Medical Xpress

Research on HIV-1 resistance in Old World monkeys

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For his research of HIV-1 resistance in monkeys, Matt Stremlau, has been named the grand prize winner and the North American regional winner for the GE & *Science* Prize for Young Life Scientists. The competition, which includes a grand-prize award of $25.000, is supported by GE Healthcare and the journal *Science*.

Stremlau will receive his award in Stockholm, Sweden, on Wednesday, 12 December, during an award ceremony. He received the grand prize for his essay, "Why Old World Monkeys Are Resistant to HIV/AIDS," which is being published in the 7 December issue of *Science*.

“It is exciting to be publishing Dr. Stremlau's essay so close to World AIDS Day as his innovative research identified the factor responsible for blocking HIV-1 infection in Old World monkey cells and also provided important insights into innate immunity to viruses,” said Monica Bradford, executive editor of *Science*. “Understanding the early steps of HIV-1 infection is essential for developing strategies to prevent the transmission of the virus.”

Matt Stremlau’s prize-winning essay details the path he and his colleagues followed to determine why Old World monkeys are resistant to HIV-1.

The researchers first found that the protein TRIM5alpha blocked HIV-1 replication in the cells of these close relatives of humans. Further investigation revealed that the protein probably evolved to inhibit viral

replication. In these monkeys, the retrovirus is blocked from entering the cells because TRIM5alpha causes the protein shell, or capsid, covering the virus to break down rapidly and prematurely. In humans, TRIM5alpha does not block the entry into the cell.

The researchers also learned that a single amino acid change in the human TRIM5alpha protein bestows similar resistance to HIV-1. In his essay, Stremlau writes that the group's discovery of TRIM5alpha suggests new strategies of protecting cells for retrovirus infections. "Efforts aimed at enhancing these innate immune defenses may ultimately prove to be more effective at protecting humans from HIV than vaccine strategies aimed primarily at stimulating humoral or cellular immune responses," he writes.

“The discovery of TRIM5alpha revealed an important innate immune defense against retroviruses,” Stremlau said in an interview. “Certain monkey species, mostly those from Africa and Asia, express a form of TRIM5alpha that provides natural resistance to HIV-1. TRIM5alpha blocks infection soon after the virus enters the cell by causing the rapid and premature disassembly of the viral capsid core.”

Born in New York City, Stremlau, received his B.S. in chemistry from Haverford College. After graduation, he spent one year as a Henry Luce Fellow at the National Laboratory for Agrobiotechnology in Beijing, China, before beginning graduate studies at Harvard University, where he investigated retroviral restriction in nonhuman primates in Joe Sodroski’s laboratory.

At Harvard, Stremlau cofounded the International Science and Health Network, an equipment recycling program that sends scientific equipment to laboratories in the developing world. He currently works in the U.S. Global AIDS Coordinator’s Office at the State Department as a (AAAS) Fellow.

Stremlau plans to start a postdoctoral fellowship in 2008 and is interested in emerging biotechnologies relevant to the developing world.

“This prize underscores GE Healthcare's commitment to driving and fostering innovation in the life sciences,” said Peter Erenheim, president and CEO, GE Healthcare Life Sciences. “Supporting promising young molecular biologists is vital if the field is to continue its extraordinary contribution to medicine and science.”

Each year since 1995, the GE & *Science* Prize for Young Life Scientists has recognized outstanding young molecular biologists at an early stage of their careers. Some 54 regional winners and 13 grand prize winners have so far received the award, honoring exceptional thesis work in the field of molecular biology.

“Since I first started working in a molecular biology lab in high school, I have had many mentors who have invested a tremendous amount of time in helping me succeed as a scientist,” said Stremlau. “This award reflects their remarkable ability to train and inspire younger scientists.”

Applicants for the 2007 GE & *Science* Prize for Young Life Scientists earned their PhD degrees in 2006 and submitted a 1,000-word essay based on their dissertations. Their essays were judged on the quality of research and the applicants’ ability to articulate how their work would contribute to the field of molecular biology, which investigates biological processes in terms of the physical and chemical properties of molecules in a cell.

“We were thrilled by the quality of applications we received from recent recipients of doctoral degrees from institutions around the world,” stated Bradford. “Learning about and supporting the work of these exceptional scientists as they begin their careers is very important to all of us at *Science*. We send our congratulations to them and wait eagerly to learn of

their future contributions to our understanding of molecular biology."

A judging panel selects the GE & *Science* Prize for Young Life Scientists grand prize winner and may present regional awards in four geographic regions: North America, Europe, Japan and all other countries. These regional winners receive $5,000 awards. In addition to the grand prize, the 2007 awards also recognize the following regional winners:

Bo Huang (North America): For his essay, "Molecular Accounting of a Cell." Huang was born in Chongqing, China. He graduated with honors in 2001 with a B.S. degree in chemistry from Peking University. As a graduate fellow at Stanford University, he worked on applying chemistry as a tool to solve biological problems under the direction of Richard N. Zare. His PhD thesis was on the development of microfluidic devices for the analysis of individual cells using single-molecule detection. Now, as a postdoctoral fellow at Harvard University, he is working with Xiaowei Zhuang on stochastic optical reconstruction microscopy (STORM), a fluorescence microscopy technique that can achieve molecular-scale resolution in biological samples.

Mikaela Rapp (Europe): For her essay, "The Ins and Outs of Membrane Proteins." Rapp grew up in Stockholm, Sweden. A strong interest in life science led to graduate studies in the Department of Biochemistry and Biophysics at Stockholm University, where she pursued PhD studies in the group of Gunnar von Heijne. Using large-scale cloning techniques, she performed a global topology analysis of the *E. coli* inner membrane proteome. Rapp defended her thesis in December 2006 and is currently learning membrane protein crystallography in the laboratory of Mika Jormakka at the Centenary Institute in Sydney, Australia. She plans to continue her scientific career as a postdoctoral fellow in the laboratory of Pär Nordlund at Karolinska Institutet, Stockholm, Sweden.

Takeshi Imai (Japan): For his essay, "Axonal Wiring Specificity by

Differential cAMP Levels of the Mouse Olfactory System." Imai was born in Tokyo in 1978 and grew up in Ina, a small southern city in Nagano, Japan. There, surrounded by nature, he became fascinated by biology. In 2001, he received a B.S. degree in biophysics and biochemistry from the University of Tokyo. Imai's interest in the molecular biology of neural development led him to remain at the University of Tokyo to pursue graduate studies in Hitoshi Sakano's laboratory, where he investigated the molecular mechanisms of the odorant receptor. He completed his PhD in September 2006 but stayed on in Sakano's lab as a postdoctoral fellow.

Manuel de la Mata (All Other Countries): For his essay, "The Transcriptional Control of Alternative Splicing." De la Mata was born in Santa Rosa, Argentina, where he lived until spending his high-school senior year as an exchange student in Salinas, California. He majored in chemistry at the University of Córdoba, Argentina, where as an undergraduate he studied the role of dendritic cells in the immune system in the lab of Clelia Riera under the direction of Pablo Iribarren. De la Mata entered a Ph.D. program at the University of Buenos Aires, where he studied the coupling of transcription with alternative splicing in the group of Alberto Kornblihtt. He defended his thesis in December 2006 and is currently a postdoctoral fellow in the Facultad de Ciencias Exactas y Naturales at the University of Buenos Aires.

Source: American Association for the Advancement of Science

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