



Playing Chess with Treacherous Microbes: IHV “Masters” Rise to the Challenge

At this very moment, there is a potentially lethal battle raging within every person on this planet. Each relies on the power of their immune system to protect them from a daily onslaught of disease-causing, microscopic organisms (pathogens). This drama unfolds as a series of chess-like moves between pathogens and their hosts, playing out via pre-programmed immune responses designed, initially, to quickly halt and annihilate the attacker (innate immune response) and, ultimately, to mount long-lasting defenses against future attacks (adaptive immune responses).

Fortunately, we humans often win the match. But resourceful pathogens can evolve sly mechanisms to bypass our first line of defense, evade detection and cause debilitating or lethal illnesses. Enter the chess masters, Drs. Eric Sundberg and Greg Snyder, structural immunologists at the IHV who are determined not only to outsmart these microbes but to use them for the common good.

Dr. Sundberg, head of the IHV's Structural Immunology and Oncology Laboratory and newly appointed co-director of IHV's Basic Science Division, and Dr. Snyder, an Assistant Professor in the same group, are studying the interactions between human host proteins involved in immune defenses and proteins produced by their small, yet powerful microbial opponents. Recently, both have used genetic and protein engineering,

coupled with X-ray crystallography—a method allowing them to three-dimensionally characterize the spacing of atoms within the same or different protein molecules—to dissect how pathogens circumvent human defenses. Their knowledge will inform the intelligent design of therapeutics to combat not only pathogens but immune system diseases and even many cancers.

Dr. Sundberg and colleagues are focused on the devious ability of a bacterial protein secreted by *Streptococcus pyogenes* (the agent of Strep throat), Endoglycosidase S

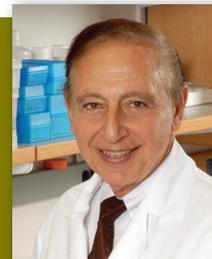


Dr. Eric Sundberg

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Director's Message:

Restructuring of IHV—Recently, I announced some restructuring of the Institute as a result of its continued growth. George Lewis and I have served as Co-Directors of the Basic Science and Vaccine Development Division; however, we've decided to separate the divisions. IHV's vaccine research is involved in a sufficient number of different studies that are extremely translational right now, and that I believe deserve the title of a separate division. Thus, George Lewis will become Director of IHV's Division of Vaccine Research, which he strongly merits. I've chosen not to



Dr. Robert Gallo



Dr. George Lewis

remain head of the Basic Science Division any longer but will remain as IHV overall Director. It is important to give younger people who have expressed exceptional talent an opportunity to lead the Basic Science Division; and so, I have named Associate Professor Eric Sundberg and Professor Wuyuan Lu as Co-Directors of the Division. They are the two most rising, prominent and well qualified faculty members to lead this

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Playing Chess with Treacherous Microbes: IHV “Masters” Rise to the Challenge *(continued from cover)*

(EndoS), to specifically target, modify, and nullify the most common and versatile type of human antibodies, type G immunoglobulins (IgGs). IgG antibodies, proteins essential for adaptive immune responses against viruses, bacteria, fungi, parasites, and certain environmental agents, are susceptible to the highly selective degradation by EndoS of specific sugar chains studding their surfaces



Dr. Greg Snyder

and defining their specific, protective functions. Remove these sugars, and antibodies have reduced or no ability to work—a scary thought.

Previous research had shown that EndoS works after binding specifically to the Fc region of an antibody. Antibodies have two distinct molecular parts—Fab regions that bind specifically recognize foreign molecules, known as antigens, and Fc regions that subsequently bind to our own cells’ receptors to trigger immune responses against the organisms that harbor those antigens. Dr. Sundberg set out to elucidate how the interactions of EndoS with the Fc region could account for its specificity for IgG, as well as its selectivity for subtypes of IgGs. “Using X-ray crystallography we obtain a snapshot of protein-protein interactions,” says Sundberg. “We looked at the structure of EndoS by itself, and then in combination with the Fc portion of an IgG molecule, to allow us to create a model of their ‘first engaged’ interactions.” Ideally, Sundberg needs to “catch EndoS right in the act of removing sugar residues,” to capture the exact mechanisms, a more difficult, future effort. For now, he has determined the critical structural parts of this three-dimensional (3-D) interaction needed for the success of EndoS.

IHV Develops HIV-1 Transgenic Nude Rat Model for HIV-1/AIDS Research

In 2001, IHV’s Animal Models Division, led by Dr. Joseph Bryant, developed a HIV-1 Transgenic rat model which was licensed by Harlan Sprague Dawley and is supplied widely to the research community. Currently, there more than 100 publications related to the use of this model for studying AIDS-associated diseases and the U.S. National Institutes of Health has funded 21 projects involving the transgenic rat. Recently, Dr. Bryant and his colleagues developed a new and improved transgenic rat model which more closely mimics HIV/AIDS seen in humans. IHV is in negotiations to license this latest animal model.

“Our new HIV-1 transgenic nude model improves on the original HIV transgenic rat model for studying early and chronic HIV infection,” said Dr. Bryant. “This new model will provide an understanding of how HIV-1 genes and protein cause specific problems in the different organs. We have currently already observed that these animals develop many of the disease conditions seen in AIDS patients very early in their life, which include kidney disease, skin disease, wasting, respiratory difficulties and most notably neurological abnormalities.”

Dr. Bryant and his IHV colleagues, Harry Davis, Dr. Eugene Ateh, Dr. Janine Davenport and collaborator, Dr. Walter Royal of the University of Maryland School of Medicine, have spent a year in characterizing this new model, which includes developing the many different phenotypes that develops disease similar to that seen in AIDS patients. This new biological development provides an in-vivo approach to study T-cell immunodeficiency, non AIDS cancers and opportunistic organisms in the HIV-1 setting. It will also provide a more consistent, reproducible model for the study of pathogenesis in HIV-1/AIDS and better mimics the disease seen in AIDS patients.



(L to R) Walter Royal, III, M.D.; Janine Davenport, DVM; Joseph Bryant, DVM; Eugene Ateh, DVM; and Harry Davis, BS,MS.

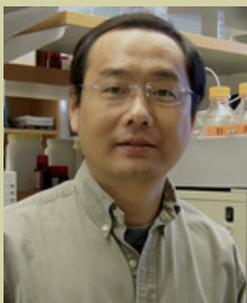
Director's Message *(continued)*



Dr. Eric Sundberg

Division, and their interactions with others (including the Director's office) are outstanding. I congratulate Eric and Wuyuan for this well-deserved, new leadership role at IHV.

Though I have no plans of retiring, IHV Associate Director and head of IHV's Division of Epidemiology and Prevention, Bill Blattner, will retire at the end of 2015. I will continue to draw on Bill Blattner's expertise until his last day at IHV and into the future as he will consult to IHV. His replacement will be vital in advising me and interacting with the other associate scientific directors. It goes without saying that Bill is truly irreplaceable and will be greatly missed. We have promising prospects, and we hope the new Division head will allow for great continuity and growth in the Division of Epidemiology and Prevention. As we get closer to Bill's retirement date, you will hear more about our plans to send Bill off with a bang.



Dr. Wuyuan Lu

I also want to recognize both the scientific and administrative support provided to the Director's office by David Pauza. David will become Associate Director of Faculty Development, an important role in preserving the legacy of the Institute (more on David's new role in this newsletter).

IHV Associate Director and Director of IHV's Clinical Care and Research Division Bob Redfield and I recruited renowned infectious disease expert Shyam Kottilil from the National Institute of Allergy and Infectious Diseases. He will serve as Co-Director of IHV's Clinical Research Unit and Associate Director for Clinical Research in Bob's Division. Shyam has all the promise of a leader and will be included in IHV leadership decisions. I expect each of these colleagues to represent the future of the Institute in a very significant way, including contributions to recruitments, seminar speakers, journal club meetings, faculty retreats, staff meetings, our annual international meeting, and, above all, in planning the direction of IHV.

Thoughts on Ebola—I have no personal expertise on Ebola and therefore I am, and have been, reluctant to say very much about it. However, since it is in the news and I am often asked, I will use this venue to say a few words. The public health problem with Ebola is obvious, but I think it will “burn out” like previous Ebola epidemics. Yes, this one



is worse, it could go longer than prior Ebola outbreaks, but this epidemic will likely fade away. The challenge we face is when Ebola returns again, but in bursts that we cannot predict. This disease, in my view, is far more a public health, economic (infrastructure), education and training problem as opposed to a scientific challenge. Certainly, hospitals need to have protocol on how to handle Ebola patients. We need good diagnostics available in countries where this is an episodic problem—which is not limited to West Africa. There are multiple vaccines already available against Ebola, but the setback today is that these vaccines were not licensed and “put to the test” or we would have been there already with effective vaccines. If pharmaceutical companies won't make this happen, then it is incumbent upon world governments to move forward the technology and biomedical breakthroughs by having successful vaccines licensed and available. Maybe they will do that now.



The Global Virus Network (GVN), which I co-founded with my colleagues (William Hall of Ireland and the late Reinhard Kurth of Germany) has been actively addressing

the recent Ebola epidemic, as the non-profit organization was created to have a role in outbreaks. I believe Ebola is not so complex in terms of the science and the vaccine should be fairly straight forward as already a considerable amount is known about the virus. There are at least 8 experts from the GVN from the US, South Africa, Germany and Italy actively involved in developing and testing therapeutics (including zMAPP) and vaccines, and in providing authoritative information to journalists and policymakers worldwide. At IHV, we are pleased that Alan Schmaljohn, a colleague at the School of Medicine, who developed one of the three antibodies in the zMAPP therapeutic, has affiliated with IHV GVN. GVN hopes to support small grants for research on Ebola and training for medical virologists, especially in Africa, as next steps.

IHV welcomes the opportunity to contribute our expertise in the field of diagnostics for Ebola and we are inquiring about varying funding opportunities. We have been instrumental in the development of effective viral assays and currently have a team of experts in the viral hemorrhagic fevers (Maria Salvato), production of assay materials such as monoclonal antibodies (George Lewis), and a diagnostic team headed by Niel Constantine that has a proven record for developing highly sensitive viral assays. We also have collaborators in Nigeria (under Bill Blattner's program), where the expertise and established laboratory resources exist for translation of new assays.

Lastly, leaders from the School of Medicine and Medical Center have developed a comprehensive readiness plan for managing a potential Ebola threat. The planning framework consists of eight primary work groups, led by a Strategic Oversight Committee chaired by Bob Redfield, focusing on treatment scenarios, policy structure, operational response, staff training and competency, the care environment, care delivery, communications, and laboratory services.

IHV Hosts Prominent AIDS Researchers During 16th Annual International Meeting

Scientists from around the globe descend on Baltimore to discuss HIV/AIDS cure, vaccine, select topics and cancer

The Institute of Human Virology (IHV) at the University of Maryland School of Medicine hosted IHV's 16th Annual International Meeting Sunday, September 14 through Wednesday, September 17 at the Sheraton Inner Harbor Hotel in Baltimore, Maryland. The Annual Meeting featured themes on HIV cure research; HIV pathogenesis; HIV structural biology, immunology and vaccines; advances in clinical, prevention and public health research, and a cross-cutting session on the molecular and immunological insights from cancer biology and treatment.

"This year's meeting covered some very important issues including developments in HIV cure and vaccine research," said Robert C. Gallo M.D., Director of the Institute of Human Virology and The Homer & Martha Gudelsky Distinguished Professor in Medicine at the University of Maryland School of Medicine. "We also had a session on cancer with some of

the top international field investigators—who will address the interface between cancer cure and HIV cure." Dr. Gallo 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.

IHV presented its Lifetime Achievement Awards at a gala during the meeting. William Paul, M.D., was honored as the 2014 IHV Lifetime Achievement Awardee for Scientific Contributions to the field of immunology and pathogenesis. Dr. Paul is Chief of the Laboratory of Immunology at the National Institute of Allergy and Infectious Diseases, and was former director of the National Institutes of Health Office of AIDS Research. He is also the founding editor of the *Annual Review of Immunology* and a member of the National Academy of Sciences. In addition to the award, IHV enjoys giving special, tailored gifts. Since the Paul's have an



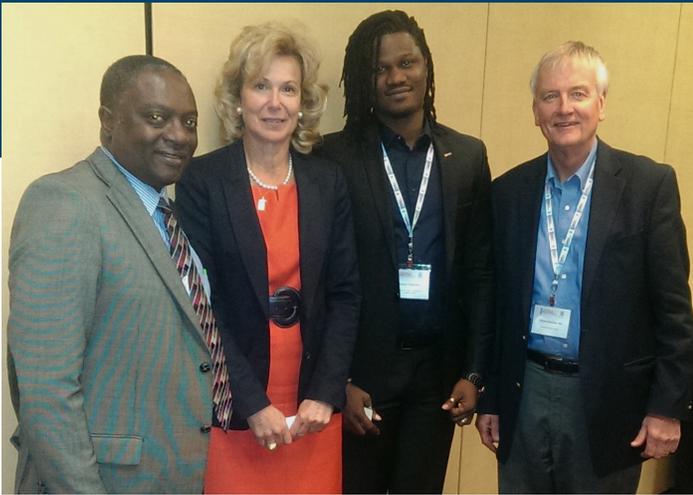
Paulo Lusso, Ph.D., of the U.S. National Institute of Allergy and Infectious Diseases, presents during the session.

apartment in New York City and enjoy the opera, IHV gave them a gift certificate to the New York Metropolitan Opera and Il Postino.

The 2014 Lifetime Achievement Award for Public Service was presented to John Martin, Ph.D. As Gilead's current Chief Executive Officer and Chairman of the Board, Dr. Martin is a leader in supporting access to life-saving anti-HIV medications that although still under patent have been made widely and affordably available to millions around the world infected with HIV, and for prevention through Pre-exposure drug therapy. In addition to the Award, IHV presented Dr. Martin a Zambian drum such as those owned by a Zambian Chief, which symbolizes hope, and a first edition 1875 publication of the book, "Livingstone's Second Expedition to Africa" by David Livingstone, which describes Dr. Livingstone's expedition to the Zambesi



(L to R) Henry Masur, M.D., Chief, Critical Care Medicine Department, National Institutes of Health Clinical Center; Robert Gallo, MD; Jay Berzofsky, M.D., Ph.D., Head, Molecular Immunogenetics and Vaccine Research Section, Center for Cancer Research, National Cancer Institute; William E. Paul, M.D.; John Martin, Ph.D.; Robert Redfield, M.D., Associate Director, IHV; Harriet Kapilikisha, JACQUES Initiative, IHV; James Rooney, M.D., Vice President of Medical Affairs, Gilead Sciences; and, E. Albert Reece, M.D., Ph.D., MBA, Dean, University of Maryland School of Medicine.



(L to R) Dr. Patrick Dakum Head of Institute of Human Virology Nigeria; Dr. Birx; Nigerian community activist Ifeanyi Orazulike; and, IHV Associate Director Dr. William Blattner.

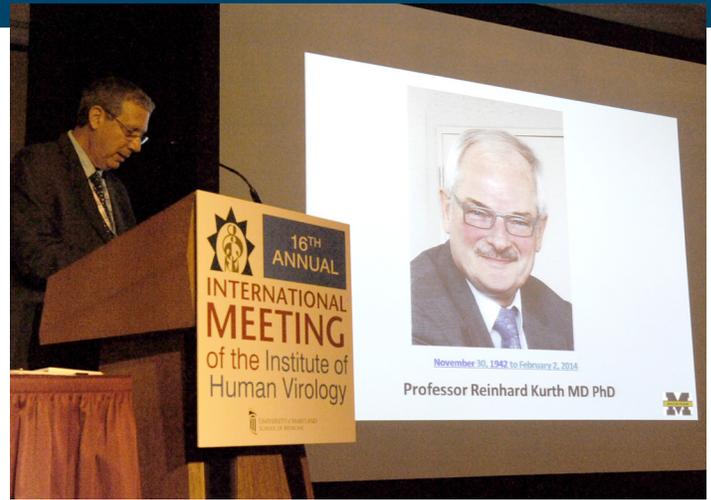
and its tributaries and of the discovery of Lakes Shirwa and Nyassa, 1858-1864.

“Bill Paul’s discoveries and research in immunology have impacted biomedical research greatly,” said Dr. Gallo. “And, as head of a pharmaceutical company developing life-saving drugs for HIV infection, John Martin has been a world leader in combating AIDS in developing nations. Both have made tremendous contributions to public health, and we are proud to honor Bill and John, each of whom have contributed so much, and influenced so many, at the Institute.”

Ambassador Deborah Birx, M.D., U.S. Global AIDS Coordinator, spoke during IHV’s Annual Meeting. Ambassador Birx is a world renowned medical expert and leader in the field of HIV/AIDS whose three decade-long career has focused on HIV/AIDS immunology, vaccine research, and global health. As the U.S. Global AIDS Coordinator, Ambassador Birx oversees the implementation of the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR), the largest commitment by any nation to combat a single disease in history, as well as all U.S. Government engagement with the Global Fund to Fight AIDS, Tuberculosis and Malaria. IHV is a national leader and recipient of PEPFAR funds—implementing the program in 7 African and 2 Caribbean nations by providing care to nearly 1 million people living with HIV. IHV also provides care to more than 5,500 Baltimoreans.



Warner Greene, M.D., Ph.D.; Gladstone Institute of Virology and Immunology, University of California San Francisco asks questions following a presentation.



Mark Kaplan, M.D. from the University of Michigan presents the Reinhard Kurth Memorial Lecture.

Mark Your Calendar



17th Annual International Meeting



Marriott Waterfront Hotel

Baltimore, MD

September 27-30, 2015

www.ihv.org

IHV Leads All-Encompassing Approach to Commemorating National HIV Testing Day—Pulls Community and Campus Together for a Worthy Cause



Staff and volunteers prepare for their day at St. Matthews New Life Baptist Church.

Derek Spencer, Executive Director of the Institute of Human Virology's (IHV) JACQUES Initiative, set out this year to make the 6th Annual City Uprising Block Party and Health Fair all-encompassing by holding it on a Saturday, to allow both the maximum number of diverse volunteers to participate and those most vulnerable to attend. As a result, an incredible collaboration between churches, nonprofits, as well as faculty, students, staff and health care providers from the University of Maryland, Baltimore touched hundreds of lives on a single June day.

On June 28th, more than 500 people were tested for HIV. 30 were persons living with HIV who were offered linkage to HIV care and supportive services. Additionally, more than 1,700 units of service were provided and delivered by a diverse group of University of Maryland faculty and students, the STAR TRACK Adolescent HIV Clinic, Baltimore Legal Aid and other local service providers to include linkage to health care, blood pressure screening, healthy lifestyle education, medication counseling, case management services, oral cancer screening and oral health education.

Religious leaders, such as Pastor Eric King of St. Matthews New Life United Methodist Church, opened his heart and church for the fourth year in a row to serve the community and support the initiative.

"We started getting involved as a site and with congregation members volunteering because we saw the need for HIV testing in the East Baltimore community," said King. "I believe that before you can ever help save a soul, you have to help save a life."

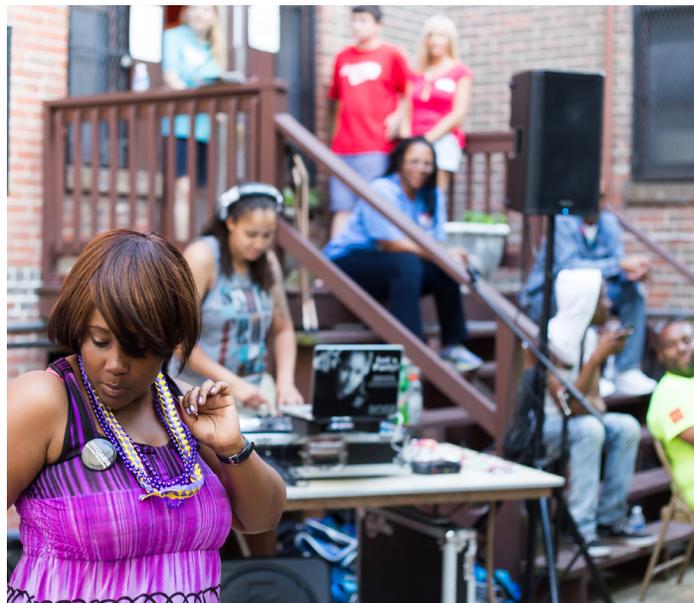
Other churches involved included Payne Memorial AME, Gallery Church of Baltimore, Unity United UMC, First & Franklin Presbyterian Church and the local faith-based non-profit, HopeSprings.

In addition to the widespread community support, the vast array of University of Maryland students and faculty paints its own story of school-wide pride and participation.

"We have been working with the different schools within the campus for some time, working to find ways to integrate the students into what we are doing at IHV's JACQUES Initiative," said Mr. Spencer. "Each student and faculty member has a unique role he or she can play in reaching out and making a difference in the lives of those impacted by HIV and other chronic health issues. The coming together of all the departments is impressive and shows the commitment we have to our community."

Dr. Valli Meeks, Associate Professor of Oncology and Diagnostic Sciences and the Director of the PLUS program at the University of Maryland School of Dentistry (UM SOD), has been working with those in the community over the last 25 years to provide continuous care for HIV patients. This is the second year that UM SOD has participated with IHV's JACQUES Initiative.

"Our dental students love the opportunity to serve during City Uprising and the experience working first hand with the community," said Dr. Meeks. "Our focus wasn't just screening for HIV, but providing those that visited our station with a full oral examination to see if there were any gum diseases or oral cancer. I'm so very proud of our students, as they don't come with preconceived stigmas about the individuals from the community. They have big hearts and a desire to learn how to best serve those living with HIV."



The community celebrates at the First & Franklin Presbyterian Church block party and health fair.



UMB student takes a client's blood pressure at the Martin Pollak Project, Inc.

Nursing students also participated in the exciting day of events. Second-year students involved in the nurse practitioner program are required to take a specialty course that provides them an opportunity to participate in City Uprising.

"Through our second year specialty course, our family nurse practitioner students get the opportunity to work with those living with HIV," said Hazel Jones-Parker, Assistant Professor at the School of Nursing and Director of Clinical Education at the University of Maryland Institute of Human Virology AIDS Education and Training Center. "Our students feel that their involvement in City Uprising helps them see this disease for what it really is and hear the countless stories of people that contracted HIV through no fault of their own."

In addition to assisting with HIV testing, Dr. Jones-Parker's nurse practitioner students provided nutrition counseling, blood pressure monitoring, as well as other forms of testing.

While the fact that nursing and dental students' involvement seems to "make sense" for this type of event, campus participation didn't stop there. Law students from the University of Maryland Francis King Carey School of Law participated in City Uprising, too. Third-year law student Brian Bajew got involved to gain experience in working with individuals living with HIV/AIDS, so he could better understand the facts and myths surrounding the illness.

"It is a fantastic opportunity to become better acquainted with a part of our culture that is otherwise largely shaped by myths

and rumors," said Mr. Bajew. "As a future attorney, it was a valuable experience to work with individuals who are in need of legal assistance and whom I might very well represent one day."

Ryan Steidl, JD/MBA Candidate 2016, shared that City Uprising was offered as part of the law school's summer clinical program in an effort to offer more to the City of Baltimore, providing a chance for law students to gain professional interaction with other disciplines, engage with underserved persons, and assist in providing comprehensive services to the communities.

"[During City Uprising], I primarily helped with intake and assisting persons in properly filling out all of their forms," said Mr. Steidl. "I also assisted in compiling and organizing all completed forms at the end of the day so that the information could be used for understanding the results of City Uprising. I would recommend UMB students be a part of City Uprising to experience how other disciplines must learn to work more efficiently together, and to understand one another in order to address the multiple and complex needs of underserved persons."

The daylong initiative touched the lives of many, but not just those coming for help. Law students like Ryan and Brian, and the countless other students and faculty from multiple disciplines, lent their talents and specialties to impact a population that needs support and understanding.

To be a part of this exciting movement taking place across the University of Maryland, Baltimore campus, contact Alexandra "Allie" Reitz at areitz@ihv.umaryland.edu to see how you can participate in events like this one throughout the year.



IHV Board Member and WYPR's Sheilah Kast interviews IHV Associate Director and Head of IHV's Clinical Care and Research Division Dr. Robert Redfield and IHV's JACQUES Initiative Executive Director Derek Spencer for National HIV Testing Day.

Cummings Hosts Chaffetz at IHV



(L to R) IHV Board of Advisors Chairman Terry Lierman (coming fresh off the streets after campaigning for his daughter, Brooke Lierman for the Maryland House of Delegates), IHV Associate Director Dr. Robert Redfield and IHV Director Dr. Robert Gallo.

IHV Board of Advisors member U.S. Congressman Elijah Cummings (D-MD), in his capacity as Ranking Member of the Oversight and Government Reform Subcommittee on National Security, Homeland Defense and Foreign Operations brought new Subcommittee Chairman U.S. Congressman Jason Chaffetz (R-UT) to visit IHV. IHV leadership briefed both Members of the U.S. House of Representatives on the status of HIV/AIDS research, the Global Virus Network, and public health policy initiatives, among other important issues. The Congressmen also visited with clients of IHV's JACQUES Initiative program to hear about the importance of community outreach programs.



(L to R) IHV Associate Director Dr. William Blattner, The Honorable Elijah Cummings and The Honorable Jason Chaffetz.



Dr. Henry Lowe

Jamaica's Dr. Henry Lowe Joins IHV Board of Advisors

Henry Lowe, Executive Chairman of the Environmental Health Foundation (EHF), has served on the Board of Directors of some of the largest companies in Jamaica, such as Jamaica Public Service, Air Jamaica, National Water Commission, the Airports Authority of Jamaica, the Port Authority, the Scientific Research

Council and the Jamaica Bureau of Standards, among others. The EHF undertakes a range of environmental and health-related issues with a focus on health, education and the environment as well as Science and Technology. In 2000, Dr. Lowe purchased the 2-acre property at 39 Lady Musgrave Road to establish the first wellness and lifestyle centre in Jamaica and the Caribbean. The Eden Gardens Wellness and Lifestyle concept was developed to ensure the harmony and wellness of the four elements – body, soul, mind and life – in the operations of the facility. In October 2008, Dr. Lowe announced his research findings to the global scientific community regarding the Ball Moss at Ehrlich II, the 2nd World Conference on Magic Bullets in Nurnberg, Germany. In 2010, Dr. Lowe established the Bio-Tech R&D Institute with the primary mission of undertaking research and development of biological materials, especially those of local origins, for wealth creation. His vision is for the Institute to act as a catalyst for the development of biotechnology as a business in Jamaica.

Ratner Expands Goats for the Old Goat Program

The Goats, Education, Medicine, and Sustainability (GEMS) Development Foundation was established by IHV's Board of Advisor Member Ellen Ratner to expand the mission of the Goats for the Old Goat program, which was initially established to raise money and awareness to fight hunger in South Sudan. The Program gives goats to returning former slaves and people in South Sudan who are hungry—especially because of ongoing civil conflict.

Goats For The Old Goat began as Ratner, who is also White House Correspondent and Bureau Chief for The Talk Radio News Service, was preparing for her 60th birthday. Although she can't believe it, she is in fact an "old goat." Birthdays are a big deal in



Ellen Ratner in Africa

Ratner's family, but she did not want presents. Because of her work in Southern Sudan (a part of which was recently called "the hungriest place on earth") she wanted her friends and others to contribute money for goats, so that people would be able eat and children would not have a lifetime legacy of malnutrition.

Goats can graze easily on the grasses of Southern Sudan. They provide milk (up to a liter a day) and cheese. She goats multiply. Goats are used for food and their dung is used as fertilizer. By pooling resources, neighbors can begin micro-businesses as small dairies. A she-goat can provide up to one liter of milk a day, making a difference between real nourishment and hunger. Goat milk is considered high quality protein, a good source for calcium and fat and a good source for riboflavin, which is important for the body's energy production. Excess milk can be made into cheese and sold in the market, and she- goats have kids, building income for families and single women. One goat opens a world of survival, and allows a family to have the safety net to pursue education and micro-business. Neighbors can work together to start small local dairies. As there is no need to homogenize goat's milk, it is simple to begin production for sale.

By working with and expanding these programs, the GEMS Development Foundation plans to be a constant presence in South Sudan fostering sustainable development. GEMS Development Foundation is its own nonprofit corporation, with its own Advisory Board, whose programs are sponsored by WINDREF (The Windward Islands Research and Education Foundation), a U.S. nonprofit corporation located in New York, qualified under Section 501(c)(3) of the Internal Revenue Code.



Goats For The Old Goat

For more information please visit <http://goatsfortheoldgoat.com>

Moynahan Honored by Post University

IHV Board of Advisor Member and Global Virus Network Chairman Timothy C. Moynahan, Esq., with legal practices in Waterbury and Southbury, Connecticut, was honored by Waterbury-based Post University with an Honorary Doctor of Letters Degree during the University's May 10, 2014 commencement ceremonies. After presenting the doctoral degree, the Post University Board of Trustees also announced that the university named the law section of the library after Moynahan. Post University bestowed the honors following Moynahan's donation in 2011 of more than 2,000 law books to its library—doubling the university's collection, making it the largest undergraduate legal studies library in the area.



Timothy C. Moynahan (second from left)



His Excellency Goodluck Ebele Jonathan presents Dr. Abimiku the Nigerian National Honors Award.

Abimiku Receives Honors from Nigerian Government

Alash'le Abimiku, Ph.D., Associate Professor, Division of Epidemiology and Prevention, Institute of Human Virology (IHV) was made Member of the Order of the Niger of the Federal Republic of Nigeria by President Goodluck Ebele Jonathan. The Award honors Nigerians "from all walks of life, those who have rendered special and outstanding services in their various callings, to the benefit and progress of the nation." The President of the Federal Republic of Nigeria, His Excellency Goodluck Ebele Jonathan, presented Dr. Abimiku the Award during a ceremony in Abuja, Nigeria on September 29, 2014. The award was bestowed upon Dr. Abimiku in recognition of her 30 years of service to developing research infrastructure through the establishment of PLASVIREC in Jos, Nigeria and the Institute of Human Virology Nigeria in Abuja, with the goal of empowering Nigeria's response to its myriad health challenges, particularly HIV. Dr. Abimiku was a postdoctoral fellow in 1991 at the National Institutes of Health, working with IHV Director Dr. Robert Gallo, where she pioneered the characterization of Nigeria's HIV epidemic, showing the isolates to be non B, subtype G and A/G recombinant. These subtypes – G and recombinant form (CRF02) are second in the world behind subtype C prominent in Southern Africa as the cause of the HIV pandemic. These data have significance to HIV vaccine development. Dr. Abimiku in collaboration with Drs. Gallo and Blattner have channeled more than \$300 million in research and health care implementation and training funds to Nigeria and have impacted several million. As "LYNCH PIN FOR NIGERIA" she has channeled grant funding from The Bill and Melinda Gates Foundation, the World AIDS Foundation, the U.S. Department of Defense, U.S. Centers for Disease Control, U.S. President's Emergency Plan for AIDS Relief (PEPFAR), U.S. National Institutes of Health, and Canadian Global Health Research Initiative to impact

the health of the people of Nigeria and achieve research with broad scientific and public health impact.

Gallo Receives Honors



Dr. Gallo receives the Bonino Pulejo International Prize in Sicily, Italy.

In May, Robert C. Gallo, M.D., Director, Homer and Martha Gudelsky Professor and Medicine, Division of Basic Science and Vaccine Development, Institute of Human Virology, received his 32nd honorary doctorate degree from Marshall University in West Virginia, USA. In October, Dr. Gallo also received the Bonino Pulejo International Prize at the University of Messina in Sicily, Italy from the Fondazione Bonino-Pulejo, a Foundation dedicated to fostering fellowships to newly graduated medical and law students from Universities in Sicily and Calabria. Dr. Gallo received the award for his research on viral proteins and human retroviruses.



Dr. C. David Pauza

Pauza Appointed as IHV Associate Director of Faculty Development

Q&A with Dr. C. David Pauza, Associate Director of Faculty Development, Professor of Medicine, and Head of the Laboratory of T Cells & Viral Pathogenesis, Institute of Human Virology

What is your objective in this new role?

Improve recruitment, retention and development of faculty that will contribute to program growth within the IHV. As we face

extraordinary competition for research funding, our faculty will benefit from an assigned Associate Director position focused on faculty needs. This position also provides mentoring for existing IHV faculty to help improve success rates for research funding.

How will you meet your objective?

This position will have administrative responsibility for faculty recruitment including our open positions seeking outside individuals and identifying promising Research Associates within IHV who may be suitable for promotion to Assistant Professor with increased obligation for independent funding. This position reports directly to IHV Director Dr. Gallo and will provide regular summaries of funding success, application rates, access of mentoring opportunities and plans or progress in faculty recruiting.

How will this new position impact IHV?

By establishing this new Associate Directorship for Faculty Development, Dr. Gallo and the IHV are recognizing the substantial obstacles facing our faculty as they seek independent funding and career advancement. We are committed to providing the best possible environment for scientific success that will drive IHV toward its critical goals in research for human health and continue to develop the next generations of biomedical scientists.

Italian Minister of Health Visits IHV

The Honorable Minister of Health of Italy, Beatrice Lorenzin, and her colleagues visited IHV to meet with IHV's leadership and Italian faculty to discuss current HIV/AIDS research and other public health issues. Following the meeting, Minister Lorenzin presented Dr. Gallo a coin—one side included the coat of arms of the Italian Republic and the reverse side included a reproduction of the coin of Antonius Pius depicting the sacred snake of Asclepius who guides the boat that takes him from Epidaurus to the Tiber Island in Rome and marks the spot where the Romans built the temple of the god (293 B.C.).



Dr. Gallo and Minister Beatrice Lorenzin



IHV Faculty meet with Italian officials.

Highlighting the Women of IHV's HIV Basic Science and Clinical Research

IHV Faculty



Alash'le Abimiku, M.D., Associate Professor, Medicine, Division of Epidemiology and Prevention, Co-Founder and Executive Director, Laboratory Diagnostics and Research, Institute of Human Virology, Nigeria: Dr. Abimiku's goal is to augment international scientific collaborations

between the Institute and her country of origin Nigeria where she has built her research activities on the study of HIV pathogenesis and protection using human natural transmission models.



Carla Alexander, M.D., Assistant Professor, Medicine, Division of Clinical Care and Research: Dr. Alexander is conducting outcomes research related to improving engagement and retention in care for HIV positive young men who have sex with men facing complex challenges. Her work introduces a

palliative approach for health workers providing outpatient care for this population.



Shashwatee Bagchi, M.D., Assistant Professor, Medicine, Division of Clinical Care and Research: Dr. Bagchi has been working with patients with HIV/AIDS since 2002 domestically and internationally, has served on national guidelines committees for both HIV/AIDS and tuberculosis in Tanzania and

Zambia, and helped develop centers of HIV excellence in several countries. Her research work has ranged from HIV treatment strategies when working internationally to focus on the apparent increased cardiovascular morbidity and mortality in HIV-infected persons in the current generation of the HIV epidemic.



Ulrike Buchwald, M.D., Assistant Professor, Medicine, Division of Clinical Care and Research: Dr. Buchwald's research focuses on the care of HIV-infected patients in the IHV outpatient clinic and during hospitalization. She is also involved in international HIV

care and education as well as operational projects on TB and TB/HIV coinfection, and she focuses on infections in critically ill patients.



Cristiana Cairo, Ph.D., Assistant Professor, Medicine, Division of Basic Science and Vaccine Development: Dr. Cairo is investigating how exposure to microbial antigens before birth alters infant immunity. In particular, she is interested in the mechanisms that

impair infant immune responses to vaccines and affect susceptibility to infections early in life.



Fiorenza Cocchi, M.D., Assistant Professor, Medicine and Senior Scientist, Laboratory of the Director, Division of Basic Science and Vaccine Development: Dr. Cocchi's research includes studying the association between mycoplasma and B cell lymphoma.



Sabrina Curreli, Ph.D., Research Associate, Medicine and Senior Scientist, Laboratory of the Director, Division of Basic Science and Vaccine Development: Dr. Curreli's research includes HIV pathogenesis and role of infectious agents in tumorigenesis, with particular focus on lymphoma during Mycoplasma and HIV-1 infection.



Lori Fantry, M.D., MPH, Associate Professor, Medicine, Division of Clinical Care and Research: Dr. Fantry is Medical Director of the Evelyn Jordan Center, the University of Maryland's and the IHV's largest HIV clinic. Her work also includes providing care to hospitalized patients with infectious diseases; teaching medical students, residents, and fellows; and doing clinical research regarding HIV and women and HIV and cancer.



Suzanne Gartner, Ph.D., Associate Professor, Medicine and Head of the Laboratory of Stem Cell Biology, Division of Basic Science and Vaccine Development: Dr. Gartner's laboratory continues to pursue studies of human nurse macrophages, a type of specialized

macrophage, discovered by her group, which can serve as a site for the de novo generation of new cells. Her current work focuses on the role of nurse macrophages in HIV pathogenesis, particularly maintenance of viral persistence, and the possible involvement of these cells in erythropoiesis.



Roberta Kamin-Lewis, Ph.D., Associate Professor, Microbiology and Immunology, Division of Basic Science and Vaccine Development: Dr. Kamin-Lewis' research goals include determining the role of antibody Fc mediated effector function in protection against HIV-1

and determining the factor(s) that underlie the poor durability of the antibody response to HIV-1 gp120 (envelope) antigens.



Mariam Khambaty, M.D., Assistant Professor, Medicine, Division of Clinical Care and Research: Dr. Khambaty is an infectious disease clinician with a focus on HIV, Addictions, and Hepatitis C in the outpatient setting. She also works in outpatient general infectious disease

clinics and has a special interest in tropical and mycobacterial diseases.



Janaki Kuruppu, M.D., Assistant Professor, Medicine, Division of Clinical Care and Research: Dr. Kuruppu is the Medical Director of the Infectious Disease Clinic at Midtown, and the acting Medical Director of the inpatient dedicated infectious disease service.



Olga Latinovic, Ph.D., Assistant Professor, Microbiology and Head of the Laboratory of Imaging Studies of Pathogens & Cell Interactions and of the Imaging core, Division of Basic Science and Vaccine Development: Dr. Latinovic is developing novel antiviral therapy strategies using

HIV entry inhibitors, with a particular focus in understanding antiviral synergistic activity and its mechanism between CCR5 antagonists and CCR5 antibodies. She is developing super resolution microscopy methods in order to visualize direct CCR5 interactions with CCR5 blockers.



Yiling Liu, M.D., Research Associate, Medicine, Division of Basic Science and Vaccine Development: Dr. Liu's research currently focuses on HIV infection in bone marrow, as well as the role of macrophages in the development of AIDS-associated B-cell lymphomas. This work includes

identification of the types of cells in marrow that harbor HIV, and whether this tissue serves as a reservoir for HIV persistence.



Meron Mengistu, Ph.D., Research Associate, Division of Basic Science and Vaccine Development: Dr. Mengistu is studying the timing, location and extent of anti-HIV envelope exposure during HIV interaction with target cells. To do this, she has developed single virus

imaging methods including super-resolution microscopy.



Rebecca Nowak, Ph.D., Instructor, Division of Epidemiology and Prevention: The goals of Dr. Nowak's research are to understand molecular pathogenesis of virally associated cancers particularly in the context of HIV infection. She is currently investigating the prevalence of anal human papillomavirus (HPV) and associated immune and behavioral correlates in Nigerian gay, bisexual, and other men who have sex with men (MSM) at high risk for HIV infection.



Sylvia Ojoo, M.B., ChB, Clinical Assistant Professor, Medicine, Division of Clinical Care and Research: Dr. Ojoo has more than 10 years experience developing and implementing large scale HIV care and treatment programs in Kenya, an experience that has led her to work on

clinical care delivery systems as they pertain to chronic disease management.



Marzena Pazgier, Ph.D., Assistant Professor, Biochemistry and Molecular Biology and Head of the Laboratory of Biomolecular Recognition, Division of Basic Science and Vaccine Development: Currently, Dr. Pazgier's research centers on applying structural biology and

protein chemistry tools to define mechanisms governing the Fc receptor (FcR)-mediated functions of antibodies to HIV-1. These studies aim at designing novel vaccine concepts to induce FcR-dependent anti-HIV activity in humans.



Bhawna Poonia, Ph.D., Assistant Professor (P/T), Medicine, Division of Basic Science and Vaccine Development: Dr. Poonia's research aims to identify means for improving immune responses in HIV infection based on mechanisms of viral

immunopathology and Fc receptor genetics. Her chief goal is to explore ways to improve defective T cell (gamma delta and CD8) effector mechanisms for efficient HIV control.



Maria Salvato, Ph.D., Professor, Medicine and Head of the Laboratory of Arenavirus Disease & Preventive Vaccines, Division of Basic Science and Vaccine Development, Principle Investigator of IHV's Viral Hemorrhagic Fever Lab, Associate Director of the

IHV-Global Virus Network Center of Excellence: Dr. Salvato is interested in the mechanisms by which hemorrhagic fever viruses cause disease. After profiling the development of hemorrhagic fever in a primate model, Dr. Salvato is assessing treatment of specific steps, such as decline in PTSG2 (COX2) expression and stopping thrombocytopenia.



Nadia Sam-Agudu, M.D., Assistant Professor, Epidemiology and Prevention, Division of Epidemiology and Prevention: Dr. Sam-Agudu, originally from Ghana, is a US-trained Board Certified Pediatric Infectious Diseases expert

who is addressing the unabated HIV epidemic among young women and in the children at risk through maternal infant transmission. Throughout sub Saharan Africa rates of infection among women by age 20 reach those of men 15 to 20 years their senior pointing to the high risk these women experience during adolescence. Dr. Sam-Agudu has received international funding to conduct research to develop best practices for addressing the health needs of these young women and their children.



IHV Trainees (Pictured Left to Right)

Alanna Murday, BS, Graduate Research Assistant/Ph.D. Candidate in Molecular Medicine (affiliation), Division of Basic Science and Vaccine Development

Suchita Chaudhry, Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Development

Haoting Hsu, Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Development

Toshie Nata, M.D., Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Development

Beatriz Trastoy, Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Development

Virginia Carroll, Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Development

Neelakshi Gohain, Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Development

Chiara Orlandi, Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Research

Shikha Shrivastava, Ph.D., Post-doctoral Fellow, Division of Clinical Care and Research

Lydia Tang, MBChB, Visiting Instructor, Division of Clinical Care and Research

Jacqueline Bork, M.D., Visiting Instructor, Division of Clinical Care and Research

Jennifer Husson, M.D., Visiting Instructor, Division of Clinical Care and Research

Not Pictured

Modupe Coker, DDS, MPH, Graduate Research Assistant, Division of Epidemiology and Prevention

Yi Hu, Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Development

Sandra Postel, Ph.D., Post-doctoral Fellow, Division of Basic Science and Vaccine Development

Zhanna Shubin, Ph.D., Candidate, Division of Basic Science and Vaccine Development

IHV New Grants



Man Charurat, Ph.D.,

Associate Professor, Division of Epidemiology and Prevention, Institute of Human Virology, received a five-year, \$3.1 million award from the National Institutes of Health entitled "Microbiome Affects Risk of Growth in HIV-exposed but Uninfected Infants-Nigeria." This study posits that the

acquisition of a distorted gastrointestinal microbiome resulting from exposure to maternal HIV infection in HIV-exposed but uninfected infants is associated with postnatal growth as measured by increased nutritional deficiencies, increased GI permeability, and adverse clinical outcomes.

Dr. Charurat also received a five-year \$3.1 million award from the National Institutes of Health in collaboration with Claire Fraser, Ph.D., Professor and Director of the Institute for Genome Sciences. The study entitled, "Microbiome Affects Risk of Growth in HIV-exposed but Uninfected Infants-Nigeria" will investigate that the acquisition of a distorted gastrointestinal microbiome resulting from exposure to maternal HIV infection in HIV-exposed but uninfected infants and its association with postnatal growth as measured by increased nutritional deficiencies, increased GI permeability, and adverse clinical outcomes.



Erik de Leeuw, Ph.D.,

Assistant Professor, Division of Basic Science and Vaccine Development, Institute of Human Virology, received a \$100,000 award from the Maryland Innovation Initiative.

In this study, he proposes to optimize a synthetic compound, BAS00127538, with proven potent antibacterial activity

against multi-drug resistant ESKAPE bacterial pathogens. These six ESKAPE organisms (Enterococcus faecium, Staphylococcus aureus, Klebsiella species, Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacter species) are among the biggest infection threats we face today. These multi drug-resistant (MDR) pathogens infect some of the most vulnerable patient populations, including those in the intensive care units, burn victims, cystic fibrosis patients, and the elderly.



Bhawna Poonia, Ph.D.,

Assistant Professor, Division of Basic Science and Vaccine Development, Institute of Human Virology, received a two-year, \$150,000, award from the National Institutes of Health, for a study entitled "Genetic Polymorphisms in Rhesus Macaque FcRn and Association

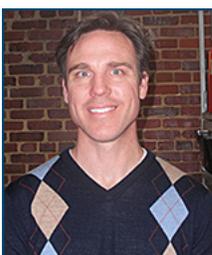
with IgG Levels." The aims of this study are to confirm polymorphism in regulatory region of the rhesus macaque FcRn gene; develop an FcRn haplotype assay for rhesus macaques and test for polymorphisms in the coding and regulatory regions of FcRn in a cohort (n=200) of rhesus macaques; and show whether the discovered polymorphisms affect FcRn expression levels or IgG levels.



Fabio Romerio, Ph.D.,

Assistant Professor, Division of Basic Science and Vaccine Development, Institute of Human Virology, received a one-year Administrative Supplement to his prime grant in the amount of \$183,677 from the National Institute of Allergy and Infectious Diseases entitled "Cell Surface

Marker Combinations to Identify Latently Infected CD4+ Cells In Vivo." This supplement will allow Dr. Romerio to further his studies into the identification of biomarkers that may be used for the identification of HIV-1 latently infected cells.



Eric Sundberg, Ph.D.,

Associate Professor, Division of Basic Science and Vaccine Development, Institute of Human Virology, received a \$75,000 award from the National Psoriasis Foundation for a study entitled "Treating psoriasis by inhibiting IL-36 signaling inside the cell and out."

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

Questions/Comments? Contact Nora Grannell, Director of Public Relations & Marketing, NGrannell@ihv.umaryland.edu

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Institute of Human Virology (IHV) Recruits Renowned Infectious Disease Specialist Shyamasundaran Kottlil, M.B.B.S., Ph.D.

Dr. Kottlil, formerly of the National Institute of Allergy & Infectious Diseases, becomes Co-Director of IHV's Clinical Research Unit and Professor of Medicine at the University of Maryland School of Medicine

In September, the Institute of Human Virology and the University of Maryland School of Medicine announced the recruitment of Shyamasundaran Kottlil, M.B.B.S., Ph.D., a world-renowned expert in infectious disease, particularly in viruses including Hepatitis B Virus (HBV), Hepatitis C Virus (HCV) and Human Immunodeficiency Virus (HIV). Dr. Kottlil was appointed by Robert C. Gallo, M.D., Director and Co-Director of the Division of Basic Science and Vaccine Development Division at IHV and The Homer & Martha Gudelsky Distinguished Professor in Medicine at SOM, and Robert Redfield, M.D., Associate Director and Clinical Care and Research Director at the IHV and Professor of Medicine and Chief of the Division of Infectious Diseases at SOM. Dr. Kottlil will serve as Co-Director of IHV's Clinical Research Unit and as Associate Director for Clinical Research within the Institute's Division of Clinical Care and Research. He was also appointed Professor in SOM's Division of Infectious Diseases of the Department of Medicine by Dean E. Albert Reece, M.D., Ph.D., M.B.A.

"Dr. Kottlil will be an important addition to both IHV's scientific and clinical contributions," said Dr. Gallo. "We are very happy to have him with us."

"I have full confidence that Dr. Kottlil will use his acquired skill set and global reputation to rapidly expand the Institute of Human Virology's therapeutic clinical research program, especially in the area of Hepatitis B and C, as well as strengthen our clinical research targeting HIV, and HIV related co-morbidities to include non-HIV neoplastic disease, such as lung cancer," said Dr. Redfield.

Since 2003, Dr. Kottlil has been working at the National Institute of Allergy & Infectious Diseases (NIAID), National Institutes of Health (NIH) in Bethesda, MD under the direction of Dr. Anthony Fauci, where he has built a robust clinical research program in

the area of HBV and HCV pathogenesis and therapeutics. In 2009, Dr. Kottlil also assumed the role of the Scientific Director of the NIH -District of Columbia Program for AIDS Progress, a high priority program targeting HIV, HCV, and HBV treatment and prevention in our nation's capital. During his tenure at NIAID, Dr. Kottlil established himself internationally as one of the key leaders in clinical research in the areas of antiviral drug development, and the development of novel therapeutic strategies for the treatment and management of chronic viral diseases, especially HCV and HBV. His success led to recently being named NIAID Outstanding Mentor of the Year in 2014.

"Dr. Kottlil excels in the tripartite areas of clinical care, clinical research, and the education of medicine," said Dean Reece, who is Vice President of Medical Affairs for the University of Maryland and the John Z. and Akiko Bowers Distinguished Professor at the UM SOM. "In addition to treatment and research, he will be directly involved in medical education of medical students, residents, and fellows in all campus clinic locations, as well as junior faculty mentorship. He will be an outstanding addition to the Institute of Human Virology and to the Department of Medicine, serving as a senior member of the Division of Clinical Care and Research, and the Division of Infectious Diseases."

Dr. Kottlil received a Bachelor of Medicine, Bachelor of Surgery degree from the Medical College in Trichur, Kerala, India in 1991. He completed his postgraduate training at the Medical College in Calicut, Kerala, India from 1991-1993. Dr. Kottlil received a Doctor of Philosophy in Immunology from the Memorial University of Newfoundland, St. John's, Newfoundland, Canada in 1997. He completed an internal medicine residency program at Brown University in Providence, Rhode Island from 1997-2000. From 2000-2003, Dr. Kottlil completed a Fellowship in Infectious Diseases at the NIAID in Bethesda, MD.

Robert Gallo: Boomerang missile hit AIDS victims, too



Dr. Joep Lange



Robert C. Gallo July 24, 2014

Lunatic rebels delayed cure that Ukraine and Russia need most.

"Do you think we can ultimately beat this thing?" was the question Joep Lange, the renowned clinical researcher who lost his life last week aboard Malaysia Airlines Flight 17, asked me 15 years ago about HIV/AIDS.

Lange, a professor at the University of Amsterdam's Academic Medical Center and head of the Amsterdam Institute for Global Health and Development, was my host as visiting professor in the Netherlands for several days.

Professor Lange was dedicated to improving HIV drug therapy and making medicine accessible to those infected with the virus in developing nations. In 2002, he famously said, "If we can get cold Coca-Cola and beer to every remote corner of Africa, it should not be impossible to do the same with drugs."

It is ironic that Lange and his colleagues were traveling to the 20th International AIDS Conference in Melbourne, Australia, when their jetliner was savagely blown up by barbarous Russian-backed rebels. They might as well have aimed that boomerang missile at themselves. Russians and Ukrainians alike will suffer more than most from this slaughter of a cadre of AIDS researchers.

Infection up 250%

Ukraine is one of the European nations most badly affected by the HIV/AIDS epidemic. According to the UNAIDS, as of Jan. 1, 245,216 cases of HIV infection were registered among citizens of Ukraine, including 65,733 AIDS cases and 31,999 AIDS-related deaths.

Ukraine's HIV prevention tactics are terribly inadequate, and the disease will no doubt spread with the country's continued unrest.

As for Russia, the prevalence of HIV infection there is even higher than in the Ukraine. Between the two nations, according to UNAIDS, they account for nearly 90% of new infections diagnosed in a region that spans Eastern Europe and Central Asia.

Since 2001, even as Africa has begun to successfully battle HIV, prevalence of the virus in this region has increased 250%.

In short, the lunatics on the Ukraine/Russia border fired a missile on the very people trying to help alleviate and ultimately end the epidemic ravaging the two nations.

Mankind needs each and every activist and clinician on the front lines of the war on AIDS. There is no doubt the field will suffer a setback in treatment and prevention as we continue to learn of those who lost their lives in this unforgettable tragedy.

Ray of hope

Often, there is a silver lining on a cloud, even the darkest, most tragic one. With the horror of AIDS, we saw scientific and social spinoffs. The AIDS pandemic inspired pioneering biomedical breakthroughs, including a greater understanding in the field of immunology and cancer research, and an interest from pharmaceutical companies to advance viral drug therapy.

AIDS also resulted in greater tolerance for sexual orientation, an increase in women's rights and a greater understanding of socioeconomic differences.

Perhaps with this tragedy, we will see an increase in dedication to bringing treatment and education to developing nations and a new determination to end AIDS through the development of a functional cure and an effective HIV preventive vaccine.

Perhaps mankind will work harder to end global terrorism and the killing of innocent people engaged in living full and productive lives. Lest we forget, there are many others who died on the Malaysian passenger jet as well—each of whom had dreams we will never see come to fruition.

May none of them have died in vain.

Robert C. Gallo, director of the Institute of Human Virology at the University of Maryland School of Medicine in Baltimore, is co-founder of the Global Virus Network and is best known for his co-discovery of HIV as the cause of AIDS.



**INSTITUTE OF
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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.



725 West Lombard Street • Baltimore, Maryland 21201-1009 • For more information call 410.706.8614 or visit www.ihv.org