



# Discovery

Laboratory • Clinic • Community • World • Winter 2017



## *IHV Awarded \$138M to combat HIV/AIDS in Africa & Launches Center for International Health, Education, & Biosecurity*

*Baltimore-based Institute appoints  
Dr. Deus Bazira Mubangizi as director  
of the new Center*

On November 22, the Institute of Human Virology (IHV) at the University of Maryland School of Medicine announced more than \$138 million in multiple five-year

grants awarded by the Centers for Disease Control and Prevention to combat HIV/AIDS in Kenya, Tanzania, Zambia, and Nigeria. The Institute concurrently announced the formation of the IHV Center for International Health, Education, & Biosecurity (CIHEB), and its newly appointed director, Deus Bazira Mubangizi, DrPH, MBA, MPH, Assistant Professor of Medicine, Director, Center for Health, Education, & Biosecurity, Institute of Human Virology, University of Maryland School of Medicine. The Center, in addition to the significant new funding, is the culmination of more than a decade of designing and implementing successful global health programs through unparalleled leadership and a talented team who dedicate their lives to ending the HIV/AIDS pandemic.

"Since 2004, the IHV has been awarded close to an astonishing \$926 million from the President's Emergency Plan for AIDS Relief (PEPFAR), a program initiated by President George W. Bush and continued by President Barack Obama," said Robert C. Gallo, MD, The Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-founder, 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 for the development of the HIV blood test. Dr. Gallo is also Co-founder and Scientific Director of the Global Virus Network (GVN).

"It goes without saying that the establishment of our Center for International Health, Education, & Biosecurity is long overdue," said Dr. Gallo. "Dr. Mubangizi has led much of our recent PEPFAR program success, and I have no doubt he will continue to build upon the Institute's expertise and extend our reach in other regions of the world to end HIV/AIDS and related illnesses. I am proud of our faculty and staff who are committed to helping developing nations prevent and address infectious diseases, and build infrastructures that better protect humanity from biosecurity threats."

"Our global program's success is attributed to the bold vision of my colleagues and IHV co-founders, Dr. Robert Redfield and Dr. William Blattner, who is now retired,"

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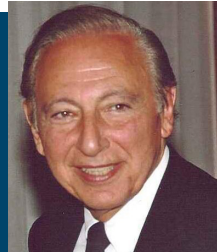
*Dr. Deus Bazira Mubangizi*

## *Director's Message:*

*While the Trump Administration appoints new leadership, I want to share my opinion piece, "A Call To End HIV/AIDS In America," published by The Huffington Post on October 24, 2016:*

As the new Administration is presented with great challenges facing the United States, one will be a longtime foe, the U.S. HIV/AIDS epidemic. Since President Barack Obama was elected in 2008, I have publicly called on our country's leaders to utilize the largest global health initiative in history—the President's Emergency Plan for AIDS Relief (PEPFAR)—as a model to address the U.S. epidemic. This historical global health initiative, which uniquely put a real dent in the global HIV/AIDS crises, was launched in 2003 by President George W. Bush. Across all of sub-Saharan Africa, fewer than 50,000 people were on treatment in 2002. To save lives and decrease transmission of HIV, as of September 30, 2015 ([www.pepfar.gov](http://www.pepfar.gov)), PEPFAR has

*continued on page 3*



Robert C. Gallo, MD



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CIHEB team in Zambia

said Dr. Gallo. “They have led teams who dreamt big, achieved immense success including caring for well over one million individuals overseas, and pioneered programs that now serve as public health models worldwide. I congratulate both on the launch of this new and already prominent Center.”

“Building a team at the IHV which will continue to make a significant impact on global health through this new Center is a great source of personal pride for me and all of my colleagues involved,” said Robert Redfield, MD, the Robert C. Gallo, MD Endowed Professorships in Translational Medicine, Co-founder, Associate Director, Director, Division of Clinical Care and Research, Institute of Human Virology, University of Maryland School of Medicine. “Seeing Dr. Mubangizi take the reins of our varying global programs ensures that the strong foundation that we laid since 2004 is just the beginning of the IHV’s impact on international health, education, and biosecurity.”

Dr. Mubangizi’s research interests include diffusion of health innovations, interdependence between public-private health partnerships, private health insurance, health financing under decentralized systems, pharmaceutical regulation, hospital governance and efficient models for delivery of primary care services in resource-limited settings. His experience comprises ten countries from Africa, Asia and the Caribbean.

In his role as the Institute’s CIHEB Director, Dr. Mubangizi will facilitate unique partnerships between academia, foreign governments, and community organizations to help developing nations learn how to diagnose, treat, and prevent their own AIDS and related epidemics.

“I look forward to building upon the work done over the past twelve years within the IHV’s Division of Clinical Care and Research and Division of Epidemiology and Prevention to strengthen public health infrastructures overseas through strategic international, national, and local collaborations,” said Dr. Mubangizi. “Through the design and implementation of our combined evidence-driven unique education, training, and treatment service

delivery programs, we will better address each country’s complex HIV/AIDS and other public health epidemics with an integrated approach that will extend into overall infectious disease protection.”

Dr. Mubangizi continued, “The next era of our work will be built on a foundation of strong scientific evidence, leveraging technology in all its forms to improve efficiency and undertake key implementation science research that will ensure effectiveness of interventions across the three pillars of health, education and biosecurity. Most importantly everything we do will start with the end in mind—promoting solutions that are home grown and sustainable. Further, I hope



CIHEB team in Nigeria



## Director's Message *(continued)*



*City Uprising volunteers and IHV's JACOUES Initiative staff are joined by Councilman Brandon Scott, who has a long commitment to youth in Baltimore City, during a testing event*

supported lifesaving antiretroviral treatment (ART) for 9.5 million men, women, and children—a more than four-fold increase since the beginning of President Obama's administration. Needless to say, it has been enormously successful as it paired government, academia and local organizations together to tackle a growing, unruly public health crisis.

At the end of 2012, an estimated 1.2 million persons aged 13 and older were living with HIV infect on in the United States, including 156,300 (12.8%) persons whose infections had not been diagnosed (CDC. Prevalence of Diagnosed and Undiagnosed HIV Infection—United States, 2008–2012. MMWR 2015; 64:657–662).

Our Institute of Human Virology (IHV) at the University of Maryland School of Medicine in Baltimore, Maryland has reached well over one million in HIV care and treatment overseas through PEPFAR while locally caring for close to 6,000 HIV infected individuals annually at our Baltimore clinics. We know PEPFAR works, and

we undoubtedly see the need for a similar program in the U.S.

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. More than 50 percent of youth with HIV do not know they are infected.

A comparable domestic program for inner cities and the rural south, which



*IHV's JACOUES Initiative facilitates community engagement to test Baltimoreans for HIV and Hepatitis C*

are the regions hardest hit in America's HIV epidemic, doesn't just begin to achieve the U.S. government's goal of an "AIDS-free generation," but it could provide access to prescribed care and medical therapies so that patients with HIV can live a normal lifespan (many don't even realize this is possible).

Federal and state officials have already allocated enormous sums to fight bioterrorism. But in years past, more Americans have been the victims of HIV/AIDS than have been affected or killed by any bioterrorist attack. In any case, a focused domestic program would certainly help prepare people in the event of a bioterrorist attack.

Education and testing are key to managing and preventing HIV infection. This country needs a program that can teach people about prevention and early detection. As long as adverse socioeconomic conditions prevail, those living in HIV/AIDS "hot spots" without education about the disease and facing other life challenges—such as mental illness, drug abuse, homelessness and lack of health insurance—will be at risk even if we do develop an AIDS vaccine. When an AIDS vaccine does become available, a program to reduce HIV infection would ensure that our nation is prepared to readily distribute the medicine.



*Improving microscopy to support TB management services in Kenya*



## Director's Message *(continued)*



IHV's JACQUES Initiative leads community programs to link Baltimoreans to care and other services

In countries like Botswana and Rwanda, IHV has helped bring about viral suppression for 80% or more of the HIV infected population. That means they will not be transmitting the virus such that the number of new infections will wane significantly in those countries. Clearly, that same opportunity exists in the United States, although the current percentage of our HIV-infected population whose viral load is suppressed is much lower. Yet, we are behind these African countries in bringing the epidemic under control.

Unless we develop a program to fight HIV infection, our urban centers and the rural south will continue to face an even more daunting epidemic. To improve the health of millions of Americans and to reduce HIV infection rates, the next administration should craft and implement a domestic HIV/AIDS plan targeting our inner cities and the rural south.



IHV partners with community groups in Kenya to facilitate educational discussions about HIV/AIDS and related infectious diseases

# IHV 2017



## 19th Annual International Meeting of the Institute of Human Virology

**OCTOBER 23-26<sup>th</sup>**  
**Four Seasons Hotel**  
**Baltimore, Maryland**

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CIHEB team in Kenya

to seek opportunities that will foster collaboration between the Institute and other departments and Schools at the University of Maryland, Baltimore with similar interests.”

Over the past twelve years, the IHV has partnered with the governments of Botswana, Ethiopia, Guyana, Haiti, Kenya, Nigeria, Rwanda, South Africa, Tanzania, Uganda, and Zambia to coordinate a global response to the AIDS pandemic. CIHEB’s new \$138 million in PEPFAR funding will build upon the IHV’s existing programs, including \$97.5 million awarded to the IHV in the previous 18 months to combat infectious disease in Botswana, Kenya, Nigeria, and Zambia. The new \$138 million in grant funding includes the following:

- \$20 million to partner with the Kenya Medical Research Institute (KEMRI) to support the Kenyan Ministry of Health’s efforts to strengthen interventions, program development, and policies regarding the country’s public health practices related to non-infectious and infectious diseases in Kenya.
- \$35 million to collaborate with the Nairobi city council and government of Kenya to provide technical assistance for the prevention, care, and treatment of HIV and infectious disease services within inner city Nairobi, and to support the growth of Kenya’s first Methadone treatment center through the expansion of

services targeted at key populations and hard to reach groups.

- \$50 million to support the implementation and expansion of comprehensive, integrated, high quality HIV prevention care and treatment services to the population of Kenya’s Kisii and Migori counties through the establishment of effective and sustainable public health systems with accountability and oversight.
- \$12.5 million to support the expansion of effective, high quality, sustainable, and comprehensive HIV prevention, care, and treatment services in 12 target regions of Tanzania that include 90 districts, local and national government authorities, as well as local partners and organizations.

- \$12.5 million to partner with the government of Zambia to develop and implement community interventions to end the transmission of HIV infection and to provide an infrastructure that facilitates linkage to care and sustained viral suppression.
- \$8 million to support the government of Nigeria in the development of a robust data quality assessment and improvement system and the implementation of an outcome evaluations program targeting HIV epidemic control; and, to study varying interventions to identify gaps in HIV health care driving significant loss of care among adolescents.

For more information, visit [www.ciheb.ihv.org](http://www.ciheb.ihv.org).



CIHEB team in Tanzania



## Prominent Virus Researchers Descended Upon Baltimore to Participate in IHV's 18th Annual International Meeting



*Renowned drug developer Raymond Schinazi and Virus Researcher Peter Vogt received prominent Lifetime Achievement Awards during meeting gala*

The Institute of Human Virology (IHV) at the University of Maryland School of Medicine held its 18th Annual International Meeting, Monday, September 19–Thursday, September 22 at the Four Seasons Hotel in Baltimore, Maryland. IHV's Annual International Meeting again attracted hundreds of elite scientists who descended upon Baltimore to share ideas and inspire collaborations.

"It really is astonishing that so many leaders in the field of medical virology are in one place at one time," 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. "The agenda was as compelling as I have seen since this meeting's inception."

This year's dynamic program, among other themes, facilitated intense discussions on HIV "cure" research, focused on paths forward to new treatments and vaccine research and brought to light new discoveries that are impacting the field. Global health representatives from around the world focused on translating laboratory discoveries into public health practice.

During a gala held Wednesday, September 21, the 2016 IHV Lifetime Achievement Award for Public Service and the 2016 IHV Lifetime Achievement Award for Scientific Contributions were awarded to Raymond Schinazi, PhD, Hon DSc, Professor of Pediatrics and Director, Laboratory of Biochemical Pharmacology, Emory University and Member, Board of Directors, Global Virus Network (GVN) and Peter Vogt, PhD, Professor, Department of Molecular and Experimental Medicine, The Scripps Research Institute, California.

"Ray Schinazi is an outstanding leader in the field of anti-viral drug research and his extraordinary ability in translating research has saved the lives of millions of people globally," said



*Samuel Broder, MD, Raymond Schinazi, PhD, Hon DSc, and Harvey Alter, MD*

Dr. Gallo. "Peter Vogt is a pioneer in the study of the genetics, replication cycle and mechanisms of cancer induction by animal retroviruses. His work, more than anyone else's work in the study of animal viruses, gave us the foundation for understanding human retroviruses."

In 1996 Dr. Gallo co-founded the IHV with colleagues Robert Redfield, MD, The Robert C. Gallo, MD Endowed Professorships in Translational Medicine, Associate Director of the IHV and Director of IHV's Division of Clinical Care and Research and William Blattner, MD, retired since January 2016 and formerly Associate Director of the IHV and Director of IHV's Division of Epidemiology and Prevention. IHV is also comprised of



## IHV's 18th Annual International Meeting

an Animal Models Division, Basic Science Division and Vaccine Research Division. Since 2004, the Baltimore-based Institute has cared for more than 1,000,000 HIV positive individuals in 7 African and 2 Caribbean nations in addition to approximately 6,000 HIV positive Baltimoreans. IHV is internationally renowned for its basic science research, which includes the search for a functional cure and a promising preventive HIV vaccine funded largely by the Bill & Melinda Gates Foundation and in part by others including the National Institute of Allergy and Infectious Diseases.

"I want to thank Man Charurat for his hard work in co-organizing this year's meeting and laying the foundations for a successful meeting," said Dr. Gallo.



L to R: Alash'le Abimiku, MON, PhD, Man Charurat, PhD, Joseph Bryant, DVM, and Yanto Lunardi-Iskandar, MD, PhD



L to R: Senait Forthal, Don Forthal, MD, George Lewis, PhD, Roberta Kamen-Lewis, PhD, and Anthony DeVico, PhD



L to R: Roberto Accolla, MD, PhD, Luigi Buonoguro, MD, Arnaldo Caruso, MD, PhD, Luciana Accolla, and Guido Poli, MD





This year's Awardees were joined by Robert Gallo, MD and past IHV Lifetime Achievement Awardees. L to R: Dr. Robert Gallo, John Bartlett, MD, Isaac Witz, PhD, Raymond Schinazi, PhD, Hon DSc, Peter Vogt, PhD, and Harald zur Hausen, MD



Peter Vogt, MD and Robert Gallo, MD



L to R: Marzena Pazgier, PhD, Man Charurat, PhD, MHS, Wuyuan Lu, PhD, and Eric Sundberg, PhD





*Cynthia Derdeyn, PhD*



*Robin Weiss, MD, PhD*



*Frances Eun-Hyung Lee, MD*



*Harald zur Hausen, MD*



*Mario Stevenson, PhD*



*Joseph Pagano, MD*



*Jeffrey Ravetch, MD, PhD*





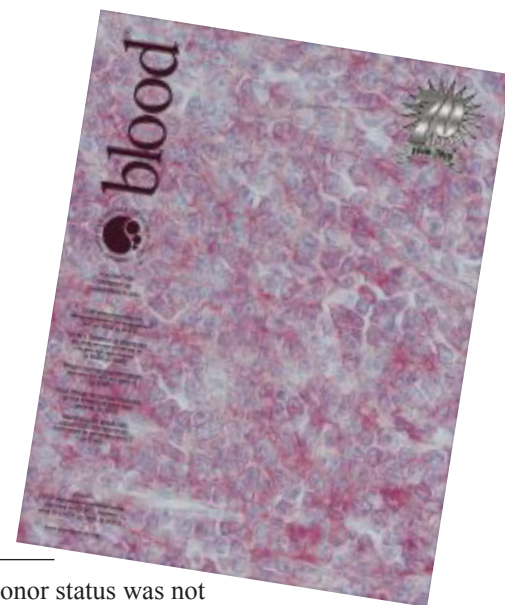
*Members of the IHV gather during the Institute's annual holiday party while celebrating 20 years since its co-founding.*



## Screening transplant donors for HTLV-1 and -2

Robert C. Gallo,<sup>1,2</sup> Luc Willems,<sup>2-4</sup> Hideki Hasegawa,<sup>2,5</sup> and the Global Virus Network's Task Force on HTLV-1

<sup>1</sup>Institute of Human Virology, University of Maryland School of Medicine, Baltimore, MD; <sup>2</sup>Global Virus Network, Baltimore, MD; <sup>3</sup>Cellular and Molecular Biology, Agro-Bio Tech, Gembloux, Belgium; <sup>4</sup>Interdisciplinary Cluster for Applied Genoproteomics, University of Liège, Liège, Belgium; and <sup>5</sup>National Institute of Infectious Diseases, Tokyo, Japan



### Introduction

Human T-cell leukemia virus-1 (HTLV-1) is the first pathogenic human retrovirus discovered in 1980<sup>1</sup>. HTLV-1 causes 2 devastating diseases: adult T-cell leukemia/lymphoma (ATL) and a neurological disorder, HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP or, more briefly, HAM). ATL becomes apparent in 2% to 5% of those infected with HTLV-1; another 1% to 2% will develop HAM.<sup>2</sup> There are usually 2 to 3 decades of latency after the infection before the onset of symptoms. A second HTLV (HTLV-2) isolated in 1982 has been causally linked to HAM, but not ATL.<sup>3</sup>

In other cases, HTLV-1 and HTLV-2 infection may remain asymptomatic for years while being transmitted from person-to-person through host cells in body fluids and breast milk, blood cell transfusions, and solid organ transplantation. There are no licensed vaccines to prevent HTLV-1 or HTLV-2 infections.

### Worldwide HTLV-1 distribution

Based on published data, at least 5 to 10 million people globally are infected with HTLV-1; this is certainly an underestimate because many highly populated regions such as China, India, and much of Africa and the Middle East have not been adequately assessed.<sup>4,5</sup> Known regions of high HTLV-1 endemicity include southern Japan, the Caribbean, South America, tropical and South Africa, Iran, Romania, and Melanesia.<sup>4,5</sup> Prevalence rates in the United States and Europe are relatively low and mainly because of immigrants from endemic areas.

Despite the apparent low prevalence, several cases of transplant-associated HTLV-1 myelopathy have been reported in recent years (Table 1). In the United States, these include 2 kidney transplant cases resulting in HAM.<sup>6,7</sup> HAM also was reported in a heart transplant case in France, and in 2 kidney and liver transplant cases in Spain.<sup>6</sup> In Germany, transplanted kidneys and a liver resulted in primary T-cell lymphoma in 3 patients.<sup>8</sup> In Japan, where significant clusters of HTLV-1 are present, 3 cases of HAM were reported following kidney transplants, along with 8 cases of ATL following kidney

transplants, although donor status was not reported.<sup>2</sup> These post-transplant HAM cases occurred with rapid onset and rapid progression.<sup>9-11</sup> These findings call into question the current widespread view that systemic HTLV screening of donated organs is unnecessary: this view is based on the assumption that HTLV-1-associated diseases will develop only in a small proportion of infected individuals and that progression to disease is slow compared with the average lifespan of humans and therefore poses no major threats to public health.

### Screening and transplantation

Thirty-five years after the discovery of HTLV-1, donor/recipient screening for the virus remains sporadic or nonexistent in most countries.<sup>12</sup> In 1993, a Centers for Disease Control and Prevention and a US Public Health Service Working Group recommended that those infected with HTLV-1 or HTLV-2 be counseled “not to donate blood, semen, body organs or other tissues.”<sup>13</sup> Nevertheless, on October 23, 2009, the US Organ Procurement and Transplant Network dropped its recommendation for universal HTLV-1/HTLV-2 screening in deceased organ donors because of the perception of low HTLV-1 prevalence in the United States, low positive predictive value of serologic screening tests, and a lack of serologic tests appropriate for use by organ procurement agencies.<sup>14</sup> Moreover, international transplant society guidelines provide no recommendations on HTLV-1 screening and use of donated organs.<sup>2</sup>

Yet the notion of safety in “low prevalence” regions may be questionable.<sup>15,16</sup> Pockets of high HTLV-1 prevalence have been found in some countries, including the United States and the European Union, and decades of refugee migration and immigration have altered the makeup of many urban and regional populations.<sup>4</sup> In particular, the ongoing migration from the Middle East and Africa is likely to significantly alter the prevalence of HTLV-1/HTLV-2 in many European Union



countries.<sup>4</sup> Given these evolving foci of HTLV-1/ HTLV-2 infections and the very poor prognosis of post-transplant HAM and ATL, there are calls for more widespread screening of live and deceased organ donors.

Tedla et al. suggested that organ procurement organizations and transplant programs should determine local prevalence to guide screening efforts.<sup>17</sup> Ramanan et al. recommended targeted screening of potential high-risk living (and deceased) donors for HTLV-1/HTLV-2 seropositivity to inform transplant candidates of the potential risk of infection and disease and to reduce or prevent the occurrence of HAM in solid organ transplant recipients.<sup>18</sup> Suggestions also have been put

**Table 1. Recently reported transplant cases resulting in HAM or ATL from HTLV-1–infected organs**

Country	Transplanted Organ	Disease	Cases	Reference
France	Heart	HAM	1	6
Germany	Kidney	ATL	2	8
Germany	Liver	ATL	1	8
Jamaica	Kidney	ATL	1	2
Japan	Kidney	ATL	8	2
Japan	Kidney	HAM	3	9-11
Spain	Kidney	HAM	2	6
Spain	Liver	HAM	1	6
United Kingdom	Kidney	ATL	1	2
United States	Kidney	HAM	2	6,7

forward for national or international registries of all HTLV-1–affected transplants.<sup>19</sup> Alerted to the dangers of rapid-onset HAM following HTLV-1–infected organ transplants in late 2014, the Japanese Ministry of Health, Labor and Welfare started working with the Japan Society for Transplantation and the Japanese Society for Clinical Renal Transplantation to begin HTLV-1 screening of all kidney donations (Y. Yamano, St. Marianna University, written communication,<sup>12</sup> December 2014). Similarly, the United Kingdom issued new transplantation guidance on HTLV-1/HTLV-2 screening of cadaveric solid organs in 2011.<sup>20</sup>

The Global Virus Network (GVN; gvn.org) joins with these investigators and others in calling for more systematic HTLV-1/HTLV-2 screening before solid organ transplantation.

## GVN

The GVN is an international coalition of leading medical virologists collaborating and cooperating on research into human viral diseases. Established in 2011, the GVN currently consists of 34 affiliated laboratories in 24 countries. It supports research; promotes training in medical virology for young scientists; serves as a technical resource for governments, businesses, and international organizations; facilitates international scientific cooperation; and advocates for funds for the field and evidence-based public policies.

In 2014, the GVN formed a task force of international experts on HTLV-1 and the diseases this virus causes.

The mission of the HTLV-1 Task Force is to help speed the discovery of therapies to prevent virus transmission and progression from infection to disease and to educate the public about this virus, the serious diseases it causes, and how to prevent its spread. One critical recommendation emerging from recent expert discussions is to improve local and regional screening efforts to prevent virus transmission and to better understand the prevalence of HTLV-1 infection and the burden of HTLV-1–associated diseases in countries with potentially vulnerable populations. In an editorial, Taylor noted that, “Whereas not screening donors... for human immunodeficiency virus infection would be considered unethical, the same is not the case of HTLV-1, another human retrovirus, where risk assessments are made based on the predicted prevalence of cases among donors, the probable risk of transmission, and the subsequent likelihood of disease.”<sup>19</sup> Yet, those risk assessments are based on inadequate national epidemiology, ignoring changing demographics in many countries, and a poor understanding of the natural history of transplant-acquired HTLV-1 and posttransplant disease progression. The screening costs for HTLV-1 are small in comparison with the cost of post-transplant illness and death, lost productivity, and treatment expenditures associated with HAM and ATL following HTLV-1 infection.

## Conclusion

For these reasons, the GVN Task Force on HTLV-1 recommends and urges transplant societies to make wider use of available screening assays and to educate donors and recipients about HTLV-1/HTLV-2 infection, transmission, and disease prevention. Improved assays and institutional screening practices will help to reduce virus transmission and may provide better information about the incidence of and prognosis of HTLV-1–associated diseases after organ transplants. In addition, the US Centers for Disease Control and Prevention and other health prevention agencies should consider updating their policy recommendations on organ transplant screening.<sup>13</sup> Authorship Contribution: E.M. drafted the article; R.C.G., L.W., and H.H. undertook critical revision of the article for important intellectual content and the final approval of the article.

Conflict-of-interest disclosure: Global Virus Network Task Force member C.B. has consulted on a legal issue related to HTLV-1 infection. None of the remaining authors and members of the task force have reported additional conflicts of interest. A complete list of the members of the Global Virus Network’s Task Force on HTLV-1 appears in “Appendix.” Correspondence: Edward McSweegan, Global Virus Network, 725 West Lombard St, Room S-420, Baltimore, MD 2120; e-mail: emcsweegan@gvn.org; and Robert C. Gallo, Institute of Human Virology at the University of Maryland School of Medicine, 725 West Lombard St., Room S-307, Baltimore, MD 21201; e-mail: rgallo@ihv.umaryland.edu.



## Appendix

The members of the Global Virus Network (GVN) Task Force on HTLV-1 are: Roberto Accolla, University of Insubria, Italy; Charles Bangham, Imperial College, London, United Kingdom; Ali Bazarbachi, American University, Beirut, Lebanon; Umberto Bertazzoni, Verona University, Verona, Italy; Anna B. de Freitas Carneiro-Proietti, Hemominas Foundation, Belo Horizonte, Brazil; Hua Cheng, Institute of Human Virology, Baltimore, MD; Luigi Chieco-Bianchi, University of Padova, Padova, Italy; Vincenzo Ciminale, University of Padova, Padova, Italy; Antoine Gessain, Institut Pasteur, Paris, France; Eduardo Gotuzzo, Cayetano Heredia University, Lima, Peru; William Hall, GVN cofounder, University College Dublin, Dublin, Ireland; Joseph Harford, National Institutes of Health, Bethesda, MD; Olivier Hermine, Fondation Imagine, Paris, France; Steve Jacobson, National Institutes of Health, Bethesda, MD; Beatrice Macchi, University of Rome Tor Vergata, Rome, Italy; Cal Macpherson, St. George's University, Grenada, West Indies;

Renaud Mahieux, Ecole Normale Supérieure de Lyon, Lyon, France; Masao Matsuoka, Kyoto University, Kyoto, Japan; Edward McSweeney, Global Virus Network, Baltimore, MD; Edward L. Murphy, University of California at San Francisco, San Francisco, CA; Jean-Marie P'eloupon'ese, Centre National de la Recherche Scientifique, Paris, France; Jordana Reis, Fiocruz, Belo Horizonte, Minas Gerais, Brazil; Viviana Simon, Icahn School of Medicine at Mount Sinai, NY; Yutaka Tagaya, Institute of Human Virology, Baltimore, MD; Graham P. Taylor, Imperial College, London, United Kingdom; Toshiki Watanabe, University of Tokyo, Tokyo, Japan; and Yoshihisa Yamano, St. Marianna University, Kawasaki, Japan. Robert C. Gallo, Luc Willems, and Hideki Hasegawa are co-chairs of the GVN Task Force on HTLV-1. Robert C. Gallo is a cofounder and scientific director of the GVN, and is a director of the GVN Center of Excellence at the Institute of Human Virology.

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## Two Prominent IHV Researchers Honored with Robert C. Gallo, MD Endowed Professorships in Translational Medicine



*George K. Lewis, PhD, Robert C. Gallo, MD, and Robert R. Redfield, MD*

An investiture ceremony was held November 29, 2016 to name Robert Redfield, Jr., MD, and George Lewis, PhD as the Robert C. Gallo, MD Endowed Professors in Translational Medicine. The ceremony was timed to coincide with the bi-annual meeting of the IHV Board of Advisors so that Board members could also attend the ceremony held in the beautiful, historic Westminster Hall on campus.

Though both honorees have varying backgrounds, their core commonalities and commitment to advancing biomedical research and human health shined during the poignant ceremony. Dr. Redfield, Professor and Chief of Infectious Diseases of Medicine, Professor of Microbiology & Immunology, and Co-Founder, Associate Director and Director, Division of Clinical Care and Research, Institute of Human Virology, earned his medical degree at Georgetown and completed internal medicine, infectious disease, and tropical medicine training at Walter Reed Army Medical Center and Walter Reed Army Institute of Research

before going on to serve in the US Army Medical Corps. George Lewis, PhD, Professor of Microbiology & Immunology and Director, Division of Vaccine Research, Institute of Human Virology, was born and raised in rural Mississippi and did his

undergraduate and graduate work at the University of Mississippi before heading to San Francisco, where he worked as a postdoctoral fellow at the University of California San Francisco and then joined the faculty there before coming to the University of Maryland, Baltimore.

Both Drs. Redfield and Lewis are longtime colleagues of Robert Gallo, MD, the Homer & Martha Gudelsky Distinguished Professor in Medicine, Co-Founder and Director of the Institute of Human Virology, who is recognized internationally for his discovery of the first known human retroviruses (HTLV-1 and HTLV-2), discovery of interleukin-2 (IL-2), co-discovery of HIV as the cause of AIDS and his development of the HIV blood test. Dr. Gallo co-founded the Institute of Human Virology with Dr. Redfield and the recently retired William Blattner, MD, and Dr. Lewis has been a prominent member of the IHV since its inception.

Faculty members such as Drs. Redfield and Lewis are critical to helping the School of Medicine maintain its standing in the top echelon of U. S. medical schools.



*George K. Lewis, PhD, is joined by his family including his wife, Roberta Kamin-Lewis, PhD to his right*





Robert R. Redfield, MD is joined by his family including his wife, Joy Redfield, to his left

Endowed fellowships, which started at Oxford University back in the 1800s, help institutions attract and retain teachers of excellence. "It is because of endowed professorships like this that we can recruit faculty members of great significance to these positions, which continues a tradition going back 500 years," said E. Albert Reece, MD, PhD, MBA, Vice President for Medical Affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean of the School of Medicine. "The talented members of this group inspire our students, advance the frontiers of knowledge, and make discoveries that change people's lives."

The professorships were established with the generous support of two former IHV board members, The Honorable Robert Keith "Bob" Gray and Stewart Greenebaum. Bob Gray was a friend of Dr. Gallo's even before IHV was founded, and it was a generous gift from him that enabled IHV to apply for and receive matching funds from the Maryland ENnovations program that fully endowed the Gallo professorship at the

Distinguished level. Stewart Greenebaum helped recruit the founders to the state of Maryland. The Greenebaum family's philanthropic donations to IHV include the initial donation for the Gallo professorship, as well as an annual Distinguished Scholar Lecture, which has attracted world-wide recognition.

"It is an honor to have friends such as Stewart Greenebaum and Bob Gray, who so kindly donated to the establishment of this endowed professorship in my name," said Dr. Gallo. "In sports, the greatest athletes are given the title, Most Valuable Player (MVP). For the IHV, Drs. Redfield and Lewis are our MVPs," said Dr. Gallo. "From the earliest years and continuing to present day, Drs. Redfield and Lewis have contributed greatly both in their scientific and financial contributions to the Institute, among many other important things. I am privileged and humbled to have my name attached to their name."

Dr. Lewis was recruited to the Department of Microbiology & Immunology in 1984. In 1987 Dr. Lewis switched his research program to focus entirely on HIV/AIDS, with an emphasis on HIV-1 vaccine

development and antibody-mediated protection against the virus. A promising vaccine candidate is now undergoing clinical trials. Yet Dr. Lewis remains humble about his work and his endowed professorship. "I was both surprised and highly honored to be appointed as the Robert C. Gallo, MD Endowed Professor in Translational Medicine," he said. "Under any circumstance, receiving an endowed professorship is a signal event in an academic life. That this professorship is in the name of my colleague and friend, Bob Gallo, means more to me than words can express."

Dr. Redfield made several important early contributions to our understanding of HIV, including the demonstration of the importance of heterosexual transmission and the development of the Walter Reed staging system for HIV infection. His dominant area of research interested is the development of novel biological approaches to the treatment of chronic viral pathogens with a particular focus on targeting host cell pathways and host directed immunity for their therapeutic potential. Dr. Redfield oversees an extensive clinical program providing HIV care and treatment to more than 5,000 patients annually in the Baltimore/Washington, DC community. He also leads extensive global care and treatment and postgraduate medical education programs that are currently active in six African countries and one Caribbean country. "Being selected as one of the inaugural recipients of the Robert C. Gallo Endowed Professorship in Translation Medicine is a great honor," said Dr. Redfield. "Throughout my career I have deeply treasured translational medicine, but the most rewarding was when I collaborated with the Gallo NCI lab in the early days of the AIDS epidemic. I never dreamed that decades later I would receive this honor."



# Institute of Human Virology (IHV) Awarded \$17.5M for HIV Vaccine Research

## Baltimore-based scientists awarded grant to solve a major challenge in HIV-1 vaccine research

This past August, the **Institute of Human Virology (IHV)** at the University of Maryland School of Medicine announced a \$17.5 million grant from the U.S. National Institute of Allergy and Infectious Diseases (NIAID) to tackle a significant scientific global challenge



Robert Gallo, MD

Distinguished Professor of Medicine, Director, Institute of Human Virology, University of Maryland School of Medicine, and his colleagues **George Lewis, PhD**, Professor of Microbiology and Immunology, Director, Division of Vaccine



George Lewis, PhD



Anthony DeVico, PhD

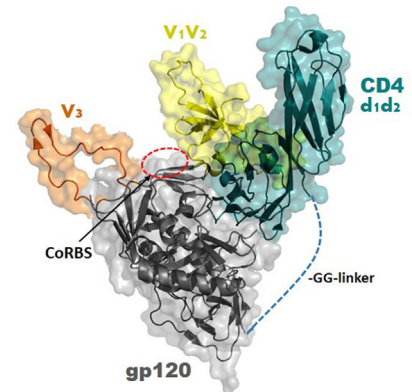
Research, Institute of Human Virology, University of Maryland School of Medicine and **Anthony DeVico, PhD**, Professor of Medicine, Division of Vaccine Research, Institute of Human

Virology, University of Maryland School of Medicine. IHV's grant collaborators include Guido Silvestri, MD at the Yerkes National Primate Research Center of Emory University and Warner Greene, MD, PhD, of the Gladstone Institute of Virology & Immunology at the University of California at San Francisco.

"Since our group co-discovered HIV as the cause of AIDS in the early 1980's, I have long stated that any successful vaccine would need to block HIV infection from the start given the nature of retroviruses and HIV's aggressive replication cycle," said Dr. Gallo, who pioneered the field of human retroviruses with his 1980 discoveries of the first human retroviruses (Human T cell Leukemia-1, or HTLV-1 and Human T cell Leukemia-2, or HTLV-2). "In order to do this, we must have persistent antibodies to protect against HIV."

HIV vaccine development presents unprecedented challenges on multiple levels, a reality, often overlooked, that cannot be overstated. The chief challenge is that HIV is a human retrovirus that replicates by irreversibly inserting its genes into the host genome. Thus, HIV infection is established permanently in a matter of days or perhaps even hours (1–6), and it cannot be cleared by primary or anamnestic responses that occur after exposure. In addition to integrating into the host genome, a second unique challenge is that HIV replicates in CD4+ T cells that are key players in protective immunity not only to HIV itself but also too many other pathogens. These central features distinguish the path to an HIV vaccine from the traditional design principles that led to successful vaccines against other infectious agents.<sup>1</sup>

"While we study the antibody sustainability problem, we need to activate T cells that fight HIV," said Dr. Lewis. "However, T cells are also the



very cells that HIV infect and kill. Thus, there is a fine balance we must reconcile so that we can examine and produce long-lasting antibodies for an effective vaccine."

Last fall, IHV launched Phase 1 clinical trials of a novel HIV vaccine candidate developed by Drs. Gallo, Lewis, DeVico and Tim Fouts, PhD of Baltimore-based Profectus Biosciences, Inc., a spinoff company from IHV. The candidate immunogen, denoted as the Full-Length Single Chain (FLSC), is designed to elicit strong protective antibody responses across the spectrum of HIV-1 strains. The IHV team will utilize the FLSC as a model system with the goal of finding ways to improve the efficacy and durability of all HIV vaccines.

"We have noticed an unusual, but not uncommon, phenomenon in HIV's envelope protein that affects the sustainability of antibodies," said Dr. DeVico. "We need to learn why this is happening so we can promote durability in our vaccine's antibody response against HIV."

"We believe this antibody durability challenge is solvable," said Dr. Gallo. "Importantly, funding sources and collaborators such as NIAID and The Bill and Melinda Gates Foundation are critical partners in our quest to solve this complex scientific challenge and we are grateful for their continued support, among others."

<sup>1</sup>Lewis GK, DeVico AL, Gallo RC. Antibody persistence and T-cell balance: two key factors confronting HIV vaccine development. *Proc Natl Acad Sci U S A*. 2014;111(44):15614-21. doi: 10.1073/pnas.1413550111. PubMed PMID: 25349379; PMCID: 4226080.



## Public Health Epidemiologist Dr. Peter Volberding Keynotes Greenebaum Annual Lecture

The Twelfth Annual Marlene and Stewart Greenebaum Lecture hosted guest lecturer, Paul A. Volberding, MD, who is Professor of Medicine at the University of California San Francisco, Director of the AIDS Research Institute, Director of Research at the UCSF Global Health Sciences and Co-Director at the UCSF-GIVI Center of AIDS Research. Dr. Volberding is widely considered one of the world's leading AIDS experts. He co-founded one of the first AIDS-designated clinics in the early 1980s at San Francisco General Hospital. This clinic has evolved into the top-rated medical care facility for AIDS in the country. Dr. Volberding has served on numerous key national committees over the course of the epidemic, including the National Academy of Sciences (Institute of Medicine) AIDS Policy

Review Steering Committee, National Institutes of Health (NIH) AIDS Drug Selection Committee, National Institute of Allergy and Infectious Diseases AIDS Clinical Trials Group Executive Committee, Institute of Medicine Round Table, and the AIDS Clinical Trials Group Executive Committee. In 1990, Dr. Volberding Co-Chaired the Sixth International Conference on AIDS, held in San Francisco, and served on the international advisory committees for all subsequent international conferences. He is currently Chief Of Medical Service at San Francisco Veterans Affairs Medical Center, and principal investigator and Co-Director of UCSF's Center for AIDS Research. Dr. Volberding has written numerous research and review articles. He is the Co-Editor-in-Chief of the Journal of Acquired Immune Deficiency



*Paul Volberding, MD*

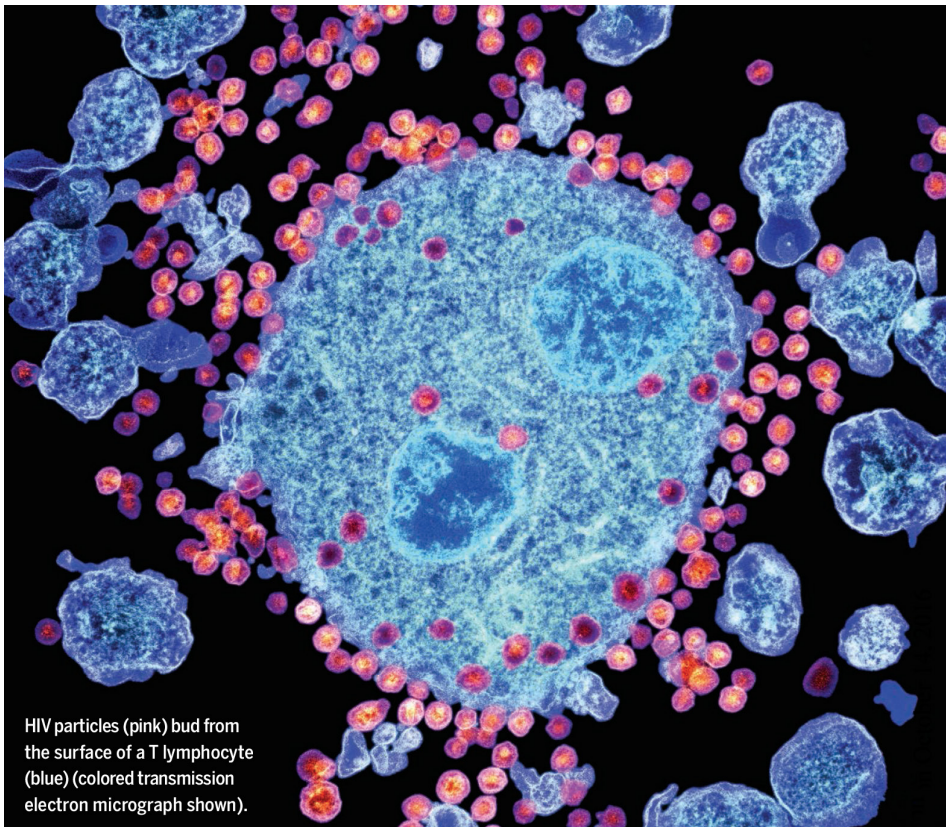
Syndromes, and is the founder and chair of the board of the International AIDS Society-USA. He is also the Co-Editor of *The Medical Management of AIDS*, the most widely used textbook of HIV medicine, now in its sixth edition. In 1999, he was elected to the Institute of Medicine of the National Academy of Sciences.

With more than 150 in the audience on May 23, Dr. Volberding presented "Learning from AIDS: The Arc of the Epidemic," at the historically renowned Westminster Hall on campus. The Greenebaums are close friends and sponsor this annual IHV series insisting that the key note speaker be someone who has made substantial scientific contributions, while caring for the betterment of the human condition.

*L to R: Dave Wilkins, Robert Gallo, MD, Stewart Greenebaum, Paul Volberding, MD, Robert Redfield, MD, and Kevin Cullen, MD*







**HIV**

# Shock and kill with caution

Strategies to silence latent HIV infection should be explored

By Robert C. Gallo

**A**ntiretroviral therapy has made lifelong suppression of human immunodeficiency virus (HIV) replication a possibility for some patients. But with the 2015 estimate of 36.7 million people infected worldwide, there is a great need to explore other ways to address this epidemic—from preventing new infections by treating uninfected high-risk individuals, to developing a vaccine, to targeting latent HIV that hides in immune cells and persists in patients. The idea of clearing latent infection has prompted strategies aimed at an HIV-1 cure. Although this approach should continue to be tested, other approaches, including those that seek to permanently suppress the latent virus, should also be explored. Different strategies may target different viral reservoirs, and may turn out to be complementary.

The existence of T cells harboring latent HIV-1 provirus was first described in 1986 (1), as was the demonstration that activation of those T cells “reawakened” HIV-1 expression (2). The importance of these latently infected cells, however, came to the forefront following the work of several clinical investigators (3) who showed that these cells persist long after anti-HIV therapy and virus suppression, and periodically release HIV-1, presumably in response to a milieu favorable to T cell activation. The idea then arose that HIV-1 infection would be curable if latent virus could be deliberately reactivated. This would lead to T cell death, either directly from HIV-1 cytopathic effects or by cytotoxic T lymphocytes (CTLs). Concurrent anti-HIV therapy would block new rounds of infection. This idea has been called “shock and kill” or “kick and kill,” and has spawned numerous studies (4), clinical trials, and discussions at meetings. Part of this impetus was provided by an enduring focus on one patient, the so-called “Berlin patient”

(5), who—through a series of fortunate events—is the only known example of complete HIV-1 cure. This individual was HIV-1–positive, but also had leukemia, which allowed physicians to treat him with total body irradiation. Fortunately, he survived this aggressive treatment, and his leukemia. Another fortunate circumstance was the availability of bone marrow cells from an HIV-1–negative donor who carried a rare homozygous mutation in the HIV-1 co-receptor CCR5 (CCR5D32), which renders cells resistant to HIV-1 infection (6). With the ablation of his own bone marrow cells and the acceptance by his weakened immune system of T cells lacking functional CCR5, he became free of HIV-1 and presumably unable to be infected. Although no new principles came from this study, it did provide a proof of concept for a “cure.” The results are indeed germane to developing approaches, such as gene therapy, that destroy or remove CCR5 from infected persons (7). However, the study’s relevance to almost all other HIV-1–infected patients, as well as its connection to currently envisioned “shock and kill”

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approaches, is not apparent.

Clinical testing of the “shock and kill” approach has begun only recently, and therefore merits further evaluation (8). However, this strategy presents a few issues of concern that should not be overlooked. It is assumed that all latently infected cells will die following viral reactivation and/or by CTL attack, but there is no evidence for this; rather, these cells do not die. This may be because only weak latency-reversing agents (LRAs) have been tested clinically. Therefore, it is possible that more effective agents (alone or in combination) might do a better job at reawakening the virus and killing the infected cell, which should be tested. Also, there is no assurance that combination antiretroviral therapy (cART) will completely block the released virus from infecting new cells, especially in the brain or lymphoid tissues where the antiretroviral drugs may not reach fully suppressive concentrations. The effectiveness of these drugs in anatomical sites is still being debated. Treatment intensification does not seem to reduce the size of the viral reservoir, and there appears to be no genetic evolution of the virus in patients under suppressive cART therapy, both of which suggest that current regimens completely block virus spread. However, some have suggested that poor drug penetrance in certain anatomical sites plays against drug-resistant strains. Because this issue is still unresolved, we should use caution and consider that current regimens may not achieve suppressive concentrations (in at least some anatomical sites), and thus may be unable to block virus spread in the context of “shock and kill” strategies.

Another issue of concern is that some LRAs may activate uninfected T cells, rendering them new targets for infection. This could possibly be the case with Toll-like receptor agonists that are being evaluated as LRAs. More recently, the idea has emerged to combine certain LRAs with therapeutic vaccines, as a new version of the “shock and kill” approach. This is of course attractive, but it remains to be established whether a therapeutic vaccine can be devised to raise effective CTL responses in immunocompromised individuals. Indeed, in one case, a vaccine could raise protective CTL responses prior to infection (9), but its efficacy in infected patients is questionable. Latent viruses other than HIV-1 may also be reactivated and spread by LRAs, thereby giving rise to serious side effects later on. Such viruses include Epstein-Barr virus, cytomegalovirus, human T cell lymphotropic virus, hepatitis C virus, human herpes virus, human herpes virus 8

(Kaposi sarcoma herpes virus), and human endogenous retroviruses. Moreover, the use of agents that target host factors (all LRAs tested so far fall into this category) will also modulate host gene expression (including inheritable epigenetic marks), which may cause unwanted side effects. Indeed, any approach involving T cell activation could be toxic beyond just the potential of activating other disease-causing viruses and making cells more sensitive to HIV-1 infection. We should not forget that although cART does not represent a cure, it allows HIV-1-infected individuals a full life, especially with simpler drug regimens.

There are HIV-1-infected cell types other than CD4+ T cells that are not

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**“‘Shock and kill’ and ‘soothe and snooze’ may turn out to be two non-mutually exclusive approaches to a functional cure for HIV-1 infection.”**

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given consideration in the “shock and kill” approach. For example, macrophages are infected by HIV-1 (10) and generally do not die from infection. Brain cells are also an HIV-1 sanctuary (11), mainly in microglial cells. A recent study has shown that viral replication persists in lymphoid tissues of infected individuals despite suppressed viremia (12). Although not directly addressed, myeloid cells could be the source of this persistent viral replication. Indeed, macrophages are a source of continual low-level production of HIV-1 (13). Whether or not myeloid cells represent a long-lived viral reservoir remains to be conclusively addressed, but until then, their role should not be ignored or discounted. In short, there is more to HIV-1 persistence in the context of suppressive cART than CD4+ T cell reservoirs. Agents such as histone deacetylase inhibitors show limited efficacy in reactivating HIV-1 because they target only one molecular mechanism that maintains viral latency. Many other blocks are still in place, including the lack of key transcription factors, the presence of other epigenetic blocks, and a cellular environment that is quiescent and unable to support viral replication.

Another approach to address latent HIV infection is to force the latent virus to remain quiescent by stronger and more

durable virus-suppressing agents. So far, the only example of this “soothe and snooze” strategy is the use of the HIV-1 Tat inhibitor, didehydro-cortistatin A (14). This drug appears to be highly specific for Tat, without off-target effects. However, other latency-promoting agents, particularly those acting in an HIV-1-specific manner, should be explored. Other goals in developing this strategy include drugs targeting cellular factors that play a role in viral replication, and those that reach anatomical sanctuaries more efficiently. Durable HIV suppression could be concurrently supported by gene therapy strategies that target the HIV-1 provirus and/or CCR5 with gene editing tools. In line with longer-term virus suppression, Byrareddy et al. (15) report that combining ART with antibodies that block T cells sustained low viremia in simian immunodeficiency virus (SIV)-infected monkeys. Despite the success of cART, there are still very high-priority areas that must be supported, including HIV-1 testing, promoting preexposure prophylaxis, and developing a vaccine (16). Therapeutic strategies aimed at an HIV-1 cure through viral reactivation should continue to be tested, but other strategies such as viral suppression should also be explored. Indeed, funding agencies are starting to support research aimed at permanently silencing the latent provirus. “Shock and kill” and “soothe and snooze” may turn out to be two non-mutually exclusive approaches to a functional cure for HIV-1 infection.■

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#### ACKNOWLEDGMENTS

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## New Recruit



Chozha Rathinam, MSc, PhD

### Dr. Chozha Rathinam Joins IHV's Division of Basic Science

In October 2016, **Chozha Rathinam, MSc, PhD**, joined the Institute of Human Virology's Division of Basic Science from Columbia University. Currently, his lab focuses on intrinsic and extrinsic molecular circuits that cause stem cell based pathophysiologies including Cancer, inflammatory disorders,

Immunodeficiencies and aging. He recently received the R01 from the National Heart, Lung and Blood Institute (NIH) to conduct his research on the role of NF- $\kappa$ B in Hematopoietic Stem Cells.

In 2000, Chozha Rathinam finished Master of Science (M.Sc.) in Life Sciences, a highly prestigious research oriented Masters program in the country, at Bharathidasan University, India with distinction grades. After having served as a Lecturer of Biotechnology at Bharathidasan University, in 2001 he moved to Germany to pursue his doctoral (Dr. Rer. Nat.) studies at the Hannover Medical School, under the supervision of Dr. Christoph Klein. His doctoral work unraveled that the transcription factor-Gfi1 acts as a molecular switch that promotes the differentiation of dendritic cells from Hematopoietic Stem Cells (HSCs). This seminal work was published in prestigious journals, such as *Immunity* and *Leukemia*. His achievements during the doctoral studies were recognized through various merit scholarships including the "Pro-rector of Hannover Medical School" in the years 2001 & 2002, Fellowship from the "Land of Lower Saxony" in 2003 and "Varta Foundation" in 2004, and received the national level "Best Ph.D. thesis work award". In 2006, he moved to the United States to conduct his postdoctoral studies in the laboratory of Dr. Richard Flavell, Yale University, New Haven, CT. His postdoctoral work highlighted the previous unappreciated roles of post-translational modifications of proteins (Ubiquitylation) in the biology of stem cells. Of note this work has been recognized as the "novel avenue of stem cell biology" by the experts in the field. He also generated a novel line of humanized mouse models that show superior engraft of human HSCs and efficient development of human immune system under xenogenic settings. The key findings of his research have been published in many top tier journals, such as *Nature Immunology*, *Cancer Cell*, *Genes & Development*, *Blood* and *PNAS*. In 2010, he became a group leader at the NIH center for excellence in Stem Cell Biology, Providence, RI and in 2011 he became an Assistant Professor at the department of Genetics & Development at Columbia

University Medical Center, New York, NY. His lab at Columbia University focused on the role of inflammatory signals in the control of normal and leukemic stem cells and recently published many papers in prestigious journals, including *Journal of Experimental Medicine*, *Stem Cells and Oncotarget*. His work received the New Innovator Award from the Leukemia Research Foundation and BD Immunology award.

## Grants



Man Charurat, PhD

Manhattan **Charurat, PhD**, Professor of Medicine, Director, Division of Epidemiology and Prevention, received a five year, \$7 million award from the Centers for Disease Control for a project entitled "Strengthening HIV Field Epidemiology, Infectious Diseases Surveillance, and Lab Diagnostics Program." The SHIELD project supports the PEPFAR Nigeria program to improve the quality of HIV service delivery through instituted M&E processes. SHIELD builds on the existing capacity of the University of Maryland Baltimore (UMB) to collaborate with all 11 implementing partners who are supporting service deliveries through the CDC, USAID, and DOD funding programs. In Nigeria, UMB led by the School of Medicine, is a leading public health partner with the GoN, several donors and local institutions.



Ernest Ekong, MMD, MPH

Additionally, **Dr. Charurat, Ernest Ekong, MMB, MPH**, Director of Clinical Programs, Institute of Human Virology, Nigeria, and Vicki J. Tepper, PhD, Associate Professor, Department of Pediatrics, University of Maryland School of Medicine, received a five-year, \$1,083,880 grant from the National Institute of Child Health and Human Development (NICHD) for "The Adolescent to Adult Patient-centered HIV Transition Study (ADAPT)."



Niel Constantine, PhD, MT(ASCP)

**Niel Constantine, PhD, MT(ASCP)**, Professor of Pathology, Division of Epidemiology and Prevention, was awarded a supplement to a current 2-year contract from FHI360 under the USAID Global Health Supply Chain Quality Assurance Program in the amount of \$165,048 for "Technical Assistance and RTK Retention Store". A large number and variety of diagnostic



test kits are procured by USAID and provided to countries. The project involves laboratory assessment of rapid test kits from over 30 countries to determine if the manufacturer's claims for performance are met. This supplement provides for the establishment and management of a test kit storage facility for long-term monitoring and periodic assessment of test kit suitability. In addition, studies will be performed to determine the cause of test kit failures, to investigate laboratory/field-related complaints, analysis of collective test kit performance data, and the effect of various environmental factors on the suitability of test kits as claimed by manufacturers. In addition, **Dr. Constantine** received \$96,570 from the Department of Psychiatry for activities related to markers associated with environmental and genetic vulnerability to *Toxoplasma gondii* infection and its neurobehavioral consequences (PI: Dr. Postolache).



Robert Gallo, MD

George Lewis, PhD

Anthony DeVico, PhD

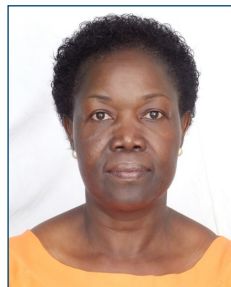
**Robert Gallo, MD**, The Homer & Martha Gudelsky Distinguished Professor of Medicine, IHV Director, Division of Basic Science and Division of Vaccine Research, **George Lewis, PhD**, the Robert C. Gallo Endowed Professorship in Translational Medicine, Director, Division of Vaccine Research, **Anthony DeVico, PhD**, Professor of Medicine, Division of Vaccine Research, received a four year \$17.5 million award from the National Institute of Allergy and Infectious Diseases, entitled "Durable Antibody Mediated Protection Against HIV." See article in this issue for further information (see pg 16).



Deus Bazira Mubangizi, DrPH, MBA, MPH

**Deus Bazira Mubangizi, DrPH, MBA, MPH**, Assistant Professor of Medicine, Director, Center for Health, Education, & Biosecurity, Division of Clinical Care and Research, received a five year, \$25 million award from the Centers for Disease Control for the project entitled, "PACT ENDELEZA." This program aims to support the delivery and utilization of quality HIV prevention, care and treatment services in Nairobi and Machakos Counties with a focus on

implementing sustainable innovative approaches to service delivery and ultimately transitioning this support to a highly competent and committed county health management team. In addition, **Dr. Mubangizi** received a five year, \$12 million award from the Centers for Disease Control entitled "REACH (Reaching, Engaging and Acting for Health)." This program aims to implement CDC-RFA-GH16-1648 cooperative agreement, which aims to provide technical assistance to the local clinical implementing partners and the Regional Health Management Teams who support Tanzania's HIV strategic plan for implementation of comprehensive HIV clinical services.



Sylvia Ojoo, MD

**Sylvia Ojoo, MD**, Assistant Professor of Medicine, Division of Clinical Care and Research, received a five year, \$50 million award from the Centers for Disease Control entitled, "PACT-TIMIZA (Accomplish the mission of ending the epidemic)." This program supports implementation and expansion of comprehensive HIV prevention, care and treatment; establish systems for quality assurance and improvement

and support strengthening of county and sub-county systems for sustainable HIV service delivery in Kisumu and Homa Bay counties.



Robert Redfield, MD

**Robert Redfield, MD**, the Robert C. Gallo, MD Endowed Professorships in Translational Medicine, Co-founder, Associate Director, Director, Division of Clinical Care and Research, received a five year, \$15 million award from the Centers for Disease Control to partner with the Kenya Medical Research Institute (KEMRI) and Westat. The goal of the program is to enhance the country's preparedness and response against major diseases

and their associated risk factors that are the main causes of the country's preventable morbidity and premature deaths. The cornerstone of our proposed program is hinged on key pillars, namely: 1) Working through Kenya institutions as a deliberate sustainability strategy, 2) Improving the culture and practice of research evidence to policy and practice translation in order to narrow the gap between knowledge and action, 3) Enhancing capacity of institutions and competences of individuals in order to address structural and systemic barriers that have impeded optimal population health impact given level of investment made.



# IHV Faculty News (continued)



Chozha Rathinam, MSc, PhD

**Chozha Rathinam, MSc, PhD**, Assistant Professor of Medicine, Division of Basic Science, was awarded an R01 from the National Heart, Lung and Blood Institute (NHLBI), NIH in the amount of \$1,25,000 over 5 years for conducting the research on "NF-kB Signaling in the control of Hematopoiesis." NF-kB signaling pathway is one of the most extensively studied and understood pathways, however, the physiological consequences of augmented NF-kB

signaling in Stem Cells have not been understood. Despite many recent studies documenting constitutive activation of NF-kB in patients with hematological disorders, including Acute Myeloid Leukemia (AML) and Myelodysplastic Syndrome (MDS), it remains unclear if constitutive NF-kB signaling is sufficient and/or necessary for the onset of these diseases. The proposed research will specify the role of NF-kB in the pathophysiology mediated by Stem Cells and identify novel NF-kB mediated signal transduction pathways. In addition, the proposed research will provide key insights into the molecular pathways by which deregulated NF-kB signals affect the biology of human Hematopoietic Stem Cells. This work would utilize various transgenic and knockout mouse models and a novel line of humanized mouse model. Knowledge obtained through the proposed research would aid the development of newer and more successful therapies for human hematologic diseases that arise due to constitutive NF-kB activation.



Robb Sheneberger, MD

**Robb Sheneberger, MD**, Assistant Professor of Family Medicine, Division of Clinical Care and Research, received a five year, \$10 million award from the Centers for Disease Control entitled "Z CHECK: Zambia Community HIV Epidemic Control of Key Populations." The University of Maryland recently deployed the Community HIV Epidemic Control (CHEC) model in the Southern Province of Zambia, using community health workers equipped

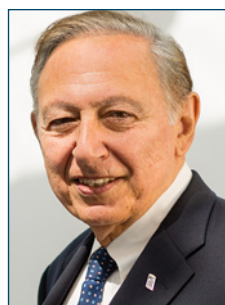
with electronic tablets to identify, recruit, and retain high-risk pregnant women and mother-baby pairs into care.

## Publications



Clement Adebamowo, BM, ChB, ScD

**Clement Adebamowo, BM, ChB, ScD**, Professor of Epidemiology & Public Health, Institute of Human Virology, and Associate Director Population Science Program, the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center was last author on "Recurrence of cervical intraepithelial lesions after thermo-coagulation in HIV-positive and HIV-negative Nigerian women," *BMC Women's Health*. 2016 May 11;16(1):25. Dr. Adebamowo was also co-author on "Urban and rural prevalence of diabetes and pre-diabetes and risk factors associated with diabetes in Tanzania and Uganda", *Global Health Action*. 2016 May 23;9:31440. Dr. Adebamowo was also co-author on "Burden of cancer attributable to Infectious Agents in Nigeria": 2012-2014. *Front Oncol* 2016; 6: 216; "The burden of HPV associated cancers in two regions in Nigeria" 2012-2014, *Cancer Epidemiology*, 2016 Dec; 45: 91-97; "Genome-wide Association Studies in Women of African Ancestry Identified 3q26.21 as a Novel Susceptibility Locus for Estrogen Receptor Negative Breast Cancer." *Hum Mol Genet*. 2016 Sep; pii: ddw305; "Moderate Alcohol Consumption and Chronic Disease: The Case for a Long-Term Trial." *Alcohol Clin Exp Res*. 2016 Nov; 40(11): 2283-2291.



Robert Gallo, MD

**Robert Gallo, MD**, The Homer & Martha Gudelsky Distinguished Professor of Medicine, IHV Director, Division of Basic Science and Division of Vaccine Research, published a perspective on October 14, 2016 in *Science* on "Shock and kill with caution."

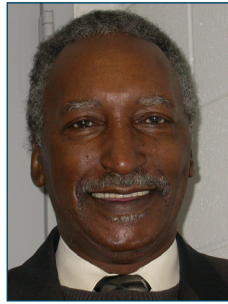
Members of the Global Virus Network (GVN) Task Force on HTLV, co-chaired by **Robert Gallo, MD**, The Homer & Martha Gudelsky Distinguished Professor of Medicine, IHV Director, Division of Basic

Science and Division of Vaccine Research, recently published an opinion piece in the journal, *Blood*, on the need for better screening of transplantation donor organs in order to prevent new cases of HTLV-associated diseases. The commentary—Screening transplant donors for HTLV-1 and -2—was published online on November 9, 2016 in *Blood's* First Edition section. Hardcopy publication in the journal and indexing in PubMed will follow shortly. In addition, the Task Force members also published a review article on November 11, 2016 in *Antiviral Research* entitled, "Reducing the global burden of HTLV-1 infection: An agenda for research and action."





Mikulas Popovic, MD, PhD



Joseph Bryant, DVM

**Mikulas Popovic, MD, PhD**, Adjunct Professor of Medicine, Institute of Human Virology was last author with co-author **Joseph Bryant, DVM**, Associate Professor of Pathology and Director, Division of Animal Models, Institute of Human Virology on "Efficient Procedure for N-Glycan Analyses and Detection of Endo H-Like Activity in Human Tumor Specimens" in the American Chemical Society's Journal of Proteome Research, 2016 Aug 5;15(8):2777-86.



Nicholas Stamatatos, MD, PhD

**Nicholas Stamatatos, MD, PhD**, Assistant Professor of Medicine, Institute of Human Virology, was the lead author on "Class 3 Semaphorins Induce F-Actin Reorganization in Human Dendritic Cells: Role in Cell Migration" in the Journal of Leukocyte Biology, 2016 Dec;100(6):1323-1334. **Sabrina Curreli, PhD**, Research Associate of Medicine, Institute of Human Virology, and **Olga Latinovic, PhD**, Assistant Professor of Microbiology, Institute of Human Virology, were among the co-authors.



Richard Zhao, PhD

**Richard Zhao, PhD**, Professor and Division Head of Molecular Pathology, Department of Pathology, Department of Microbiology-Immunology, Associate Member, Institute of Human Virology published an article as a senior and corresponding author in the Proceeding of National Academy of Sciences on "Characterization of cytopathic factors through genome-wide analysis of the Zika viral proteins in fission yeast."

**Robert Gallo, MD**, The Homer & Martha Gudelsky Distinguished Professor of Medicine, IHV Director, Division of Basic Science and Division of Vaccine Research, J. Marc Simard, M.D., Professor, Department of Neurosurgery, University of Maryland School of Medicine, Ge Li, Ph.D., a Research Scientist, University of Maryland School of Medicine, are among the co-authors.

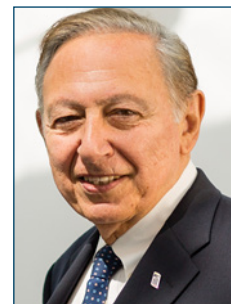
## Appointments and Honors



Clement Adebamowo, BM, ChB, ScD

**Clement Adebamowo, BM, ChB, ScD**, Professor of Epidemiology & Public Health, Institute of Human Virology, and Associate Director Population Science Program, the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center, has been appointed to the External Scientific Advisory Board of the Glaxo Smith Kline's Africa Non-Communicable Diseases (NCD) Open Lab. Dr. Adebamowo was appointed

Co-Chair of the NIH and Wellcome Trust funded Human Heredity for Health in Africa initiative. He was elected a member of the Scientific Advisory Board of the Keystone Symposia on Molecular and Cellular Biology. Additionally, Dr. Adebamowo was recognized as a 2016 Grant Recipient at the 9th Annual UMD-UMB Research and Innovation Seed Program and Reception at the University of Maryland College Park on October 17, 2016.



Robert Gallo, MD

**Robert Gallo, MD**, The Homer & Martha Gudelsky Distinguished Professor of Medicine, IHV Director, Division of Basic Science and Division of Vaccine Research, delivered the Raymond Schinazi Distinguished Lecture on Thursday, Sept. 1, 2016 at Emory University in Atlanta, GA. His lecture, "Virus Epidemics with Special Emphasis on HIV and AIDS: Reflections on the Past and Prospects for the Future," focused on reflections of the past and areas

where we might have done better. He discussed the great contributions in the field of HIV research and where we are today as well as a view of the key problems for the future. Gallo provided background on the special aspects of this kind of virus, namely a retrovirus, and his earlier discovery of the first known human retroviruses, human T cell leukemia virus-1, or HTLV-1, as well as HTLV-2. He ended his lecture by describing the direction in which research is headed, the Institute of Human Virology's HIV vaccine, including where it is today (phase 1 human clinical trials) and the difficulties facing the field in the future.



# *JOIN US! 80<sup>TH</sup> BIRTHDAY CELEBRATION ROAST & TOAST FOR*

**ROBERT “BOB” GALLO, MD**

***MAY 11, 2017***

*The Grand, 225 N. Charles Street, Baltimore*

On Thursday, May 11, the Institute of Human Virology (IHV) at the University of Maryland School of Medicine will host an 80th Birthday Celebration Roast & Toast for IHV’s co-founder and director, Robert “Bob” Gallo, MD. We not only will celebrate the life and legacy of Dr. Gallo, but also will raise funds to support the next generation of risk-taking medical virologists who emulate Dr. Gallo’s values and attributes.

Against the scientific tide at the time, Dr. Gallo led the hunt to prove that retroviruses exist in humans, not just animals. He became the first scientist to identify a human retrovirus—human T cell leukemia virus (HTLV)—which is the only known virus to cause leukemia. This trailblazing discovery was the cornerstone of Dr. Gallo’s research several years later when he co-discovered the human immunodeficiency virus (HIV) as the cause of AIDS and again, when he and his team pioneered the development of the HIV blood test. His research has helped transform care and quality of life for people living with HIV.

Perhaps no one knows better than Dr. Gallo the importance of unexpected discoveries and curiosity in scientific research, especially in this time of global virus pandemics. While junior scientists do not have the decades of experience of senior faculty, their fresh ideas and enthusiasm help create innovative solutions and open up new possibilities in scientific research and discovery. Your support of Dr. Gallo’s 80th Birthday Celebration Roast & Toast will enable IHV to create a research fund to support these young, risk-taking researchers who will uncover answers that will shape future treatment and cures.

Table sponsorships (\$1,500, \$3,000, \$5,000, and \$10,000), Program Ads (\$500 and \$1000), and Tickets (\$250) are on sale now. Please contact IHV’s Development Director, Lori Piccolo, at [lpiccolo@ihv.umaryland.edu](mailto:lpiccolo@ihv.umaryland.edu) or 410-706-1388 with questions and look for more information after January 1st.

