VILCEK FOUNDATION

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Vilcek Foundation Honors Prominent Immigrant Immunologist and Young Researchers of Promise

Dan R. Littman receives $100,000 prize

Fernando Camargo, Roberta Capp, and Houra Merrikh win $50,000 Vilcek Prizes for Creative Promise

New York, NY, February 2, 2016 — The Vilcek Foundation is proud to announce immunologist Dan R. Littman as the winner of the 2016 Vilcek Prize in Biomedical Science. The Vilcek Prizes are awarded in recognition of immigrant contributions to the arts and sciences, and include a $100,000 cash award. Dr. Littman, a professor of molecular immunology at New York University's Skirball Institute of Biomolecular Medicine, was selected for his fundamental insights into the workings of the immune system. His work helped unravel HIV pathogenesis and paved the way for therapeutic approaches to HIV and inflammatory and autoimmune diseases.

"Dr. Littman is a leading example of why immigrants are vital not just to the American sciences, but to American society as well," said Jan Vilcek, president of the Vilcek Foundation. "His research led to the development of antiretroviral drugs that helped curbed the AIDS epidemic in the 1990s, and he continues to shed light on the workings of the human immune system, opening the potential for future treatments of autoimmune and inflammatory diseases."

Dan Littman's path through immunology stretches across a dizzying array of interconnected subjects. Whether unraveling the molecular basis of the interaction of HIV with the human immune system, or uncovering genes that shape the identity, specificity, and function of immune cells, or unpicking the interplay of the human microbiome and immune system, Littman has brought nearly four decades of immunological expertise to bear on basic questions with far-reaching clinical implications. In the mid-1980s, Littman identified the genes for proteins that give the immune system's major sentinels their essential identity: the CD8 protein on the surface of killer T cells and the CD4 protein on the surface of helper T cells. Those findings offered researchers a gateway into the workings of immunity. More important, a decade later, they led to the uncovering of the precise mechanism by which HIV infects the human immune system.

In the mid-1990s, Littman and his collaborators found that in addition to the CD4 molecule on helper T cells, HIV relies on a protein called CCR5, now known as a major HIV co-receptor, to gain entry into cells during infection. Beyond illuminating the pathogenic mechanism of the virus, the finding led to the development and approval of CCR5-blocking drugs that continue to be used in some antiretroviral drug cocktails for HIV treatment. Further, they set the stage for ongoing approaches based on gene editing and stem cell technology that might someday help engineer HIV resistance in people.

Littman's work on the genetic underpinnings of immune cell development has led to the identification of a gene switch called RORgammat, which plays a crucial role in the genesis of a group of helper T cells that secrete the immune molecule IL-17. Named Th-17 cells, these immune sentinels, which abound in the intestines, among other sites, mediate inflammatory and autoimmune diseases, such as ankylosing spondylitis, colitis, and psoriasis. Applying Littman's findings in a therapeutic context, other researchers have shown that inhibitors of RORgammat can ameliorate the symptoms of psoriasis in animal models. Clinical trials of such inhibitors are now underway.

More recently, Littman has set his sights on the interplay of the immune system with the body's resident microbes. His findings have revealed links between the abundance of a group of intestinal denizens called segmented filamentous bacteria and the levels of Th-17 cells in the small intestine; manipulating the levels of the bacteria in mice altered their ability to fight an intestinal pathogen but also rendered the animals more susceptible to autoimmune disease. Along the same lines, Littman's team uncovered a heightened incidence of rheumatoid arthritis in people with elevated levels of the intestinal bacterium *Prevotella copri*. Together, these findings suggest that manipulating the human gut microbial mix might help augment or tamp down immune responses underlying many diseases.

For his wide-ranging contributions to immunology, Littman has garnered numerous honors—notable among them, memberships in the United States National Academy of Sciences, National Academy of Medicine, and the American Academy of Arts and Sciences. Littman was born in Romania and moved to the United States in 1963. He holds an M.D./Ph.D. degree from Washington University School of Medicine, St. Louis, and accepted a professorship in molecular immunology at New York University's Skirball Institute of Biomolecular Medicine in 1995.

The Vilcek Foundation is also honoring three outstanding immigrant scientists—38 years of age or younger—who have demonstrated evidence of creative promise with their scientific work in the United States. Each winner of the Vilcek Prizes for Creative Promise in Biomedical Science will receive a $50,000 cash award.

Fernando Camargo is an associate professor at Harvard University and Boston Children's Hospital. Camargo's work has led to major technical advances in researchers' ability to track circulating blood and immune cells and uncovered surprising insights into their origins. Contrary to a long-held view that blood cells arise from so-called hematopoietic stem cells, Camargo showed that a different group of primitive cells called progenitor cells give rise to circulating blood cells. Because progenitor cells are more abundant and long-lived than hematopoietic stem cells, the findings bear implications for improving the efficacy of blood transplantation in the clinic. Camargo has also unraveled the role of a cellular signaling protein called Yap1, which controls cell growth and organ size. He is working on developing ways to boost or suppress Yap1 in cells for an array of clinical applications, including cancer treatment and regenerative medicine. Camargo was born in Arequipa, Peru.

Roberta Capp is an assistant professor at the University of Colorado School of Medicine. Capp's efforts to solve problems that plague access to health care in the United States have led to insights on emergency department use by Medicaid enrollees. Capp found that many patients on Medicaid often depend on emergency departments for non-urgent conditions best treated in primary care settings, largely due to systemic barriers to primary care. To address the issue, Capp conducted a randomized controlled trial of a program of patient navigators, a term applied to trained professionals who work closely with patients to help them obtain timely primary care from diagnosis to follow-up. The trial revealed that patient navigation services made a significant dent in emergency-department use and hospital admissions. Capp is now working with Medicaid officials in Colorado to find ways to improve health care access and delivery for underserved communities. She is also exploring ways to reduce return visits to emergency

departments that are attributed to medical errors. Her work has implications for making health care accessible, affordable, and patient-centered. Capp was born in São Paulo, Brazil.

Houra Merrikh is an assistant professor at the University of Washington School of Medicine. Her work on the mechanics of DNA replication and gene expression in cells has uncovered hidden conflicts between the cellular machines that use threads of DNA as a template to carry out these life-sustaining functions. Merrikh has shown that such conflicts can lead to genetic mutations, which can serve as a substrate for evolution. More important, such mutations may underlie a raft of clinically relevant phenomena, such as the development of antibiotic resistance in bacteria and the onset of cancer in human cells. By unraveling the mechanism of the conflicts, which appear to be a common feature among genes, Merrikh's work has thrown open a window on the molecular minutiae of gene evolution. She is now exploring precise ways to predict how such conflicts influence human disease. Merrikh was born in Tehran, Iran.

The prizewinners were selected by panels of experts in the field of biomedical science. All prizewinners will be honored at a ceremony in New York City in April 2016.

In addition to prizes in biomedical science, the Vilcek Foundation also recognized immigrants in the arts with the 2016 Vilcek Prizes in Theatre. For more information about the prizes, please visit Vilcek.org.

The Vilcek Foundation was established in 2000 by Jan and Marica Vilcek, immigrants from the former Czechoslovakia. The mission of the foundation, to honor the contributions of immigrants to the United States and to foster appreciation of the arts and sciences, was inspired by the couple's respective careers in biomedical science and art history, as well as their personal experiences and appreciation for the opportunities they received as newcomers to this country. The foundation awards annual prizes to immigrant biomedical scientists and artists, and sponsors cultural programs such as the Hawaii International Film Festival.

To learn more about the Vilcek Foundation, please visit Vilcek.org.

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