for me through mentorship,” she

said. *“Dr. Cassidy Claassen [Associate Professor of Medicine, Ciheb] has provided additional mentorship and many opportunities through various public health and research experiences beyond what I would have imagined.”*

In addition to Dr. Claassen, Dr. Toeque was thankful for the support received from other IHV/UMB and Ciheb faculty based in Zambia, including Dr. Lottie Hachaambwa, Assistant Professor of Medicine and CEO of Ciheb Zambia, and Dr. Brianna Lindsay, Ciheb Epidemiologist.

“I have had a great team of people that are really there for me and have an interest in helping me achieve my goals,” Dr. Toeque said. She views the fellowship as a steppingstone to achieving her aspiration to help lead public health program planning and implementation in sub-Saharan Africa.

Starting in June, Dr. Toeque will transition to the second year with a focus mainly on her research and global public health work through June 2022.



Team members at the Mchini DREAMS center safe space location in Chipata, Eastern Province.



Alumni Rising Stars: Anu Osinusi, MD, MPH

Dr. Osinusi, formerly of the Division of Clinical Care & Research, is now Vice President for Clinical Research at Gilead.

Q: Tell me about your experience working with the Institute of Human Virology?

Dr. Osinusi: My first interaction was in 2003 as a Research Associate for a year. I worked with IHV Co-founder Bob Redfield, who headed the Division of Clinical Care and Research, and his Division colleagues, Dr. Anthony Amoroso, Dr. Bruce Gilliam, Dr. Charlie Davis, and Derek Spencer with the JACQUES Initiative program. I focused on HIV treatment in minority populations and the initial PEPFAR grant for HIV care and treatment in nine African and Caribbean countries. After my internal medicine residency training in Chicago, I spent a year at the National Institute of Allergy and Infectious Diseases, where I started working with Dr. Shyam Kottlil and continued to do so during my two-year Fellowship in Infectious Disease at the Institute of Human Virology at the University of Maryland School of Medicine. I left in 2010 to join Dr. Kottlil and Dr. Henry Masur as a clinician-researcher working with the National Institutes of Health DC Partnership for HIV/AIDS Progress program on clinical and translational research in hepatitis C, but I continued to collaborate with IHV. A critical aspect

of our work was to evaluate new drug targets in collaboration with industry and understand how and why minority populations responded differently to treatments. Over the evolution of my career in the last 17+ years, I have kept in contact and maintained working relationships with the people at IHV.

Q: What Makes IHV so special?

Dr. Osinusi: Not only is the work being done world-renowned, but IHV also recognizes that mentorship is important. They give young investigators and junior people opportunities to lead projects, contribute, and help them grow their careers. People were open to conversations about directions a project could take or career development. I was fortunate to have that in my training to help get me where I am today.

Q: What do you do now?

Dr. Osinusi: At Gilead Sciences as the Vice President for Clinical Research, I oversee the clinical development efforts for all viruses that are not HIV. It's a broad portfolio that includes hepatitis B, hepatitis C, and hepatitis D, as well as respiratory viruses and emerging viruses, such as COVID, Ebola, herpes, and Marburg. This involves the work we do from the pre-clinical animal models through early- mid- and into late-stage clinical development through approval by regulatory agencies such as the FDA. I've worked with IHV in several of these clinical trials, including the trials using remdesivir for treating COVID.

Q: What do you think is the biggest lesson that you learned from your experience at IHV?

Dr. Osinusi: Typically, in academia and research, you don't learn about the vulnerable and marginalized communities. However, at IHV this isn't the case, and the team is committed to ensuring people of different

backgrounds can participate in research. It was during one of the Institute's JACQUES Initiative HIV 101 courses, when I observed that it didn't matter if someone didn't have an education or was formerly incarcerated—everyone was treated with dignity and respect. The participants in the course were there to learn, be empowered, and they want to be part of a solution in their own communities.

I took this with me to the NIH where we were doing HIV and hepatitis research. There was a whole community of people just a few blocks away on the metro red line that we weren't necessarily connected to. The lessons I learned at the IHV were part of my work at NIH-DCPFAP where I strongly believed that we could build strong a relationship with the community as long as we did it in a way that would be convenient and respectful to our community's lifestyle.

Q: What are your proudest career moments thus far?

Dr. Osinusi: At every phase of my career, I have been fortunate to work with really great people and we have been able to come together to accomplish great things. Some of whom remain my mentors even today, such as Dr. Kottlil.

Getting the hepatitis C drugs approved was a big highlight. Seeing a disease that had only a cure rate of 25-30% after 48 weeks of treatment in certain populations now essentially being cured with an 8-12-week course of one pill a day is a phenomenal achievement to have been a part of.

I am also really proud of the work done with remdesivir for COVID-19. To have been a part of the solution and to have had a chance to make a difference for patients, their loved ones and communities is truly a unique privilege.

How the Institute’s HIV-care providers nimbly adapted to ensure their community patients continued to receive timely medical treatment

When the lockdown shut everything down in late-Spring 2020, the care providers in the IHV THRIVE (Together Healing, Reaching, Inspiring to achieve Victory over illness and Embrace life) Program—located at the University of Maryland Medical Center Midtown Campus—worried about their patients. They worried that they wouldn’t receive continuing medical care to keep the virus under control. They worried whether their patients would be more susceptible to getting COVID-19 or would have more severe illness when they did get sick. They worried about the strain on their patient’s mental health as well.

With a little luck and a heap of elbow grease, IHV’s THRIVE care team rallied together going above and beyond with admirable dedication to their patient community.



Pivoting delivery of care

During the initial shutdown, the THRIVE Program like many other medical care programs converted to all telemedicine appointments.

“Many of our patients loved the convenience, but for others this was a barrier as some patients weren’t as tech savvy or might not have data or minutes on their cell phones or access to a computer,” says **Sarah Schmalzle, MD**, Assistant Professor of Medicine and the Medical Director of IHV’s THRIVE Program. She says the clinic’s team taught their patients how to sign up for email and find available platforms, so they could do their visits remotely. The team worked together to ensure that each patient saw all the necessary providers through virtual visit, whether it be physicians, social workers, nurses, the mental health counselor, the nutritionist or pharmacists.

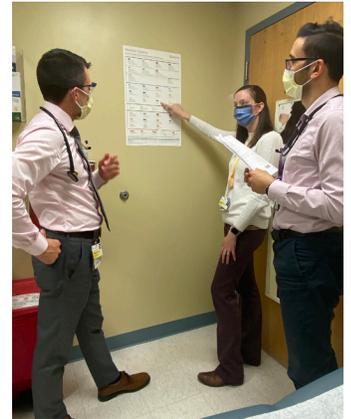
“We made it a point to focus on retention efforts to do as much as we could to find people that fell out of care and make sure they came back,” says Dr. Schmalzle.

Aside from medical care visits, the care team helped their patients weather the pandemic in other ways



Sarah Schmalzle, MD

as well. The physicians prescribed patients longer refills with less frequent pick-ups on their medications. Social workers supported patients dealing with food instability and social isolation by having food delivered to patient’s homes. The group also loosened restrictions for who could receive meal-replacement shakes, to get nutrition to people who were malnourished or had food shortages.



Dr. Schmalzle teaching two fellows

The staff weathered many stressors during this time, as well. It was many nights and weekends working. Many of them dealt with losses of either friends or family. At one point the THRIVE space moved to make way for a COVID treatment space, and staff split their time among treating COVID-19 patients in addition to their existing patients. Their dedication despite these personal and professional stressors was heroic.

How patients fared

“Our biggest concern was that our patients with HIV would be more susceptible to COVID or more at-risk for more severe illness,” says Dr. Schmalzle.

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THRIVE-ing during the Pandemic *(continued)*

As to whether those people with HIV are at greater risk of contracting COVID-19, **Patrick Ryscavage, MD**, Assistant Professor of Medicine and IHV's Chief of Infectious Disease at the Midtown Campus says, *"it is difficult to disentangle HIV-specific risk factors from the disparities in COVID-19 risk we see among people of color. When you do try to isolate HIV alone, most studies suggest that HIV by itself doesn't seem to increase the risk for testing positive for SARS-CoV-2."*

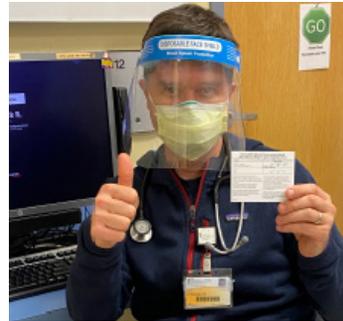
But, are people with HIV more likely to have severe illness from COVID-19 or be hospitalized considering HIV weakens the immune system? *"The data seem to be mixed, some studies saying 'yes' and others saying 'no,'"* says Dr. Ryscavage. *"It is important to remember that people living with HIV have higher rates of other health conditions associated with severe COVID-19 outcomes, including high blood pressure, diabetes, and chronic kidney disease. It is difficult for studies to control for these chronic diseases and many do not include a population control group. As of now, the most compelling evidence suggests that people with HIV may be at some risk for developing severe illness, specifically among those with low CD4+ T cell counts, which makes sense as these patients often suffer more severe outcomes in other respiratory viral infections."*



Dr. Ryscavage speaking with a fellow

"In the few programs that have reported data thus far, total visits or touch points with patients didn't dramatically decline, but rather flipped to virtual visits. So, patients weren't necessarily seeing their providers less, which is good news," says Dr. Ryscavage.

Still, the routine surveillance testing of viral loads did decline anywhere from 15-20% depending on the study, he says. Dr. Schmalzle confirmed that this was an issue in THRIVE and now they are working to play catch-up and collect data on how far behind patients are on their routine testing.



Dr. Ryscavage (left) and Dr. Schmalzle get their COVID vaccinations

Of their patient population, Dr. Schmalzle says over half of them are over the age of 50. Many are on disability at home alone. Many face social isolation and loneliness on a regular basis, pandemic notwithstanding. *"We were worried about their mental health or that their social isolation would worsen,"* she says.

One silver lining she says is that people seemed more likely to attend mental health visits through telemedicine than they did formerly for in-person visits. Anecdotally, she says her patients proved to be extremely resilient as many of them are used to dealing with poorly dealt hands in life, and this was just another hurdle in a long series.

Vaccination and the future

Now that the world is opening back up and the pandemic is on the downtrend with introduction of the vaccines, IHV's THRIVE Program has returned to about two-thirds of patients doing in-person visits. *"Many of our patients just wanted to come back as they think of us as their surrogate family,"* says Dr. Schmalzle. She says their focus now is on getting their patients COVID-19 vaccinations.

Initially she says there was some hesitancy to get the vaccine—mostly because patients didn't know if as a person with HIV whether they should get the vaccine or not and they didn't want to get one without information from a trusted source. Dr. Schmalzle says that her team set up pharmacy Q and As and Zoom education sessions to get patients' questions answered. They posted vaccine information sheets in all the patient care rooms and all providers now ask every patient if they plan to get vaccinated. Her team helps patients register online and set up transportation to the vaccine sites too.

"We celebrate COVID vaccination in that every staff member who gets one gets a photo and we post it in the waiting room with their permission," says Dr. Schmalzle. *"There is an optimism and a thought that together we will weather this storm."*

Why COVID-19 survivors should only get one dose of mRNA vaccine. . .

Data seems to be indicating that survivors of COVID-19 may not need two doses of mRNA vaccine, which would free up more doses for others.

Anthony Harris, Florian Krammer, Mohammad Sajadi, Viviana Simon • Originally published on USA Today on March 30, 2020

During this COVID-19 pandemic that has now been going on for over one year, there are very few things that everyone agrees on. Two things that almost everyone agrees on are:

1. We need to get as many people vaccinated as quickly as possible to prevent hospitalizations, deaths, and the spread of virus variants; and
2. People are tired of modifying their behavior and are eager to return to normal life. This pandemic fatigue is leading some states to relax important interventions such as mask mandates, even with less than 10-15% of their populations vaccinated.

With this backdrop, we believe that COVID-19 survivors should only get one dose of mRNA vaccine (made by Pfizer and Moderna) which would speed the rate of immunization by allowing others to get these additional doses. While we are strong believers that people who have not been infected with SARS-CoV-2 should receive two doses of mRNA vaccine, we also think government officials should address the increasing amount of evidence that suggests those who previously had COVID-19 can achieve the same level of immune response with only one dose of a Pfizer or Moderna vaccine.

Modifying how many doses of the vaccine COVID survivors need

There are at least eight publications that have appeared in the last month that have indicated that this may be a reasonable approach. These studies, including from our groups at the University of Maryland School of Medicine and the Icahn School of Medicine at Mount Sinai, have

shown that previously infected COVID-19 patients mount an antibody response to a single dose that is equal to or exceeds two doses in those not previously infected. Although not randomized trials, these studies conducted by multiple research groups on different continents provide strong evidence that a single dose of mRNA vaccine may be enough. This is due to the presence of immunological memory and is the reason why most booster vaccines are given as single doses only, while a primary vaccination series can be one or more doses—like the measles mumps rubella (MMR) shots given to infants.

Some countries, including France, have responded to this data modifying their policies and are only administering one dose to previously infected individuals. Canada has recently adopted another strategy to increase the vaccine supply. They are extending the time after COVID-19 infection when someone would qualify for a vaccine to four months (the US only suggests waiting for 3 months). We are in favor of this as a study has shown immunity after infection for at least 6 months, and studies such as ours show immunological memory for at least 9 months.

Some argue that we should not modify policies until large, randomized trials are conducted. We disagree with this argument. First, it is important to point out that the large, randomized vaccine trials conducted to test these vaccines for efficacy did not, for the most part, include people who were previously infected. Second, such trials would take over half a year to complete, causing a missed critical window of opportunity.

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Why COVID-19 survivors should only get one dose of mRNA vaccine. . .

(continued)

Freeing up vaccines for more people

How many more people could be vaccinated with a worldwide change in policy of a single dose vaccine for those previously infected with SARS-CoV-2? The figure below demonstrates that by going to a single dose policy, more than 110 million people worldwide who were previously infected could receive only one dose. That would free up more than 110 million doses, allowing much faster protection against the spreading variants, which appear to be more contagious. Doses administered more quickly to additional individuals could prevent tremendous morbidity and mortality from COVID-19.

Some have argued against this single-dose policy for COVID-19 survivors, saying it would be too hard to implement if everyone needed a confirmatory antibody test. While this may be a valid point, we don't think such confirmation is necessary for public health purposes.

A medical history of having laboratory-confirmed COVID-19 can be done by self-report, like is done for other parts of the medical history, like a diagnosis of diabetes or asthma. While this system is not perfect (some people may intentionally or non-intentionally check the box), enough vaccine would be freed up to make a difference in the ongoing pandemic. Such a change will free up immunization capacities because not everyone needs to return for a second vaccination. When facing an implementation problem, there are practical solutions, we just need to put in the effort to implement them.

Anthony Harris, MD, MPH, is a Professor of Epidemiology & Public Health at University of Maryland School of Medicine.

Florian Krammer, PhD, is a Professor of Microbiology at Icahn School of Medicine at Mount Sinai, Global Virus Network Center of Excellence.

Mohammad Sajadi, MD, is an Associate Professor of Medicine, Division of Clinical Care and Research at the Institute of Human Virology, University of Maryland School of Medicine, Global Virus Network Center of Excellence.

Viviana Simon, MD, PhD, is a Professor of Microbiology and Medicine at Icahn School of Medicine at Mount Sinai.





IHV Mourns Passing of Dr. John Martin

The Institute of Human Virology (IHV) at the University of Maryland School of Medicine issued a statement on April 30, 2021 to express mourning of the passing of IHV 2014 Lifetime Achievement Public Service Awardee and 2017 Annual Marlene and Stewart Greenebaum Lecturer, John Martin, PhD. Dr. Martin died on March 30. He was a leader in supporting access to life-saving anti-HIV medications that although still under patent were made widely and affordably available to millions around the world infected with HIV, and for prevention through pre-exposure drug therapy. He was a tremendous clinical scientist, businessman, global public health leader, philanthropist, and good friend.

“John Martin is irreplaceable and his passing is a devastating loss to many,”

said Robert C. Gallo, MD

The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, University of Maryland School of Medicine, a Global Virus Network (GVN) Center of Excellence, and GVN Co-Founder and International Scientific Advisor

The fields of medicine and science have many notable leaders who contribute to public health. But it is John’s leadership at Gilead Sciences that stands out and resulted in the successful development of antiviral therapeutics for the treatment of HIV, hepatitis B and C, and influenza. Further, the global public health response to HIV/AIDS was immensely facilitated by John, which is unique among the global pharmaceutical industry. His humanitarian leadership resulted in more than 10 million HIV-infected persons receiving lifesaving therapies with the best drugs available. His life’s work lives on in those he mentored and in The John C. Martin Foundation, among many others. We extend our deepest sympathies to John’s



Dr. Martin with life partner, Lillian Lou

family, especially his life partner, Lillian Lou. Our very close friend will be greatly missed.”

Dr. Martin was an exceptional individual whose towering leadership of Gilead Sciences led to a profound impact on human viral diseases worldwide. His leadership resulted in the successful development of antiviral therapeutics for the treatment of HIV, hepatitis B and C, and influenza. More importantly, Dr. Martin recognized the importance of making these critical therapeutic advancements available not just to the wealthy nations of the world, but worldwide, to include even those infected persons in the most impoverished regions of the globe. He developed a sustainable system that is treating an accelerating number of persons in low income countries, thus producing a program that has measurable results and demonstrates enormous impact on global health.

“I was deeply saddened to hear about the loss of Dr. John Martin,” said E. Albert Reece, MD, PhD, MBA, Executive Vice President for Medical Affairs, UM Baltimore, the John Z. and Akiko K. Bowers Distinguished Professor, and Dean, University of Maryland School of Medicine. ***“He was truly a giant in every aspect of global medicine and public health, and will be forever remembered for the tremendous impact he had on the global HIV/AIDS response. As Dr. Martin and I became personal friends over the years, I realized what a special***



Dr. Martin receives IHV’s Lifetime Achievement Public Service Awardee from Dr. Gallo

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IHV Mourns Passing of Dr. John Martin *(continued)*

individual he was. He leaves a lasting legacy that few in science and medicine can match. I extend my sincerest condolences to everyone in the Martin family."

"John Martin was a one-of-a-kind scientist/businessman/philanthropist who was a true visionary in translating drug discovery for public health benefit," said **Shyam Kottlil, MBBS, PhD**, Professor of Medicine and Director of the Division of Clinical Care and Research, Institute of Human Virology at the University of Maryland School of Medicine. *"He will be remembered for making Gilead Sciences a leading pharmaceutical company. His innovative ACCESS program revolutionized global health care for millions suffering from HIV and/or hepatitis viruses. He was inspirational for both business and scientific communities and continued his work for improving global health through John C. Martin Foundation. He will be missed as a leader, visionary, and philanthropist who influenced an entire generation of physician-scientists like me."*

"The world of infectious disease lost a real pioneer with the untimely death of Dr. John Martin, founder and former CEO and Executive Chairman of Gilead Sciences," said **Warner Greene, MD, PhD**, Director, Gladstone Center for HIV Cure Research, Nick and Sue Hellmann Distinguished Professor of Translational Medicine, Founding and Emeritus Director, Gladstone Institute of Virology and Immunology (GIVI). Dr. Greene serves on IHV's Scientific Advisory Board and received the 2019 IHV Lifetime Achievement Award for Scientific Contributions. *"John absolutely revolutionized the treatment of people infected with HIV and HCV while at the same time building Gilead into a major biopharmaceutical powerhouse. His entrepreneurial spirit and modest manner will be greatly*



Dr. Martin (left), Dr. Lou Lange (center), and Dr. Shyam Kottlil

missed, but his impact on virology long remembered."

Dr. John Martin joined Gilead Sciences in 1990 and was Executive Chairman from March 2016 through March 2019. He served as Chairman and Chief Executive Officer from June 2008 through March 2016, and President and Chief Executive Officer from 1996 through May 2008. Prior to joining Gilead, Dr. Martin held several leadership positions at Bristol-Myers Squibb and Syntex Corporation. He invented ganciclovir in 1982 and contributed to the research, development and commercialization of a number of antiviral drugs active against HIV, cytomegalovirus, influenza, and hepatitis B and C.

Dr. Martin served on the Board of Directors of the Global Virus Network (GVN), of Kronos Bio, and The Scripps Research Institute. He previously served as President of the International Society for Antiviral Research, Chairman of the Board of Directors of BayBio, and Chairman of the Board of Directors of the California Healthcare Institute (CHI). He served on the National Institute of Allergy & Infectious Diseases Council, the Board of Directors of the

Biotechnology Industry Organization, the Board of Directors for CHI, the Board of Trustees of the University of Chicago, the Board of Trustees of Golden Gate University and the External Scientific Advisory Board of the University of California School of Global Health. Additionally, Dr. Martin served on the Centers for Disease Control/Health Resources and Services Administration's Advisory Committee on HIV and STD Prevention and Treatment and was a member of the Presidential Advisory Council on HIV/AIDS.

Dr. Martin holds a PhD in Organic Chemistry from the University of Chicago, an MBA from Golden Gate University, and a BS degree in Chemical Engineering from Purdue University. He received the Isbell Award from the American Chemical Society and the Gertrude B. Elion Award for Scientific Excellence from the International Society for Antiviral Research. In 2008, he was inducted into the National Academy of Engineering of the National Academies. In 2014, Dr. Martin received the IHV Lifetime Achievement Award for Public Service. In 2019, he received the National Academy of Sciences Award for Chemistry in Service to Society.

Grants

Manhattan Charurat, PhD, MHS, Professor of Medicine, Director, Division of Epidemiology & Prevention, Director, Center for international Health Education and Biosecurity, was awarded \$82,116 for one year to support the effort of UNICEF to assist in the service “UNICEF-University of Maryland Partnership to Implement Quality Improvement Strategy in PMTCT (prevention of mother-to-child transmission of HIV).” The main strategy of this project is capacity building of health care providers and their mentors in district hospitals.



Man Charurat, PhD, MHS

Cassidy W. Claassen, MD, MPH, Assistant Professor of Medicine, Center for International Health, Education, and Biosecurity, was awarded \$593,964 over three years from the NIH for the project “Re-engagement at Discharge (Re-Charge): “Improving Post-Hospital Outcomes for HIV-infected Adults in Zambia.” Re-Charge will improve HIV patient retention in care and viral suppression after discharge from hospital treatment, address patient- and system-level barriers, and monitor outcomes to assess retention in care at six months. The goal is to increase the proportion of clients retained in HIV care by 30% after discharge.



Cassidy Claassen, MD, MPH

Shivakumar Narayanan, MD, MPH, Assistant Professor of Medicine, Director of Hepatitis Research, Division of Clinical Care and Research, was awarded \$197,288 for two years to support the efforts of Gilead Sciences Incorporated to assist with the clinical trials to evaluate treatment with intravenous (IV) administered remdesivir (RDV, GS-5734) in an outpatient setting in participants with confirmed COVID-19 who are at risk for disease progression.



Shivakumar Narayanan, MD, MPH

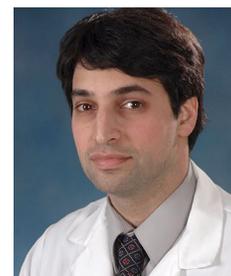
Shivakumar Narayanan, MD, MPH, Assistant Professor of Medicine, Director of Hepatitis Research Division of Clinical Care and Research, was awarded \$669,766 for three years to support the efforts of GlaxoSmithKline LLC to assist with the clinical trial in a Phase IIIb, randomized, open-label, active-controlled, multicenter, parallel-group study designed to

assess the antiviral activity and safety of a two-drug regimen of CAB LA + RPV LA administered every 2 months compared with maintenance of BIK. The study will continue with an Extension Phase after Month 12.

Shivakumar Narayanan, MD, MPH, Assistant Professor of Medicine, Director of Hepatitis Research, Division of Clinical Care and Research, was awarded \$799,560 for three years to support the efforts of Amygdala Neurosciences, Inc. to assist with the clinical trial in “ANS 6637 SC-CrEATE (Smoking Cessation Crossover Evaluation of Addiction Treatment Efficacy)” Phase 2a double-blind trial comparing ANS-6637 with placebo.

Shivakumar Narayanan, MD, MPH, Assistant Professor of Medicine, Director of Hepatitis Research, Division of Clinical Care and Research, was awarded \$640,397 for two years to support the efforts of Regeneron Pharmaceuticals, Inc. to assist with the clinical trial “COV-2066 A Master Protocol Assessing the Safety, Tolerability, and Efficacy of Anti-Spike (S) SARS-CoV-2 Monoclonal Antibodies for the Treatment of Hospitalized Patients with COVID-19.” This study is an adaptive, Phase 1/2/3, randomized, double-blinded, placebo-controlled master protocol to evaluate the efficacy, safety, and tolerability of REGN10933+REGN10987 in hospitalized adult patients with COVID-19. The safety, tolerability, and efficacy of REGN10989 will also be evaluated in the Phase 1 portion of the study to enable further investigation in other clinical settings.

Mohammad Sajadi, MD, Associate Professor of Medicine, Division of Clinical Care and Research, was awarded \$1,333,975 for two years to support the effort of the Bill & Melinda Gates Foundation for the “Development of a new CD4bs bNAb, N49X.” There is no preventive vaccine for HIV-1 infection, and the only effective treatment is life-long therapy with highly active anti-retroviral therapy (HAART). Despite the availability of antiretroviral agents for the treatment and prevention of HIV-1 infection, millions of people continue to be infected each year, particularly in sub-Saharan Africa. Thus, new preventatives of HIV-1 are needed, and antibody therapy is currently being considered as an alternative to a vaccine.



Mohammad Sajadi, MD

Mohammad Sajadi, MD, Associate Professor of Medicine, Division of Clinical Care and Research, was awarded \$54,841 for one year to support the efforts of the National Institute of Health Clinical Center Support-Professional Services.

Grants

Mohammad Sajadi, MD, Associate Professor of Medicine, Division of Clinical Care and Research, was awarded \$139,623 as the subrecipient for the Emory University to assist in the “Novel nanoparticulate adjuvants to enhance HIV-1 Env specific mucosal antibody responses.”



Nadia Sam-Agudu, MD

Nadia A. Sam-Agudu, MD, Associate Professor of Pediatrics, Division of Epidemiology and Prevention, and Senior Technical Advisor at IHV-Nigeria, received a Fogarty International Center/Adolescent HIV Prevention and Treatment Implementation Science Alliance (AHISA) small award on December 8, 2020, for continued support of the Central and West Africa Implementation Science Alliance

(CAWISA) for 2021 to 2022. This is a competitive renewal of the initial grant awarded from 2019 to 2020.

Kristen Stafford, PhD, MPH, Associate Professor of Epidemiology and Public Health and Deputy Director, Center for international Health Education and Biosecurity, was awarded \$900,000 to expand a first phase COVID-19 seroprevalence study in Nigeria. In May 2020, Ciheb was awarded \$2.1 million to estimate COVID-19 prevalence across the three Nigerian states of Enugu, Gombe, and Nasarawa. Survey findings revealed that the prevalence of SARS-CoV-2 antibodies were 23% in Enugu State, 19% in Nasarawa State, and 9% in Gombe State. This means that the proportion of the population still vulnerable to infection in these states ranged from 77% to 91%. The new grant will expand the investigation to Kano State and the Federal Capital Territory.



Kristen Stafford, PhD, MPH

Rohit Talwani, MD, Assistant Professor of Medicine, Division of Clinical Care and Research, was awarded \$229,018 for three years to support the efforts for I-Mab Biopharma Co in a Phase 1b/2, randomized, double-blind, placebo-controlled, multi-center study to evaluate the safety and efficacy of TJ003234 in subjects with severe COVID-19.



Rohit Talwani, MD

Board News



Nicolette Louissaint, PhD Joins IHV Board of Advisors

Dr. Louissaint serves as the Executive Director of Healthcare Ready, where she works to meet the most pressing patient needs before, during and after natural disasters, disease outbreaks and catastrophic events.

Prior to joining Healthcare Ready, Nicolette was the Senior Advisor to the State Department’s Special Coordinator for Ebola during the height of the Ebola Epidemic of 2014. In this role, she helped coordinate international response efforts. Nicolette currently serves as the Public Health Representative on FEMA’s National Advisory Council, as a Commissioner on the Baltimore City Sustainability Commission, and as a co-Chair of the Healthcare and Public Health Sector Coordinating Council (HPHSCC) under the Department of Homeland Security, leading on supply chain issues.

Nicolette holds Bachelor of Science degrees in Chemical Engineering and Biological Sciences from Carnegie Mellon University, a PhD in Pharmacology and Molecular Sciences from Johns Hopkins University School of Medicine, and an MBA from the University of Baltimore. She completed post-doctoral fellowships at the Johns Hopkins University and the American Association for the Advancement of Science. She has also been recently named in The Root 100 most influential African Americans in 2020.

Awards

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, is the recipient of the National Virus Association (NVA) Honorary Membership. The NVA is a leading Russian expert platform for quality educational programs in HIV infection and concomitant diseases.



Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, was the recipient of the International Magna Graecia Prize of the Magna Graecia Foundation during the International Meeting held December 9, 2020. The Italian Prize, created in 1997 “has been bestowed to the most influential people who contributed to the promotion of Italianate in the world, to those who, through their own activities, have been committed to take Italian culture out of our national borders: Italians and Italians of origin who have embodied and symbolized, in the most diverse sectors, the best qualities of our country.” Previous honorees include, the President of the Argentine Republic Mauricio Macri, the Governor of the State of New York George Pataki, the Minister of Foreign Trade of Canada Sergio Marchi, the Argentine Minister of Tourism Francisco Mayorga, among many others.

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, will receive the Gertrude Elion Distinguished Lecturer Award at the HIV DART & Emerging Viruses held December 6-8, 2020.

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute Human Virology at the University of Maryland School of Medicine and co-founder and international scientific advisor of the Global Virus Network, was awarded the “VCANBIO Award for Biosciences and Medicine,” a significant and authoritative award in the life sciences and medicine field of China. The elite Prize is jointly presented by the University of Chinese Academy of Sciences and the VCANBIO CELL & GENE ENGINEERING CORP, LTD to push forward scientific research, technological innovation and continuous development in the life sciences and medicine field of China.

Shyam Kottlil, MBBS, PhD, Professor of Medicine, Director, Division of Clinical Care and Research, was awarded Mastership in the American College of Physicians (ACP), the national organization of internists, for groundbreaking clinical research and exceptional mentorship. Dr. Kottlil is also Chief of the Division of Infectious Diseases in the UMSOM Department of Medicine and is a scientific advisory member of the Global Virus Network (GVN). Dr. Kottlil, who received the 2019 ACP’s Richard and Hilda Rosenthal Award, will be honored at the Convocation for new Masters to be held later this year.



Keynotes

Joel V. Chua, MD, Assistant Professor of Medicine, Division of Clinical Care and Research, among other lecturers, presented a Webinar lecture for the Maryland Department of Health on March 23, 2021. Dr. Chua presented on “Monoclonal Antibody Therapy: Scientific Basis and Ongoing Studies.”



Joel Chua, MD

Joel V. Chua, MD, Assistant Professor of Medicine, Division of Clinical Care and Research, presented a lecture to the AIDS Action Baltimore in a virtual format on November 18, 2020, entitled “COVID-19 Vaccine and Treatment Trials.”

Joel V. Chua, MD, Assistant Professor of Medicine, Division of Clinical Care and Research, presented at the University of Maryland Medical Center Family Medicine Grand Rounds in a virtual format on October 14, 2020. Dr. Chua’s talk was entitled “COVID-19 Therapeutics: Antivirals and Anti-spike Monoclonal Antibodies in Development.”



Robert C. Gallo, MD

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, greeted members of the NVA at their regional conference held in Khabarovsk, Russia, with a pre-recorded message April 19-20, 2021. The title of his talk was “Reflections on HIV Research Advances Pandemic Diseases, and COVID-19.”

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, presented the Uniformed Services University of the Health Sciences annual David Packard Lecture in a virtual format on March 22, 2021. Dr. Gallo presented “From T Cells and Human retroviruses to the SARS-CoV-2 Pandemic and Innate Immunity.”

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, participated in a Science Forum COVID-19 webinar from Sweden with other international virology scientists. Dr. Gallo’s talk, “From HIV to SARS-CoV-2: A Reflection on the science of these and earlier pandemics,” was January 26, 2021. The Science Forum COVID-19 is a group of researchers and doctors that collaborate science-based knowledge about the major issues and challenges that the ongoing pandemic has posed to the world. Other scientists from Sweden who participated in this webinar included Drs. Peter Horal, Jan Lotvall, and Anders Vahne.

Nadia A. Sam-Agudu, MD, Associate Professor of Pediatrics, Division of Epidemiology and Prevention, and Senior Technical Advisor at IHV-Nigeria, presented virtual Global Health Grand Rounds at the Vanderbilt Institute of Global Health on April 26, 2021. The title of her talk was “Generating Robust Data for Health Policy on COVID-19 among Children and Pregnant Women in African Countries: the AFREhealth Collaboration.”



Nadia Sam-Agudu, MD

<https://www.vumc.org/global-health/events>

John W. Baddley, MD, MSPH, Professor of Medicine, Division of Clinical Care and Research, among other authors, published “SARS CoV-2 infection among patients using immunomodulatory therapies” in *Annals of Rheumatic Diseases* in Feb 2021, <https://doi:10.1136/annrheum-dis-2020-218580>.

John W. Baddley, MD, MSPH, Professor of Medicine, Division of Clinical Care and Research, among other authors, published “Association of Secukinumab Treatment with Tuberculosis Reactivation in Patients with Psoriasis, Psoriatic Arthritis, or Ankylosing Spondylitis” in *JAMA Dermatology* on January 1, 2021, <https://doi:10.1001/jamadermatol.2020.3257>. Erratum in: *JAMA Dermatology* on January 1, 2021.

John W. Baddley, MD, MSPH, Professor of Medicine, Division of Clinical Care and Research, published “COVID-19 Associated Pulmonary Aspergillosis: Do We Have the CAPacity to Improve Outcomes?” in *Clinical Infectious Diseases* in Mar 2021, <https://doi:10.1093/cid/ciab259>.

John W. Baddley, MD, MSPH, Professor of Medicine, Division of Clinical Care and Research, among other authors, published “Guidance on Imaging for Invasive Pulmonary Aspergillosis and Mucormycosis: From the Imaging Working Group for the Revision and Update of the Consensus Definitions of Fungal Disease from the EORTC/MSGERC” in *Clinical Infectious Diseases* on March 12, 2021, <https://doi:10.1093/cid/ciaa1855>.

John W. Baddley, MD, MSPH, Professor of Medicine, Division of Clinical Care and Research, among other authors, published “MSG07: An International Cohort Study Comparing Epidemiology and Outcomes of Patients with *Cryptococcus neoformans* or *Cryptococcus gattii* infections” in *Clinical Infectious Diseases* on March 27, 2021, <https://doi:10.1093/cid/ciab268>.

John W. Baddley, MD, MSPH, Professor of Medicine, Division of Clinical Care and Research, among other authors, published “Summary of Guidelines for Managing Histoplasmosis among People Living with HIV” in *Journal of Fungi* (Basel) on February 12, 2021, <https://doi:10.3390/jof7020134>.

John W. Baddley, MD, MSPH, Professor of Medicine, Division of Clinical Care and Research, among other authors, published “Diagnosis of central nervous system invasive aspergillosis in a liver transplant recipient using microbial cell-free next generation DNA sequencing” in *Transplant Infectious Diseases* on March 2, 2021, <https://doi:10.1111/tid.13592>.

Francesca Benedetti, PhD, Research Associate of Biochemistry and Molecular, Division of Virology, Pathogenesis and Cancer (VPC), **Sabrina Curreli, PhD, MS, MSE**, Research Associate of Medicine, Division of Virology, Pathogenesis and Cancer (VPC), **Robert Gallo, MD**, The Homer & Martha Gudelsky Distinguished Professor of Medicine, Co-Founder and Director, Institute of Human Virology, and **Daide Zella PhD**, Assistant Professor of Biochemistry and Molecular Biology, Virology, Pathogenesis and Cancer (VPC), published “Tampering of Viruses and Bacteria with Host DNA Repair: Implications for Cellular Transformation” in *Cancers* (Basel) on January 11, 2021, <https://doi:10.3390/cancers13020241>

Joel V. Chua, MD, Assistant Professor of Medicine, Division of Clinical Care and Research among other authors, published “Evolution of Nipah virus infection: past, present, and future considerations” in *Tropical Medicine and Infectious Disease* in Feb 2021.

Joel V. Chua, MD, Assistant Professor of Medicine, Division of Clinical Care and Research, among other authors, published “Short-duration treatment with the novel non-nucleoside inhibitor CDI-31244 plus sofosbuvir/velpatasvir for chronic hepatitis C: an open-label study” in *Journal of Medical Virology* in Nov 2020.

Joel V. Chua, MD, Assistant Professor of Medicine, Division of Clinical Care and Research, among other authors, published “Safety and efficacy of imatinib for hospitalized adults with COVID-19: a structured summary of a study protocol for a randomized controlled trial” in *Trials* in Oct 2020.

Joel V. Chua, MD, Assistant Professor of Medicine, Division of Clinical Care and Research, among other authors, published “Dengue infections in Colombia: epidemiological trends of a hyperendemic country” in *Tropical Medicine and Infectious Disease*, Oct 2020.

Sabrina Curreli, PhD, MS, MSE, Research Associate of Medicine, Division of Virology, Pathogenesis and Cancer, with other coauthors published “In vivo and in vitro cell based model of lung adenocarcinoma from patients with pleural effusion” in *Neoplasia* on February 11, 2021, http://doi:10.4149/neo_2021_200906N953.

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, along with other colleagues from the Institute's Division of Virology, Pathogenesis and Cancer including, **Francesca Benedetti, PhD**, Research Associate of Biochemistry and Molecular Biology, **Sabrina Curreli, PhD, MS, MSE**, Research Associate of Medicine, and **Davide Zella, PhD**, Assistant Professor of Biochemistry and Molecular Biology published "Exogenous bacterial DnaK increases protein kinases activity in human cancer cell lines" in the *Journal of Translational Medicine* on February 9, 2021, <https://doi.org/10.1186/s12967-021-02734-4>

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, along with other colleagues from the Institute's Division of Virology, Pathogenesis and Cancer (VPC) including **Sabrina Curreli, PhD, MS, MSE**, Research Associate of Medicine, **Francesca Benedetti, PhD**, Research Associate of Biochemistry and Molecular Biology, **Fiorenza Cocchi, MD**, Assistant Professor of Medicine, and **Davide Zella, PhD**, Assistant Professor of Biochemistry and Molecular Biology, among other authors published "Analysis of DnaK Expression from a Strain of *Mycoplasma fermentans* in Infected HCT116 Human Colon Carcinoma Cells" in *International Journal of Molecular Sciences* on April 9, 2021, <https://doi.org/10.3390/ijms22083885>

Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, and other colleagues wrote a letter to the editor of *Risk Analysis*, published on February 15, 2021, <https://doi.org/10.1111/risa.13669>

Robert Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, wrote a commentary, "The Great Coronavirus Pandemic of 2019-2021: the Future and the Requirement for China-America Cooperation" in *China CDC Weekly* on February 12, 2020, <http://weekly.chinacdc.cn/en/article/doi/10.46234/ccdcw2021.037>

Robert Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, with other colleagues, published "Evolution toward beta common chain receptor usage links the matrix proteins of HIV-1 and its ancestors to human erythropoietin" in *PNAS* on January 12, 2021.

Robert Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director, Institute of Human Virology, and members of The Oncology Think Tank co-authored an essay, "We Must Find Ways to Detect Cancer Much Earlier" in *Scientific American* on January 8, 2021, <https://www.scientificamerican.com/article/we-must-find-ways-to-detect-cancer-much-earlier/>

Hong Lai, PhD, MPH, Associate Professor of Epidemiology and Public Health, Division of Epidemiology & Prevention, and **Shenghan Lai, MD, MPH**, Professor of Epidemiology and Public Health, among other authors, published "Contribution of risk factors to the development of coronary atherosclerosis as confirmed via coronary CT angiography – a longitudinal radiomics-based study" in *Radiology* in Feb 2021.

Hong Lai, PhD, MPH, Associate Professor of Epidemiology and Public Health, Division of Epidemiology & Prevention, and **Shenghan Lai, MD, MPH**, Professor of Epidemiology and Public Health, among other authors, published "Cardiovascular risk factors and illicit drug use may have a more profound effect on coronary atherosclerosis progression in people living with HIV" in *European Radiology* in May 2021. <https://doi:10.1007/s00330-021-07755-7>.

Shenghan Lai, MD, MPH, Professor of Epidemiology and Public Health, "HIV and coronary atherosclerosis: research separates association from causation" in *Radiology* on April 20, 2021.

Joseph Lakowicz, PhD, Professor of Biochemistry & Molecular Biology, Associate Member of the Division of Virology, Pathogenesis and Cancer (VPC), among other authors, published "Converting the guided modes of Bloch surface waves with the surface pattern" in *Journal of the Optical Society of America B*. in Mar 2021.

Joseph Lakowicz, PhD, Professor of Biochemistry & Molecular Biology, Associate Member of the Division of Virology, Pathogenesis and Cancer (VPC), among other authors, published "Sodium-sensitive contact lens for diagnostics of ocular pathologies" in *Sensors and Actuators B: Chemical* in Mar 2021.

Joseph Lakowicz, PhD, Professor of Biochemistry & Molecular Biology, Associate Member of the Division of Virology, Pathogenesis and Cancer (VPC), among other authors, published "Fluorescence coupling to internal modes of 1D photonic crystals characterized by back focal plane imaging" in *Journal of Optics* in Feb 2021.

Joseph Lakowicz, PhD, Professor of Biochemistry & Molecular Biology, Associate Member of the Division of Virology, Pathogenesis and Cancer (VPC), among other authors, published "Far-field optical imaging of surface plasmons with a subdiffraction limited separation" in *Nanophotonics* in Dec 2020.

Joseph Lakowicz, PhD, Professor of Biochemistry & Molecular Biology, Associate Member of the Division of Virology, Pathogenesis and Cancer (VPC), among other authors, published “Fluorescent contact lens for continuous non-invasive measurements of sodium and chloride ion concentrations in tears” in *Analytical Biochemistry* in Nov 2020.

Joseph Lakowicz, PhD, Professor of Biochemistry & Molecular Biology, Associate Member of the Division of Virology, Pathogenesis and Cancer (VPC), among other authors, published “Real-time measurement of the hygroscopic growth dynamics of single aerosol nanoparticles with Bloch surface wave microscopy” in *ACS Nano* in Nov 2020.

Rebecca G Nowak, PhD, Assistant Professor of Epidemiology and Public Health, Division of Epidemiology & Prevention, among other authors, published “Herpes Simplex Virus Type-2 shedding and genital ulcers during early HIV in Zimbabwean women” in *Journal of Acquired Immune Deficiency Syndromes* in Feb 2021.

Rebecca G Nowak, PhD, Assistant Professor of Epidemiology and Public Health, Division of Epidemiology & Prevention, and **Man Charurat, PhD, MHS**, Professor of Medicine, Director, Division of Epidemiology & Prevention, Director, Center for international Health Education and Biosecurity, among other authors, published “Multiple HPV infections among men who have sex with men engaged in anal cancer screening in Abuja, Nigeria” in *Papillomavirus Research* in Dec 2020.

Chozha V. Rathinam Ph.D., MSc, Associate Professor of Medicine, Head, Laboratory for Stem Cell & Cancer Biology, and Division of Virology, Pathogenesis and Cancer **Ram Lakhani, PhD**, Postdoctoral Fellow, Division of Virology, Pathogenesis and Cancer, Published “Deficiency of Rbpj Leads to Defective Stress-Induced Hematopoietic Stem Cell (HSC) Functions and Hif Mediated Activation of Non-canonical Notch Signaling Pathways” in *Frontiers in Cell and Developmental Biology* on January 25, 2021, <https://doi.org/10.3389/fcell.2020.622190>

Patrick Ryscavage, MD, Assistant Professor of Medicine, Institute of Human Virology, among other authors published “Stepping up: retention in HIV care within an integrated health care transition program” in *AIDS Care*, Accepted for publication, anticipated May 2021.

Patrick Ryscavage, MD, Assistant Professor of Medicine, Division of Clinical Care and Research, among other authors published “STI Screening among Gay, Bisexual and Other Men who Have Sex with Men Prescribed PrEP in Baltimore City, Maryland” in *Clinical Infectious Diseases* in Dec 2020.

Nadia A. Sam-Agudu, MD, Associate Professor of Pediatrics, Division of Epidemiology and Prevention, and Senior Technical Advisor at IHV-Nigeria, along with other colleagues, published “Scaling Up COVID-19 Vaccination in Africa - Lessons from the HIV Pandemic” in the *New England Journal of Medicine* in Mar 2021, <https://doi.org/10.1056/NEJMp2103313>

Nadia A. Sam-Agudu, MD, Associate Professor of Pediatrics, Division of Epidemiology and Prevention, and Senior Technical Advisor at IHV-Nigeria, has an invited commentary titled “Implementation Science Framework for Surgical Research and Practice” in the *Journal of the American College of Surgeons*, In Press.

Sarah Schmalzle, MD, FIDSA, Assistant Professor of Medicine, Division of Clinical Care and Research, among other IHV authors, published “Multicenter retrospective cohort study of the clinical significance of *Staphylococcus lugdunensis* isolated from a single blood culture set” in *Diagnostic Microbiology and Infectious Diseases* in Mar 2021.

Sarah Schmalzle, MD, FIDSA, Assistant Professor of Medicine, Division of Clinical Care and Research, among other authors, published “Dalbavancin in the Treatment of Bacteremia and Endocarditis in People with Barriers to Standard Care” in *Antibiotics* in Oct 2020.

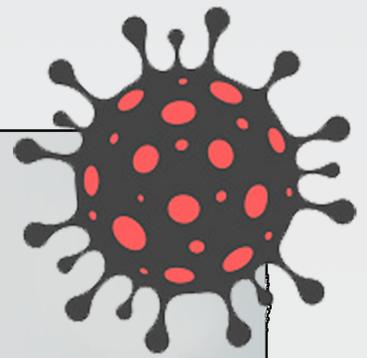
Sarah Schmalzle, MD, FIDSA, Assistant Professor of Medicine, Division of Clinical Care and Research, among other authors, published “*Streptococcus pyogenes* Infective Endocarditis – Association with Injection Drug Use: Case Series and Review of the Literature” in *Open Forum Infectious Diseases*, Accepted May 2021.

Hongshuo Song, PhD, Assistant Professor of Medicine, Head, Laboratory of Molecular Virology, Division of Virology, Pathogenesis and Cancer, and other authors on behalf of the RV254/SEARCH010 Study Group published “Dynamics of HIV-1 genetic diversification during acute infection” in *Open Forum Infectious Diseases* on September 12, 2020.

Yutaka Tagaya, MD, PhD, Assistant Professor of Medicine, Division of Virology, Pathology, and Cancer published “Is it NICE (nuclear import as a carcinogenic mechanism) to restrict HBZ in the cytoplasm?” in *Haematologica* on February 25, 2021, <https://doi.org/10.3324/haematol.2021.278377>

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