

## Virulence profile: Hinh Ly

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### Tell us about your early days

I was born in South Vietnam a few years before the end of the Vietnam War. My memories of childhood were mostly about what happened after the war—it was a hard time, just to put it lightly! I lived with my parents and siblings in a small rice-farming village in the Mekong delta, which used to serve the people there well until everything was taken away in an attempt to advance the post-war Marxist socialist principles and policies. I grew up not knowing that there's anything beyond a high school education. My family and I immigrated to the US when I was 16 years old. Despite not knowing much English, I managed to complete a high school education in Southern California in 3 years before entering the University of California, Los Angeles (UCLA) to study Microbiology and Molecular Genetics (MMG). Upon graduation, I decided to continue to my education there and completed a Master of Arts degree in the MMG Department before moving to the University of North Carolina at Chapel Hill (UNC) to complete my doctoral thesis work in the department of Microbiology and Immunology (in 2 years). I moved back to the West Coast to carry out my postdoctoral training at the University of California, San Francisco (UCSF) and served as a special postdoctoral fellow of the Leukemia and Lymphoma Society of America and on the NIH T32 HIV training grant.

### What was your first position after university?



After 3 years of postdoctoral training at UCSF, I accepted my first academic appointment at Emory University in Atlanta as an Assistant Professor of Pathology and Laboratory Medicine. During my tenure at Emory, I served as a research scholar of the American Cancer Society and as an established researcher of the Aplastic Anemia and MDS International Foundation. In late 2011, I moved my laboratory to the University of Minnesota, Twin Cities (UMN).

### What are your research interests? What areas or topics does your lab currently focus on?

Several pathogenic arenaviruses, including Lassa virus (LASV), cause hemorrhagic fever (HF) infections that can result in significant morbidity and mortality in humans with limited preventative and treatment options. A hallmark of severe HF is the high levels of viremia coupled with generalized immune suppression of the hosts, the mechanisms of which are unknown. Recent studies in our laboratory using viral reverse genetics, cell/virus-based assays, structural/biochemical analysis, and animal modeling have revealed 2 specific molecular mechanisms arenaviruses use to evade host innate immune recognition that involve the viral nucleoprotein (NP) and matrix Z protein (reviewed in<sup>1</sup>). Our structurally directed functional studies of arenaviral NPs have demonstrated that they possess 3'–5' exoribonuclease enzymatic function that is required for suppressing type I interferon (e.g., IFN $\beta$ ) induction by degrading immune stimulatory RNAs,<sup>2–4</sup> whereas the Z proteins of all known pathogenic arenaviruses inhibit IFN $\beta$  production by directly interacting with the CARD domains of the pathogen-recognition proteins RIGI and MDA5 to inhibit their normal functions.<sup>5,6</sup> Novel insights learned from our studies as well as similar studies from other groups can be exploited for the development of novel therapeutics and vaccines against deadly HF-causing viral infections (reviewed in<sup>7–9</sup>).

### Who were your mentors?

My undergraduate research mentor at UCLA was Dr. Robert W. Simons (Associate Professor in Microbiology and Molecular Genetics Department), and my Master's thesis advisors were the late Dr. Donald P. Nierlich (Professor in Microbiology and Molecular Genetics Department) and the late Dr. Andrew H. Kaplan (Assistant Professor in Microbiology and Immunology). In 1998, I moved with Dr. Kaplan to the University of

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**About Hinh Ly.** Hinh Ly received his B.S. and M.A. degrees with honors in Microbiology and Molecular Genetics from the University of California, Los Angeles (UCLA) in 1998 and Ph.D. degree in Microbiology and Immunology from the University of North Carolina at Chapel Hill (UNC) in 2000. He carried out his postdoctoral studies at the University of California, San Francisco (UCSF) in the laboratories of Dr. Tristram Parslow (HIV researcher) and Dr. Elizabeth Blackburn (telomere researcher and 2009 Nobel-prize winner in Physiology or Medicine). Prior to his current position as an Associate Professor of Virology and Immunology in the Department of Veterinary Biomedical Sciences at the University of Minnesota, Twin Cities, Dr. Ly served as an Assistant Professor in the Department of Pathology and Laboratory Medicine at Emory University. Dr. Ly's research interest has focused on the issue of virus-host interactions with an emphasis on host immune suppression by arenaviruses.

North Carolina at Chapel Hill and joined the Department of Microbiology and Immunology there as a Ph.D. student. My postdoctoral mentors at the University of California, San Francisco were Dr. Tristram G. Parslow (Professor of Pathology) and Dr. Elizabeth H. Blackburn (Professor of Biochemistry and Biophysics).

### **Do you have partners that are important for your research projects?**

I've been very lucky to have a truly committed partner in life and at work. My wife and colleague, Dr. Yuying Liang, and I started collaborating closely on the arenavirus/influenza-related projects when we both served as Assistant Professors in the Department of Pathology and

Laboratory Medicine at Emory University. Dr. Liang earned her Bachelor's degree at Sichuan University and her Master's degree at the Shanghai Institute for Biological Sciences (Chinese Academy of Sciences) before going overseas to earn her Ph.D. degree at the University of British Columbia in Vancouver, Canada. I first met her when she was working in the laboratory of Dr. Donald Ganem at UCSF as a HHMI postdoctoral fellow on the topic of lytic-switch regulatory mechanism of the Kaposi's sarcoma-associated herpesvirus (KSHV). In 2003, she was recruited to Emory University to serve as an Assistant Professor of Pathology and Laboratory Medicine. In late 2011, we decided to move (with our twin boys) to the Twin Cities, where Dr. Liang and I currently are tenured Associate Professors in the Department of Veterinary and Biomedical Sciences Department.

### **How did you get interested in science?**

As a first-generation college kid in my family, I was "urged" to consider becoming a physician even though I had no role model or anyone who was willing to offer advice and mentorship to me toward accomplishing this lofty goal. As such, the primary focus throughout most of my earlier years at UCLA was to try to earn good grades and do as much volunteering work in medically related areas, including but not limited to spending countless hours shadowing physicians and nurses at local community hospitals, private doctor's offices, enrolling in the UCLA summer premed (PREP) program, acting as a director of an undergraduate Asian and Pacific Islanders health club, and conducting free blood-pressure and simple blood-sugar screenings at local churches, supermarkets, and health fairs on a weekend basis. It was not until my third year in college that I decided to work in a laboratory as a work-study student to help clean glassware and prepare media, buffers, etc., and to start tutoring molecular biology at the Academic Advancement Program at UCLA. After a year of doing manual but necessary work in the laboratory, I was offered an opportunity to work with a lab manager (Liz) in the Simons lab to conduct a genetics screen for mutations in the *E. coli* RNase III enzyme. It was Liz Simons who got me hooked on doing bench work. I also found the teaching experience to be most exciting and fulfilling.

### **What do you do for fun?**

These days, I enjoy traveling and hanging out with my family, playing tennis and other sports with my boys, listening to all the fun stories my kids share with my wife

and me, and watching the personal/career development of the trainees in our laboratories.

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