

MARCH 09, 2010

## Lisandro Maya-Ramos

When Lisandro Maya-Ramos was a child, his family lived in a house on his grandparents' land in the southern Mexican state of Oaxaca. A river meandered through the large property, and Maya-Ramos would often play in the water, climb trees to look for mangoes and coconuts, and help his grandmother with the farm.

"I was fascinated by the animals," he says. "I used to harvest corn and plant tomatoes, and I'd milk goats with my grandma."

Maya-Ramos's rural upbringing fueled early fascination with biology, but the chance to do hands-on research has turned his interests to basic science. "You have a chance to [discover] something that has not been seen before. That's what really drives me," says Maya-Ramos, 23. "You can find novel aspects in biology which can potentially have an impact on human diseases." He graduated with honors from the University of California, San Diego in 2009 and will start an M.D./Ph.D. program in the fall of 2010.

When Maya-Ramos was 11, his father quit his job as an elementary school teacher to become a farmworker in the United States, and the family moved to Tijuana, which is near San Diego. Maya-Ramos attended a rigorous international baccalaureate high school, where he took advanced classes in science, history, and other topics. But that was not enough for his parents, who pushed him to take private lessons in English grammar and conversation. "When I was 16, I couldn't speak a word [of English]," he says. The classes improved his English, but he knew he still had a long way to go.

English wasn't the only area where his parents pushed. No one in Maya-Ramos's family had been to college, but his parents encouraged him and his younger brother to think big. "My parents said, 'You should study medicine in the United States,'" he remembers. His father became a U.S. citizen in the 1980s, through a government program that legalized many migrant workers. Several years later, Maya-Ramos was able to become a U.S. citizen as well.

Maya-Ramos came to the United States in May 2004—immediately after graduating from high school—and a month later started taking classes at San Diego City College, a community college. Despite his private lessons, he was

not yet fluent in English. Maya-Ramos could have spent a year or two just studying the language, but he opted to dive into the regular curriculum. "I didn't really want to spend the time. I said, 'I'll learn it along the way,'" he recalls. "It was difficult. I still remember standing in a history class for five minutes trying to articulate an idea just to get points." Those difficulties quickly faded as Maya-Ramos's English skills caught up.

Maya-Ramos excelled in his coursework at San Diego City College and soon gained entrance to the University of California, San Diego. His transition was eased by a summer experience for community college students called the UniversityLink Medical Science Program, which provides academic and career guidance for science students who live on campus for four weeks. Those mentors led him to the McNair Scholars Program, a federal effort that helps low-income, first-generation college students and others traditionally underrepresented in academia learn to do academic research. The McNair Program matched him with psychiatrist Andrés Sciolla, who was developing more effective treatments for Latino patients. During his sophomore and junior years, Maya-Ramos interviewed Latino patients in primary care and mental clinics to find out how many had experienced childhood trauma and what therapies had helped them.

While at UCSD, Maya-Ramos started a chapter of Project Nicaragua, a club founded at the University of California, Los Angeles to raise funds to purchase medical equipment for hospitals in Nicaragua. The UCSD group held fundraisers to purchase a pneumatic cranial drill, which is used during brain surgeries, and other equipment. In the summer of 2007, Maya-Ramos and seven other students delivered the supplies in person to doctors and nurses at the Hospital Lenin Fonseca Hospital in Managua. He stayed in Nicaragua for three weeks and visited the nearly every day. It was an eye-opening time, as he observed emergency room physicians in action and watched from inside the operating room as surgeons removed tumors from patients.

In Nicaragua, he also saw children with spina bifida, a congenital defect that causes the spinal cord to develop incorrectly. The disease has become less common in the United States thanks to the discovery that pregnant women who take folic acid supplements are less likely to give birth to a child with the disorder. "That got me thinking that sometimes science can have a wider effect on the population than a doctor alone," he says. This revelation prompted Maya-Ramos to switch his career from clinical medicine to medical research.

When Maya-Ramos returned, the National Institutes of Health-funded Initiative for Maximizing Student Diversity program at UCSD arranged for him to work with Francisco Villarreal, who was studying diabetic cardiomyopathy. More than 30 percent of diabetic patients in the United States are diagnosed with heart disease, and diabetic cardiomyopathy—which causes enlargement of the heart and vessels—can become a dangerous complication of diabetes in some patients. Maya-Ramos, then a senior,

teamed with postdoctoral fellow Israel Ramirez-Sanchez to examine the cellular effects of cocoa polyphenol, a compound that might reduce the risk of cardiovascular disease. That work sparked his fascination with the heart, which has since led him to think about a career in cardiology. "At first glance, the heart doesn't look very complex. It's basically a pump," he says. "But as you learn more, you see that it is really a complex organ."

In part because of his work in Villarreal's lab, Maya-Ramos was selected to participate in HHMI's Exceptional Research Opportunities Program (EXROP). He spent the summer of 2009 doing research with HHMI investigator Shahin Rafii at Weill Cornell Medical College in New York City. Maya-Ramos worked on a project with postdoctoral fellow Jason Butler to find better ways to culture hematopoietic stem cells for use in bone marrow transplants. "It broadened my perspective on research and potential aspects that I can pursue as a researcher," he says. "I had a wonderful experience working with people in a different field."

After his stint in Rafii's lab, Maya-Ramos went back to UCSD to continue working with Villarreal. Now he's been accepted into several M.D./Ph.D. programs. He doesn't know where he'll go—"I change my mind every week," he says. But his ultimate goal is to run an academic lab in cardiac research and use research to improve people's lives.