



# Discovery

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## Institute of Human Virology Announces Phase 1 Clinical Trials of HIV Vaccine Candidate

Baltimore-based Institute has begun enrolling volunteers for initial phase 1 clinical trials



Maryland Lt. Governor Boyd Rutherford announces launch of the Institute's HIV vaccine candidate Phase 1 clinical trials during a press conference held at IHV.

On October 8, 2015, Maryland Lt. Governor Boyd Rutherford announced that the Institute of Human Virology (IHV) at the University of Maryland School of Medicine launched its Phase 1 clinical trials of a novel HIV vaccine candidate developed by a research team led by Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor of Medicine and Director of IJV. Dr. Gallo's team includes his IJV co-workers George Lewis, PhD and Anthony DeVico, PhD, and Tim Fouts, PhD of Baltimore-based Profectus Biosciences, Inc., a spinoff company from IJV. Enrollment for the clinical trials began October 1, 2015. The candidate immunogen, denoted as the Full-Length Single Chain (FLSC), is designed to elicit strongly protective antibody responses across the spectrum of HIV-1 strains. Joining Lt. Governor Rutherford and Dr. Gallo in the announcement were E. Albert Reece, MD, PhD, MBA, Dean, University of Maryland School of Medicine, and Bruce Jarrell, MD, Chief Academic and Research Officer, Senior Vice President, University of Maryland, Baltimore.

"Maryland is one of the top science, bio-health, and research regions in the country and is home to some of the most brilliant minds in the world," said Lt. Governor Rutherford. "I am especially proud to help announce this first phase of a potential HIV vaccine that is being developed by a talented team at UMD. The Hogan administration will continue to place a priority on supporting the Maryland universities, start-ups, and institutions that are making these groundbreaking discoveries."

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## Director's Message:

### "A Look at HIV/AIDS Cure Research"



Dr. Robert Gallo

A considerable amount of funding in HIV/AIDS research today is allocated towards the development of strategies for a "cure" of HIV/AIDS. There is a general consensus at this point that a successful cure does not mean proven ability to eradicate every last viral genome—which may be next to impossible—but rather, reaching a point where the anti-HIV therapeutics would not be needed any further. The aim being that a patient could live a reasonably normal, in fact, probably a completely normal life without the need of anti-HIV drugs, and without the risk of spreading the infection. People in HIV/AIDS research believe that this is a possibility.

Though there has been one widely reported case of true virological cure (where the virus is thought to be completely eradicated from the patient), this eradication approach does not give us any information that we didn't already know previously. I refer to the case of Mr. Timothy Ray Brown, the so-called "Berlin patient," who was treated with radiation for his leukemia. This patient also benefited from the fortuitous availability of a

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UNIVERSITY of MARYLAND  
SCHOOL OF MEDICINE

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## Institute of Human Virology Announces Phase 1 Clinical Trials of HIV Vaccine Candidate



**Left to Right:** E. Albert Reece, MD, PhD, MBA, Dean, University of Maryland School of Medicine; Maryland Lt. Governor Boyd Rutherford; and, Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor of Medicine and Director of IHV.

The FLSC is distinguished by its potential ability to induce broad antibody responses to HIV-1. The antibodies induced by the experimental vaccine bind to common HIV regions that are exposed when the virus attaches to target cells, rather than to specific characteristics of the HIV envelope protein that may not be present in all virus strains. This strategy could potentially overcome limitations of previous vaccine candidates that responded to a narrower range of HIV strains.

"Our HIV/AIDS vaccine candidate is designed to bind to the virus at the moment of infection, when many of the different strains of HIV found around the world can be neutralized," said Dr. Gallo, widely known for his discovery of the first human retroviruses (including one which causes a specific kind of leukemia), co-discovery of HIV as the cause of AIDS, and the development of the HIV blood test. "We believe this mechanism is a major prerequisite for an effective HIV preventive vaccine."

However, IHV researchers believe broad immune response is not the key problem. The key problem is that within 24 hours of infection, HIV integrates its genes and becomes part of the target cell's chromosomal DNA. Thus, IHV researchers believe an effective vaccine must block infection completely and that antibodies to the virus must be active at all times. Many effective vaccines have had antibodies last for a number of years or even a lifetime. These include, for example, measles or for the recent vaccine against papilloma virus to try to prevent against cancer. These vaccines last a long, long time.

Dr. Gallo said, "With the HIV vaccine, one of the problems the field faces is that antibodies for HIV are very short lived. So, we must go forward from monkey to man to learn much more directly in humans while trying—along with the rest of the field—to solve this short lived antibody protection."

This study is the first time the FLSC vaccine candidate will be tested in humans following the clinical product development of the vaccine construct led by Profectus Biosciences, Inc. IHV will enroll 60 people with 20 volunteers initially receiving the inoculation. These clinical trials are the next step in a program at the IHV to develop a preventive HIV vaccine funded by the Bill & Melinda Gates Foundation, the U.S. Army's Military HIV Research Program (MHRP), and other research funding from a variety of sources including the U.S. National Institute of Allergy and Infectious Disease. This Phase 1 trial will be conducted at IHV and led by IHV clinician Bruce Gilliam, MD, Associate Professor of Medicine, Clinical Care and Research Division.

"I'm proud of each member of our group, notably George Lewis, PhD who is director of our Vaccine Research Division, Anthony Devico, PhD, who is a senior researcher in the Vaccine Research Division, and the vaccine team at the Bill & Melinda Gates Foundation," said Dr. Gallo. "While we still have more important basic research to do to crack the antibody protection challenge, this first step is an important one for us to learn how people (rather than test animals) respond."

IHV researchers hope to learn something from these initial safety clinical trials which are expected to be very safe. Dr. Gallo and his team are already planning secondary trials when this phase 1 is completed. Secondary trials will include collaborators such as Bart Haynes, MD and his colleagues at Duke University as part of the Center for HIV/AIDS Vaccine Immunology (CHAVI) and the National Institute of Allergy and Infectious Diseases (NIAID) and their network of trials called HIV Vaccine Trials Network (HVTN) headed by Larry Corey, MD. In the meantime, IHV will try to stimulate the field to help solve the problem of these short-lived antibodies that are holding part of the field back.

**For more information about vaccine trials at the IHV, call 410-706-1954.**



*Dr. Robert Gallo explains the mechanics of IHV's vaccine candidate during a question and answer session at the press conference.*

## Director's Message (*continued*)



Dr. Jim Watson and Dr. Robert Gallo share a laugh during a break at the Banbury Center, Cold Spring Harbor Laboratory Conference on HIV/AIDS “cure” research. Dr. Watson is best known as one of the co-discoverers of the structure of DNA in 1953 with Dr. Francis Crick.

matched donor carrying the Δ32 mutation in the CCR5 receptor. This is a cell surface molecule that HIV exploits to enter some of our cells. The Δ32 mutation prevents HIV from utilizing CCR5, and renders the individual quite resistant to infection. Fortunately, Mr. Brown survived the intensive therapy, and he is now seemingly free from HIV.

Other people have thought they had identified more cases of cure (I don't like to use the word “claim” because it implies that they made a mistake when in fact they could not know), but in the end it was not true. Some lessons did come out of those studies.

So, the challenge that remains is whether or not we can initiate successful therapeutic approaches that could end the need for antiretroviral drugs.

This basic science challenge was highlighted at a recent Banbury Center, Cold Spring Harbor Laboratory Conference which I co-organized with Robert Siliciano, MD, PhD, Professor of Medicine at Johns Hopkins University and Steven Deeks, MD, Professor of Medicine at the University of California, San Francisco called “HIV-1 and How to Kill a Killer: Attempts at Total or Functional Cure of HIV-1.” It was one of the best meetings I have ever attended on HIV/AIDS research because there was a terrific amount of discussion, which really was friendly, helpful, and insightful, and I believe at the forefront of thinking and research in the field.

The Institute of Human Virology (IHV) does not have particular funding for “cure research” as yet. We had not entered in the early phase of HIV/AIDS cure research funding because we did not agree with the major approach, so-called “shock (or kick) and kill,” which is still the main impetus for funding to this day. The problem as everyone knows is that the latently infected cells (namely cells that are infected but not producing new viruses) are not vulnerable to an immune attack. Moreover, when latent or silent, the virus is resistant to antiretroviral drugs, but under

particular conditions it may reawaken and rekindle the infection, which explains the continued need for drugs.

So, the principle of the “shock and kill” approach is to reactivate the latent virus within these cells using various classes of agents (these details I will not go into here, except in principle) with the expectation that this would lead to the demise of the infected cell. At the same time, the use of powerful anti-HIV agents would prevent any released virus from infecting other cells. The problem with this approach is that reactivation of the latent virus is quite inefficient, that not all activated cells do die following reactivation of the virus, nor are all killed by the patient's immune system. Also, will the activating agents be specific? What I mean by that is, will they only be specific for the T cells that harbor HIV? Because if they activate uninfected T cells they become new targets for HIV. And, if any virus escapes, in theory you could make the matter worse.

Another concern of this “shock and kill” approach is the myeloid derived lineage of cells which can be infected such as macrophage and the microglia cells of brain. Though it is not generally believed that they are an important source of any remaining viral reservoir, this certainly is not proven. Therefore, more studies of that kind are needed to determine conclusively whether or not myeloid cells are contributing to rebound after stopping therapy.

IHV doesn't have active funding for “cure” research because, as mentioned, we didn't believe in the approach being funded. But, nonetheless, we believe that we have some basic science and clinical research that ultimately will be useful in HIV/AIDS “cure” research. We are set to make our own proposals for significantly different avenues toward this common “cure” objective.

One such group of basic science research studies conducted here at the IHV were carried out by **Fabio Romerio, PhD** (Assistant Professor of Medicine, Basic Science Division) who is focusing his work on the role of an antisense gene of HIV-1. This gene—discovered earlier by others—is expressed in the opposite direction of all the other genes in the integrated provirus. The function of the transcript produced by this antisense gene is not well known, but Fabio and co-workers have found that this gene is uniquely expressed in latently infected cells and might be involved in the mechanisms that regulate the establishment and maintenance of HIV latency. Thus, this gene transcript might serve as a marker of latency as well as a new target for killing the latently infected cells.

Independent of this work both **Robert Redfield, MD** (Associate Director of IHV and Professor of Medicine, Head, Clinical Care and Research Division) and **Alfredo Garzino-Demo, PhD**



Dr. Fabio Romerio

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# Institute of Human Virology Hosts International Meeting of Prominent AIDS Researchers

Nobel Laureate Harald zur Hausen and NIAID Director Anthony Fauci receive Lifetime Achievement Awards



A partial view of the room during IHV's 17th Annual International Meeting.

The Institute of Human Virology (IHV) at the University of Maryland School of Medicine hosted its 17th Annual International Meeting Sunday, September 27 through Wednesday, September 30 at the Baltimore Marriott Waterfront Hotel in Baltimore, Maryland. The annual meeting is attended by internationally renowned scientists and integrates a multidisciplinary program of basic research including finding a cure for HIV, innovating and guiding development of an effective preventive HIV vaccine, and the study of HIV pathogenesis, hepatitis C and Ebola. Scientists focused on viruses and cancer to inform basic and translational research aimed at developing treatments while clinical research presentations emphasized opportunities to cure hepatitis C with newly available treatments. Global health presentations focused on translating discovery into public health practice. During a gala at the meeting, two 2015 IHV Lifetime Achievement Awards for Scientific Contributions and Public Service were awarded to Anthony Fauci, MD, Director of the National Institute of Allergy and Infectious Diseases and Nobel Laureate Harald zur Hausen, MD.

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*"Each year, our annual meeting attracts many of the best and brightest established and up and coming researchers medical virology has to offer because of the high caliber data presented during these meetings," said Robert C. Gallo MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Director, Institute of Human Virology, University of Maryland School of Medicine, who is most widely known for his co-discovery of HIV as the cause of AIDS and, along with his coworkers, for the development of the HIV blood test.*

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## Director's Message (*continued*)



*Dr. Robert Redfield holds a discussion during one of the breaks at this year's IHV Annual International Meeting.*

(Associate Professor of Microbiology and Immunology, Basic Science Division) have approaches for new therapies that go after the HIV reservoir.

Bob Redfield's efforts to develop a functional cure for persons living with HIV infection focuses on targeting CCR5 as a key receptor on the cell for HIV infection. Laboratory studies have shown a threshold of cellular CCR5 molecules is required for successful HIV infection. Working with **Alonso Heredia, PhD** (Assistant Professor of Medicine, Clinical Care and Research Division) Bob has unraveled a unique way to decrease cellular CCR5 using drugs that interrupt cell cycle and drugs that inhibit a cellular protein mTOR. Additionally, working with **Olga Latinovic, PhD** (Assistant Professor of Microbiology, Basic Science Division) Bob is exploring a molecule which binds to CCR5. He

hypothesizes that active replication of CCR5 tropic HIV is critical to maintenance of the HIV reservoir, and that reduction of CCR5 expression below a specific threshold will result in a progressive reduction in the HIV reservoir, which at some point will allow HIV control despite discontinuation of antiretroviral medications. This hypothesis is under active investigation in the humanized mouse model, and Bob plans to begin a limited pilot study in patients this spring.

Alfredo's approach is based on the concept that HIV replication needs cellular activation, while latency occurs when the infected cell goes into a resting state. Thus, his laboratory is testing inhibitors



*Dr. Olga Latinovic*



*Dr. Alonso Heredia*

of pathways of lymphocyte activation to simultaneously decrease immune activation which accompanies HIV infection, and keep HIV in its latent state. Instead of "shock and kill," this "soothe and snooze" approach may ultimately result in a decrease in proviral load, since a study that targeted the mTOR intracellular activation pathway by the group of S. Deeks (Stock P.G. et al, Am J Transplant. 4:1136-41, 2014) but inspired by research reports by Drs. Heredia and Redfield in HIV positive transplant recipients resulted in reduced levels of integrated, latent HIV.

Finally, since there are very few groups working toward elimination of macrophages and microglial cells or even considering them as HIV latently infected



*Dr. Suzanne Gartner*



*Dr. Alfredo Garzino-Demo*

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## Institute of Human Virology Hosts International Meeting of Prominent AIDS Researchers

**Nobel Laureate Harald zur Hausen and NIAID Director Anthony Fauci  
receive Lifetime Achievement Awards**



**Left to Right:** Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine and Director of the IHV with IHV Lifetime Achievement Awardees, Anthony Fauci, MD, Director of the National Institute of Allergy and Infectious Diseases and Nobel Laureate Harald zur Hausen, MD.

"I am especially pleased to be honoring two distinguished friends and colleagues for their significant scientific contributions to bettering human health and for their impactful worldwide public service," Dr. Gallo continued. Since the beginning of the HIV epidemic, Tony Fauci has led many research and education efforts that have contributed tremendously in putting an end to AIDS. He has administered a comprehensive research portfolio targeting the prevention, detection, and treatment of infectious diseases, which is not limited to HIV," said Dr. Gallo. "Harald zur Hausen's pioneering research in human papillomaviruses, most notably in showing the link between human papillomaviruses (HPV) and cervical cancer, has contributed greatly to fighting cancer. His discoveries helped lead to the development of the HPV vaccine."

During the meeting, Dr. Fauci presented a special lecture entitled "Ending the HIV/AIDS Pandemic: The Convergence of Treatment and Prevention" and Dr. zur Hausen presented the second annual Reinhard Kurth Memorial Lecture entitled "Zoonotic Origin of Some Common Human Cancers and Multiple Sclerosis?"

"My colleague, William Blattner, MD, did a great job of co-organizing the meeting," said Dr. Gallo. "I say co-organizer, but in the true sense, he was the organizer." Dr. Blattner is co-founder and associate director of the IHV and will retire at the end of January 2016 but remain available as a consultant to IHV.



**Left to Right:** Susan Buchbinder, MD, University of California, San Francisco; Carl Dieffenbach, PhD, Division of AIDS, National Institute of Allergy and Infectious Diseases; and, Prof. Dr. med. Bernhard Fleckenstein, Universitätsklinikum Erlangen, chair a session on Global Virus Threats: Translation of Basic Science to Public Health Practice. During the session, the IHV Lifetime Achievement Award Recipients presented special lectures.



**Left to Right:** Robert Gallo, MD; Barton Haynes, MD, Director of the Duke Human Vaccine Institute and Center for HIV-AIDS Vaccine; Michel Nussenzweig, MD, PhD, the Zanvil A. Cohn and Ralph M. Steinman Professor at The Rockefeller University and IHV Scientific Advisory Board Member; and, Jeffrey Ravetch, MD, PhD, the Theresa and Eugene M. Lang Professor at The Rockefeller University.



IHV Board Chairman Terry Lierman served as Master of Ceremonies during the IHV Lifetime Achievement Awards Gala.



John Moore, PhD, Professor of Microbiology and Immunology at Weill Cornell Medical College, presents "Studies on native-like SOSIP.664 trimers and other forms of Env" during a session on HIV Structural Biology, Immunology and Vaccines.



Theresa L. Chang PhD of Rutgers University presents "Integrin a4b7 expression increases HIV susceptibility in activated cervical CD4+ T cells via an HIV attachment-independent mechanism" during a session on HIV Structural Biology, Immunology and Vaccines.



Erica Ollmann Saphire, PhD, Professor, Department of Integrative Structural and Computational Biology at The Scripps Research Institute, presents "Antibodies Against Ebola Virus: Results of the Viral Hemorrhagic Fever Immunotherapeutic Consortium" during a session on Global Virus Threats: Translation of Basic Science to Public Health Practice. Dr. Ollmann Saphire was recently appointed to IHV's Scientific Advisory Board.



Artists With One Voice, a US-based collective of musicians from Cameroon, Liberia, Senegal, and the United States who are raising awareness about diseases such as Ebola and HIV through music, provided entertainment during the reception held before the Gala.

# *Institute of Human Virology*

## *Co-Founder*

### *William Blattner, MD*

#### *to Retire*

**Blattner is a pioneer in HIV epidemiology and a founder of the Institute of Human Virology, Nigeria**

The Institute of Human Virology (IHV) at the University of Maryland School of Medicine announced this fall the retirement of IHV co-founder and associate director, William A. Blattner, MD effective January 31, 2016.

Dr. Blattner's pioneering work in HIV epidemiology began during his 22 year tenure at the National Cancer

Institute. He has worked alongside fellow IHV co-founders and renowned AIDS researchers Robert Gallo, MD and Robert Redfield, MD since the early days of the HIV epidemic. Dr. Blattner also serves as head of the IHV Division of Epidemiology and Prevention, Professor of Medicine, and Chief of the Division of Cancer Epidemiology at the University of Maryland, Baltimore. He led the founding of the Institute of Human Virology, Nigeria (IHVN), a key partner in IHV's international outreach.



*William Blattner, MD and Robert Gallo, MD share a laugh during the evening's festivities.*





Man Charurat, PhD, shared parting words from IHV's Division of Epidemiology and Prevention, which Dr. Blattner has led since IHV's inception.

collaborator in the discovery of the Human T Cell Leukemia Virus (HTLV), which was the first human retrovirus and still the only known leukemia causing virus. Bill was there as a collaborator in the early 1980's to help us demonstrate the role of HIV in the cause of AIDS, a story that continues to this day and will continue as he will serve as a special advisor to IHV."

Dr. Blattner's program at the Institute has screened more than 1 million Nigerians for HIV, built HIV treatment and care capacity at 139 Nigerian hospitals, and placed 183,000 on anti-retroviral therapy across Nigeria. Dr. Blattner's scholarly achievements are reflected in his 444 research articles and book chapters which included the discovery of genes linked to familial cancer, the epidemiology and disease associations of HTLV, and studies of HIV including the first peer reviewed paper on the sensitivity

"This will be a huge loss for IHV and an even greater one for me," said Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Director, Institute of Human Virology, University of Maryland School of Medicine, who is most widely known for his co-discovery of HIV as the cause of AIDS and, along with his coworkers, for the development of the HIV blood test. "Bill and I go back to the 1970's when he was a very important



**Left to Right:** Kevin Cullen, MD, Director of the Marlene and Stewart Greenebaum Cancer Center at the University of Maryland School of Medicine; Blattner family friend, Father Bill Spacek, who provided the invocation before dinner; and, Robert Redfield, MD.

of the HIV blood test. Cumulatively, Dr. Blattner and his team received \$356 million in grant funding in the last 10 years.

"Bill's legacy at IHV can be seen in the faces of thousands of lives he has saved through his programs in Nigeria," said Dr. Redfield, Associate Director, Director of the Division of Clinical Care and Research, Professor of Medicine, Institute of Human Virology and Chief of Infectious Diseases, University of Maryland School of Medicine. "His presence at IHV will be greatly missed, but his impact on IHV and the field will continue via the many faculty, staff and students he has mentored throughout his distinguished career."

Dr. Blattner will continue to provide counsel to IHV regarding medical research, grant and administration matters, the IHV Annual International Meeting, global programs, and the Global Virus Network, headquartered in Baltimore.

His retirement celebration held during the Institute of Human Virology's 17th Annual International Meeting included an elegant dinner at Pazo's with friends, family, and future and past colleagues.

Manhattan Charurat, PhD, Associate Professor of Medicine, will assume the Director role of the IHV Division of Epidemiology and Prevention.



**Left to Right:** Former IHV COO Michael Goldrich, Senior Advisor for Research Operations and Business Development, Global Finance Strategies; Carl Dieffenbach, PhD, Director, Division of AIDS, National Institute of Allergy and Infectious Diseases; and, Lawrence Corey, MD, Principal Investigator for the HIV Vaccine Trials Network, President and Director Emeritus of the Fred Hutchinson Cancer Research Center, and Professor of Medicine and Laboratory Medicine at the University of Washington.



Patrick Dakum MBBS, MPH, Assistant Professor of Epidemiology and Prevention at IHV and Chief Executive Officer of the Institute of Human Virology, Nigeria.

## *Institute of Human Virology Works to Reduce HIV in Baltimore*

## Joint Community Event Encourages Safe Behavior and Testing



*City Uprising volunteers and JI staff are joined by Baltimore City Councilman Brandon Scott, who has a longstanding commitment to youth in Baltimore City.*

In Baltimore, one in 43 people over the age of 13 is infected with HIV, according to the Maryland Department of Health and Mental Hygiene. Most of the time, those that are infected fail to or are unable to seek proper care. Youth ages 13-24 are the fastest growing group of new HIV infections. Over 50 percent of youth with HIV do not know they are infected.

In an effort to improve knowledge about this problem, the JACQUES Initiative—a program of the Institute of Human Virology at the University of Maryland School of Medicine, held a three-day event during National HIV Testing Week to encourage people to behave safely and get tested for HIV. On June 25th to the 27th, the JACQUES Initiative, Greater Than AIDS, Walgreens Pharmacy, Lexington Pharmacy, HopeSprings, and the Gallery Church of Baltimore held the 7th Annual City Uprising Health Fair to continue Baltimore's fight against HIV/AIDS.

"The Health Fair mobilizes our campus to get out into the community and leverage our resources," said Alexandra Reitz,

program coordinator at the JACQUES Initiative. "We are the bridge between community members and access to prevention services." The JACQUES Initiative is a part of UM SOM's Institute of Human Virology, and works to provide holistic care for individuals and communities impacted by HIV.

With more than 100 volunteers from University of Maryland Baltimore's (UMB) various professional schools, the event provided services to 213 community members, about a quarter of whom were under the age of 24. Along with free HIV testing, there were many other activities as well. In addition to faculty and staff from the School of Medicine, volunteers from UMB's Schools of Nursing, Dentistry, and Pharmacy provided oral health screenings, blood pressure screenings, legal and community resources, and nutrition advice. The first day included prizes, a raffle, and educational games to target youth.

HIV/AIDS infections are more likely to occur in areas with high rates of poverty and low rates of education—the same areas



UMB School of Medicine student, Jackline Joy Lasola, prepares to offer rapid HIV testing at the City Uprising event in downtown Baltimore.



UMB volunteers join on the street in Downtown Baltimore: 2nd year UMB medical student, Ramita Dewan and University of Maryland Medical Center Nurse (RN) School of Nursing Alum, Kristen Dizon.



City Uprising event engages youth of Baltimore City. Young participant joins JACQUES Staff in the event's social media photo booth.



UMB School of Nursing Family Nurse Practitioner Students, Sharifa Lloyd (front) and Jessica Pires (back) engage community members to deliver nutritional and healthy lifestyle counseling at the City Uprising event.



UMB School of Nursing graduate and City Uprising Volunteer, Matthew Maizels, joins JACQUES Staff David Callahan and Kithia Gray.

that are also less likely to receive help, according to a report by the Baltimore City Health Department. The JACQUES Initiative focuses on these areas, working with a wide range of residents. Its main goals are to reduce new HIV infections, increase access to care, and reduce HIV-related disparities.

"We believe that to change a city, we must engage the city," said Christopher Williams, Director of Case Management and Mental Health and Interim Executive Director at the JACQUES Initiative. "By channeling partnerships with our UMB campus leaders, we

are able to mobilize the wealth of resources to provide direct services to the community and address the goals of the National HIV/AIDS Strategy as a city."

The mission of the JACQUES Initiative program is to provide a holistic care delivery model that ensures long-term treatment success for individuals and communities impacted by HIV. To learn more about the JACQUES Initiative and our ongoing volunteer opportunities, please visit [www.jacques.ihv.org](http://www.jacques.ihv.org).

# Institute of Human Virology (IHV) Awarded \$24.5M to Fight Botswana's AIDS Epidemic

Baltimore-based Institute serves as global model for public health initiatives



Participants from 13 health districts across Botswana participate in a Nurse Prescriber Training led by members of the BUMMHI held August 10–28, 2015 in Gaborone, Botswana.

This past June, the Institute of Human Virology (IHV) at the University of Maryland School of Medicine announced a five-year \$24.5 million grant from the U.S. Centers for Disease Control and Prevention (CDC) through the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) to partner with the Government of Botswana and impact the HIV/AIDS epidemic in Botswana, and to demonstrate that comprehensive HIV/AIDS treatment programs can stop the epidemic. PEPFAR is a \$48 billion initiative launched in 2004 by former President George W. Bush, and continued by President Barack Obama, to combat major infectious diseases around the world, including HIV. The announcement was made on the heels of two IHV milestones including surpassing more than 1 million in patients in overseas care and treatment and a \$50 million grant to combat HIV/AIDS in Zambia.

"This new partnership between our Institute and the Government of Botswana is a credit to the work IHV's Clinical Division carries out internationally under the leadership of my colleague and fellow IHV co-founder, Dr. Robert Redfield," said Robert Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor of Medicine and Director, Institute of Human Virology, University of Maryland School of Medicine. Dr. Gallo is most widely known for his co-discovery of HIV as the cause of AIDS and development of the HIV blood test. He continued, "We look forward to partnering with Botswana, as we have done in nine other nations through PEPFAR funding, to continue putting the first real dent in the global AIDS pandemic."

The five-year program known as the Botswana-University of Maryland School of Medicine Health Initiative (BUMMHI) will achieve the following objectives: 1) ensure universal access to comprehensive HIV/AIDS services, measured by at least 90% of HIV infected individuals receiving treatment and maintenance of care, and achieving viral suppression; 2) improve the quality of HIV services through strengthening community to facility care; 3) implement the Prevention of Mother to Child Transmission initiative to achieve PEPFAR's goal of an HIV/AIDS free generation; and, 4) develop and institutionalize a system for ongoing training



IHV's Paul Saleeb, MD, Assistant Professor of Medicine in the Division of Clinical Care and Research, and Belinda Chiba, MD, Clinical Advisor and Team Leader for BUMMHI, field questions from participants during an AIDS Clinical Care Fundamentals (ACCF) Training held August 31 - September 4, 2015 in Gaborone, Botswana.



Plan for AIDS Relief (PEPFAR) to partner with the Government of Botswana and impact the HIV/AIDS epidemic in

Botswana, and to demonstrate that comprehensive HIV/AIDS treatment programs can stop the epidemic. PEPFAR is a \$48 billion initiative launched in 2004 by former President George W. Bush, and continued by President Barack Obama, to combat major infectious diseases around the world, including HIV. The announcement was made on the heels of two IHV milestones including surpassing more than 1 million

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*Robert Redfield, MD*

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Robert Redfield, Jr. MD, Professor of Medicine and Division Head, Clinical Care and Research, Institute of Human Virology, University of Maryland School of Medicine, is the Principal Investigator of this new five year grant. He said, "If any country can reach HIV epidemic control goals, it is Botswana. The country's leadership is heavily invested in improving the health of its citizens and was one of the first countries to provide HIV antiretroviral treatment for its citizens, even before PEPFAR and Global Fund initiatives helped increase treatment in several other countries."

Of note, Botswana currently funds more than 95% of its HIV treatment program, signifying its commitment for operationalizing a sustained and effective response. The Institute will work with Botswana's Ministry of Health staff and local healthcare and management professionals to strategically place multi-disciplinary expert teams across the country and to implement key interventions and plans. The IHV, as the prime grant recipient, will collaborate with the U.S. non-profit Education Development Center (EDC) to implement education programs to ensure long-term learning outcomes through innovative teaching methods.



*Deus Bazira Mubangizi, DrPH, MPH, MBA*

"We hope this new collaboration will lead to Botswana becoming the first country to reach HIV epidemic control status," said Deus Bazira Mubangizi, DrPH, MBA, MPH, Assistant Professor of Medicine and Director for Global Health in the Division of Clinical Care and Research, Institute of Human Virology, University of Maryland School of Medicine, and co-principal investigator for this grant. "As the main partner to the Government of Botswana in the field of HIV/AIDS, the Institute of Human Virology/University of Maryland has the opportunity to showcase a successful and sustainable model for HIV epidemic control, achieved through cooperation between an American academic institution and a foreign government."

# BOARD NEWS



John D. Evans

the event. Mr. Evans is an internationally recognized expert in the telecommunications industry and a leader in technological innovation. He is perhaps best known as one of the co-founders of C-SPAN in 1977 and is frequently called upon by universities and other groups around the world to speak about the broad implications of the movement from the analog to the digital age, the convergence of high-speed computers, new broadcast and wireless technologies, and the growing universe of the Internet. As founder of the John D. Evans Foundation, Mr. Evans is committed to AIDS and cancer research, protection of the environment, and improving the quality of life through technological innovation, education, and the arts.



John McHutchison, MD

worked at Duke University Medical Center, where he served as Associate Director of the Duke Clinical Research Institute. He also held the positions of Professor of Medicine in the Division of Gastroenterology at Duke University Medical Center, Associate Director at Duke Clinical Research Institute and Co-Director of the Duke Clinical and Translational Science Award. Prior to his positions at Duke, Dr. McHutchison spent nearly 10 years at Scripps Clinic, most recently as Medical Director, Liver Transplantation. He also previously held an Assistant Professorship in Medicine at the University of Southern California. Dr. McHutchison received bachelor of medicine and bachelor of surgery degrees from the University of Melbourne, Australia, and completed his residency in internal medicine and a fellowship in gastroenterology at the Royal Melbourne Hospital. He is also a member of the Royal Australasian College of Physicians.

## Wilkens Hosts Fundraiser for Family Foundation

Last Spring, IHV Board Member Lenny Wilkens, famed NBA Hall of Fame Coach and Player, hosted a golf fundraiser to support the Lenny Wilkens Foundation. The Foundation funds organizations that deliver healthcare and education services to young people while honoring their dignity and sense of self-respect. Founders

## Evans Inducted into Cable Hall of Fame

IHV Board Member John D. Evans, along with 4-5 others, will be inducted into the Cable Hall of Fame on May 16th, in Boston. The Cable Hall of Fame recognizes those ground-breaking leaders who have shaped and advanced our industry. Induction into the Cable Hall of Fame is one of the industry's highest and most exclusive honors. The 2016



(2nd from left) IHV Board Member Tim Moynahan supports his fellow Providence College alumnus Lenny Wilkens (4th from left). Tommy Davis, former Major League LA Dodgers Baseball Great (1st from left).

Lenny and Marilyn Wilkens' commitment to this mission started with their first contribution to the Odessa Brown Children's Clinic in 1970, and eventually led them to start the Foundation. The Wilkens family is passionate about encouraging young people to explore and achieve their full potential, regardless of their circumstances.

## McHutchison Joins Board of Advisors

Dr. John McHutchison is Executive Vice President of Clinical Research at Gilead. He joined Gilead in 2010. From 2010 to 2013, he served as Senior Vice President, Liver Disease Therapeutics. In his current role, he is responsible for Gilead's development programs in liver diseases, hematology and oncology, and inflammatory and respiratory diseases. Prior to joining Gilead, Dr. McHutchison



Willi K. Born, PhD

## Born Joins Scientific Advisory Board

Dr. Willi Born is Professor in the Integrated Department of Immunology at National Jewish Health in Denver. He also holds an affiliate post as Professor of Immunology & Microbiology at the University Of Colorado School Of Medicine. Dr. Born received his MS and PhD in Biology at Albert Ludwigs Universitae in Freiburg, Germany, in 1977 and 1982, respectively. In

1982, Dr. Born completed a postdoctoral fellowship at UTHSD – Dallas and in 1984 he completed another postdoctoral fellowship at National Jewish Health. His research interests include the biology of lymphocytes expressing gamma/delta T cell receptors (gamma/delta T cells), problems regarding ligands of the gamma-delta TCR, functional development of gamma-delta T cells, organization of the gamma-delta T cell system and interactions of gamma-delta T cells with other cells and systems in the vertebrate body, the role of gamma-delta T cells in diseases, and possible therapeutic uses of gamma-delta T cell function. Dr. Born and his team are studying gamma/delta T cells in the mouse and in mouse models of diseases, including diseases of the airways and lung. His awards include the 2006 NJMRC "Faculty Citizen of the Year" and the 1989 Investigator Award at the Cancer Research Institute. In 2005 he was named a Visiting Professor at PUMC in Beijing, China; he was also named a Fellow at Deutsche Forschungsgemeinschaft in 1982 and a Fellow at Studienstiftung des Deutschen Volkes in 1974. He has authored or co-authored more than 25 publications.



### DeGrado Joins Scientific Advisory Board

Dr. William F. DeGrado is the Principal Investigator of the DeGrado Lab and Professor in the Department of Pharmaceutical Chemistry at the University of California, San Francisco's School of Pharmacy. He is also an Investigator at UCSF's Cardiovascular Research Institute. His research interests include de novo protein design; membrane proteins;

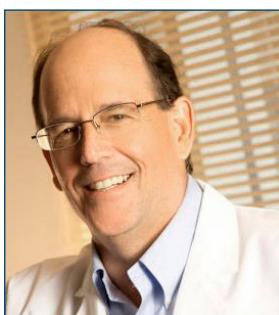
small molecule drug discovery for antimicrobials, influenza A virus, antifibrotics, and neurodegeneration; chemical biology; and peptide design. Before coming to UCSF, De Grado served as a Professor in the Department of Biochemistry and Biophysics at the UPenn School of Medicine and as Senior Director of the Medicinal Chemistry Department at DuPont Merck Pharmaceutical Company. His awards and honors include the American Chemical Society's Ralph F. Hirschmann Award in Peptide Chemistry; the Peptide Society's Merrifield Award, the DuPont Merck Summit Award, and the Eli Lilly Award in Biological Chemistry. He is a Fellow at the American Association for the Advancement of Science and serves as President of the Protein Society. DeGrado serves on the Editorial Board of Current Opinion in Chemical Biology. He received his B.A. in Chemistry from Kalamazoo College in 1977 and his Ph.D. in Chemistry from the University of Chicago. He is author of 374 publications and has been issued 29 U.S. patents.



### Ollmann Saphire Joins Scientific Advisory Board

Dr. Erica Ollmann Saphire is a Professor at The Scripps Research Institute, who studies the molecular basis of viral pathogenesis, focusing on filoviruses, arenaviruses, and the immune response against them. Her work has revealed structures of viral surface glycoproteins, mapped the binding sites of key neutralizing antibodies,

provided the only available structure of the intact human IgG, revealed molecular mechanisms of innate immunosuppression by different virus families, and illustrated genome binding and matrix assembly. Most recently, her lab has demonstrated that certain proteins, like the Ebola virus matrix, actually arrange into different structures in order to extend the functional complexity of their compact genomes. Her work has been recognized with the Presidential Early Career Award in Science and Engineering, and by Investigators in the Pathogenesis of Infectious Disease and Career Awards in the Biomedical Sciences from the Burroughs Wellcome Fund, Young Investigator Awards from the American Society of Microbiology and the American Society for Biochemistry and Molecular Biology, a New Initiatives Award in Global Infectious Disease from the Ellison Medical Foundation, and with a Surhain Sidhu award for the most outstanding contribution to the field of diffraction by a person within five years of the Ph.D. She is the Director of the Viral Hemorrhagic Fever Immunotherapeutic Consortium and she and Michael Oldstone co-direct a Center of Excellence of the Global Virus Network.



### Mellors Joins Scientific Advisory Board

Dr. John Mellors is a tenured Professor of Medicine and Chief of Infectious Diseases at the University of Pittsburgh School of Medicine. He is also the Executive Director of the HIV Program at the University of Pittsburgh Medical Center (UPMC), which provides comprehensive primary care and access to clinical trials for HIV-infected individuals. Dr.

Mellors' research focuses on the mechanisms of HIV drug resistance, on the use of antiretrovirals to prevent HIV-1 infection, and on persistent reservoirs of HIV-1 resistance to nucleoside reverse transcriptase inhibitors and non-nucleoside reverse transcriptase inhibitors, the role of low frequency drug-resistant HIV-1 variants in failure of antiretroviral therapy, and the source of persistent viremia in patients on "successful" antiretroviral therapy. His clinical research efforts helped establish the relationship between viremia and clinical outcome in HIV-1 infection and between drug resistance and treatment response in antiretroviral-experienced patients. Dr. Mellors directs the virology cores for the AIDS Clinical Trials Group and the Microbicide Trials Network. He is an elected member of the Association of American Professors.



### William Kirwan Joins Board of Advisors

Dr. William E. Kirwan served as chancellor of the University System of Maryland from August 2002 to July 2015. He is a nationally recognized authority on critical issues shaping the higher education landscape. He served as president of Ohio State University for four years (1998-2002) and president of the University of Maryland,

College Park for 10 years (1988-1998). Prior to his presidency, he was a member of the University of Maryland faculty for 24 years. A respected academic leader, Dr. Kirwan is a sought-after speaker on a wide range of topics, including access and affordability, cost containment, diversity, innovation, higher education's role in economic development, and academic transformation. In 2002, Dr. Kirwan was elected to the American Academy of Arts and Sciences. He is a member of several honorary and professional societies, including Phi Beta Kappa, Phi Kappa Phi, the American Mathematical Society, and the Mathematical Association of America. A prolific scholar, he is co-editor of the book *Advances in Complex Analysis* and has published many articles on mathematical research. Dr. Kirwan received his bachelor's degree in mathematics from the University of Kentucky and his master's and doctoral degrees in mathematics from Rutgers, The State University of New Jersey, in 1962 and 1964 respectively.

# IHV Faculty News

## Grants



William Blattner, MD

the phylodynamic analysis of patterns and linkages among and between key and general populations in Nigeria. This study is currently expanding.



Man Charurat, PhD

TRUST."The study employs the Social Ecological Model (SEM) to longitudinally collect individual, interpersonal and environmental data targeting a "hotspot" Men having Sex with Men cohort and integrates phylodynamic modeling to gain insights about the drivers of ineffective HIV prevention and treatment outcomes in Nigeria.



Fabio Romerio, PhD

allow to develop an accurate, sensitive and rapid technique to estimate the frequency of latently infected cells in clinical samples. This technology will be instrumental in assessing the efficacy of therapeutic approaches aimed at achieving a cure for HIV infection.

**William Blattner, MD**, Professor of Medicine and Associate Director, Institute of Human Virology, and

**Man Charurat, PhD**, Associate Professor of Medicine, Acting Director, Division of Epidemiology and Prevention, Institute of Human Virology, were awarded \$112,247 for a Global Fund subcontract to study



Eric Sundberg, PhD

protein components and assembled supramolecular appendages, and to identify their human host cell receptors.

**Eric Sundberg, PhD**, Associate Professor of Medicine and Co-Director, Division of Basic Science, Institute of Human Virology received a five-year \$2.8 million grant from the National Institute of Allergy and Infectious Diseases for "Structure and Function of Clostridium difficile Type IV Pili" to define C. difficile Type IV pilin structures, both as individual

## Publications



Clement Adebamowo, MD

Research and Policy, University of Minnesota.

**Man Charurat, PhD**, Associate Professor of Medicine, Acting Director, Division of Epidemiology and Prevention, Institute of Human Virology, **Rebecca Nowak, PhD**, Assistant Professor of Epidemiology and Prevention,



Rebecca Nowak, PhD

The publications include: "The Immediate HIV-related Impact of Enacted Legislation that Further Criminalizes Same-sex Practices in Nigeria," Lancet; "Evaluating Respondent-Driven Sampling as an Implementation Tool for Universal Coverage of Antiretroviral Studies among Men who have Sex with Men Living with HIV," JAIDS; and "Uptake of Treatment as Prevention for HIV and

Continuum of Care among HIV-positive Men who have Sex with Men in Nigeria," JAIDS. On June 4, 2015, Dr. Blattner along with colleagues, Drs. Charurat and Nowak, presented at the UNAIDS-WHO-New York Academy of Sciences sponsored symposium HIV2015: Using Phylogenetics to Enhance the HIV Response.

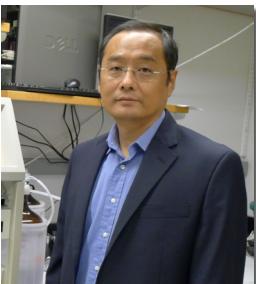
**Robert Gallo, MD**, the Homer and Martha Gudelsky Distinguished Professor in Medicine, Director, Institute of Human Virology; **William Blattner, MD**, Professor of Medicine, Associate Director, Institute of Human Virology; **Wuyuan Lu, PhD**, Professor of Biochemistry and Molecular Biology,



*Robert Gallo, MD*



*William Blattner, MD*



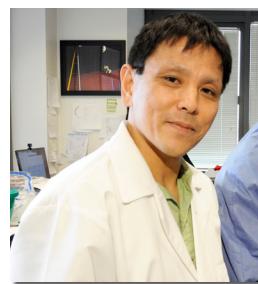
*Wuyuan Lu, PhD*



*Arnaldo Caruso, PhD*

Co-Director, Division of Basic Science, Institute of Human Virology alongside Italian colleagues including IHV Adjunct Professor, **Arnaldo Caruso, MD, PhD** of the University of Brescia published "Role of HIV-1 matrix protein p17 variants in Lymphoma Pathogenesis" in the Proceedings of the National Academy of Sciences' November 2, 2015 issue. On November 2, the Proceedings of the National Academy of Sciences released an early edition copy of the Dr. Roberto Gallo, et al manuscript entitled, "Role of HIV-1 matrix protein p17 variants in lymphoma pathogenesis." By way of background, despite the impact of highly active antiretroviral therapy on HIV-related malignancies, non-Hodgkin's lymphomas (NHL) remain a leading cause of morbidity and mortality in HIV-1 infected individuals. Gallo, along with co-senior author Dr. Arnaldo Caruso of the University

of Brescia Medical School, Italy, found that variants of the HIV-1 protein p17 (vp17s) are more frequently detected in HIV+ patients with Non-Hodgkin lymphoma (NHL) than in patients without NHL. These observations are planned to be driven to much bigger epidemiological studies by Dr. Blattner and **Man Charurat, PhD**, Associate Professor of Medicine, Acting Director, Division of Epidemiology and Prevention, Institute of Human Virology. These epidemiological studies will verify the utility of our published results and may have therapeutic implications if it can be proven that this is significant in the development of HIV-related malignancies. The published results suggest that vp17s may have a role in sustaining lymphomagenesis, thus offering new opportunities to prevent and/or treat HIV-associated NHL.



*Yutaka Tagaya, PhD*

**Yutaka Tagaya, PhD**, Assistant Professor of Medicine, Division of Basic Science, Institute of Human Virology, and his group (**Toshie Nata, PhD**, postdoctoral fellow, and **Fiorenza Cocchi, MD**, Assistant Professor of Medicine) published two papers in September 2015 from their novel multi-cytokine targeting peptide project entitled "Targeting the

Binding Interface on a Shared Receptor Subunit of a Cytokine Family Enables the Inhibition of Multiple Member Cytokines with Selectable Target Spectrum," in the Journal of Biological Chemistry and "Common  $\gamma$ -chain blocking peptide reduces in vitro immune activation markers in HTLV-1-associated myelopathy/tropical spastic paraparesis," in the Proceedings of the National Academy of Science. The latter is a collaboration with the Steve Jacobson group at the National Institute of Neurological Disorders and Stroke of the National Institutes of Health (NIH). These works represent the lab's continuing efforts to fight against incurable human diseases caused by HTLV-1 (an oncogenic retrovirus discovered originally by the Gallo group) which include adult T-cell leukemia (ATL) and HAM/TSP (HTLV-1 associated myelopathy/tropical spastic paraparesis). Dr. Tagaya also co-authored a paper with Dr. Eric Long's group at the National Institute of Allergy and Infectious Diseases of NIH on their collaborative study of the cytokine-mediated regulation of cytotoxicity by NK and CD8 T cells entitled "NK Cell Proliferation Induced by IL-15 Transpresentation Is Negatively Regulated by Inhibitory Receptors" in the Journal of Immunology in October 2015..

*continued on page 18*

# IHV Faculty News (continued)

## Honors



On May 17, 2015, **Robert C. Gallo, MD**, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Director, Institute of Human Virology, received his 33rd honorary doctorate degree from Beijing University of Technology during the 7th Meeting of the Global Virus Network (GVN) in Beijing, China.



In May 2015, **Clement Adebamowo, MD**, Professor of Epidemiology and Prevention, Division of Epidemiology and Prevention, Institute of Human Virology became a member of the International Prevention Research Institute (iPRI) International Ethics and Governance Board.

## Two IHV Faculty Members Paired with Local Teens



Shyam Kottilil, MBBS, PhD

The University of Maryland, Baltimore (UMB) and IHV Board of Advisors member **U.S. Congressman Elijah Cummings (D-MD)** paired 30 Baltimore City high school students, ages 16 to 18, for a five-week-long Summer BioScience Internship Program. Two of those high school students were mentored by Drs. **Shyam Kottilil, MBBS, PhD**, Professor of Medicine, Co-Director of IHV's Clinical Research Unit and Associate Director for Clinical Research in the Institute's Division of Clinical Care and Research, and **Greg Snyder, PhD**, Associate Professor of Medicine in IHV's Division of Basic Science, in their clinic and lab. The goal of the program is to teach students about careers in biomedical research through hands-on learning, and to link the students to faculty members who can support, guide, and inspire them to pursue careers in science research.



Greg Snyder, PhD

**Discovery** is published biannually. Complimentary copies are available upon request.

**Questions/Comments?** Contact Nora Grannell, Director of Public Relations & Marketing, [NGrannell@ihv.umaryland.edu](mailto:NGrannell@ihv.umaryland.edu)

*Editor:* Nora Grannell • *Design:* mmgraph llc

The Institute of Human Virology is a center of the University of Maryland School of Medicine and is affiliated with the University of Maryland Medical Center.

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King K. Holmes, PhD

downtown Baltimore. Dr. Holmes is Director of Research and Faculty Development in the Department of Global Health at the University of Washington as well as Professor of Global Health and Medicine.

Dr. Holmes has participated in research on Sexually Transmissible Infections (STIs) for over 50 years and in research, training, and technical assistance on HIV/AIDS and other STIs in Africa, Latin America, SE Asia, and the Western Pacific for over 30 years. He has participated in the design and conduct of 40 randomized

## *Dr. King Holmes Keynotes Greenebaum Annual Lecture*

The Eleventh Annual Marlene and Stewart Greenebaum Lecture presented by the Institute of Human Virology at the University of Maryland School of Medicine hosted guest lecturer, King K. Holmes, PhD this past Spring in Westminster Hall, a beautiful historic building located in

controlled trials of STI treatment and prevention. His research has addressed the clinical epidemiology, pathogenesis, diagnosis, treatment, and prevention of bacterial, viral, and other STIs and STI-related clinical syndromes. He has trained and/or mentored over 150 scientists involved in HIV/STI research and care in the U.S. and other countries throughout the world. In 2013, Dr. Holmes was a winner of the Canada Gairdner Global Health Award for his global scientific contributions to the field of sexually transmitted diseases and their effective treatment and prevention, and was also awarded the IDSA Alexander Fleming Lifetime Achievement Award.

With more than a hundred and fifty in the audience during the Greenebaum Lecture, Dr. Holmes spoke about "What you need to know about the STIs that are most likely to be fatal." The Greenebaum family sponsors this series of prominent lectures insisting that the keynote speaker be someone who has made substantial scientific contributions, while caring for the betterment of the human condition.

**Research with Sex Workers**

Single-dose antibiotic treatment of asymptomatic gonorrhea in hospitalized women.  
N Engl J Med. 1970; 283: 1-6.



UNIVERSITY of MARYLAND  
SCHOOL OF MEDICINE

Dear Friends and Colleagues,

We're often asked about our progress in the fight against HIV/AIDS and we always answer that we can do more. Biomedical research needs to grow and to do that we need your charitable support.

Research has been a driving force throughout our careers, and has led to many breakthroughs in the fight against HIV/AIDS.

Research led the Gallo lab to co-discover HIV as the cause of AIDS decades ago and to develop the HIV blood test.

Research enabled treatment to be developed for HIV/AIDS, which allowed the Institute of Human Virology to develop a promising HIV vaccine candidate, treat nearly 6,000 patients annually in Baltimore, and care for more than 1 million people in Africa and the Caribbean since 2004.

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And research will lead us to a functional cure for HIV.

World AIDS Day is Tuesday, December 1.

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**Will you join us in this mission to cure HIV/AIDS with your gift to research?**

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The work of our IHV physicians and scientists on HIV/AIDS, along with co-infections like hepatitis B and C or virally-linked cancers, has advanced immeasurably. For example, we are curing hepatitis C in our clinics. Basic science research is the foundation of everything; without it, there would be no drug therapy and no vaccines.

Your gift in honor of World AIDS Day will take us one step closer to the day when HIV/AIDS is ended. That day can be sooner rather than later with your help.

Thank you for helping fund the discoveries that will change the lives of so many.

Sincerely,

A handwritten signature in black ink that reads "Robert C. Gallo".

Robert C. Gallo, MD  
The Homer & Martha Gudelsky  
Distinguished Professor in Medicine  
Co-Founder and Director,  
Institute of Human Virology

A handwritten signature in black ink that reads "Robert R. Redfield Jr., MD".

Robert R. Redfield Jr., MD  
Co-Founder and Associate Director,  
Institute of Human Virology

To make a gift by mail, please send a check payable to UMBF/IHV to:

Institute of Human Virology  
Attn: Lori Piccolo, Development Director  
725 W. Lombard Street  
Baltimore, MD 21201

To make a gift online, visit [www.medschool.umaryland.edu/WorldAIDSday](http://www.medschool.umaryland.edu/WorldAIDSday).

Contact Lori Piccolo, lpiccolo@ihv.umaryland.edu or 410-706-1388, with questions. Thank you!