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RESEARCH NEWS

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Silvia N. Kariuki

As a child, Silvia N. Kariuki would often accompany her mother to work after school. Her mother was a nurse at the Kenya Medical Research Institute in Nairobi, and Kariuki would watch her mother tending to patients with a variety of diseases, including schistosomiasis, a parasitic disease sometimes called “snail fever,” that is spread through contaminated water.

"I vividly remember going in with her and seeing the patients—the kids in the ward," she says. "They looked like they were in pain, and they were kids just like me."

Even as an elementary schooler, her head was filled with questions about the patients. “‘What's wrong with them? What can you do to treat them?’” she remembers asking. Those were also the questions that Kariuki's father, a schistosomiasis researcher, was trying to answer. Repeated schistosomiasis infections—which humans get when they come in contact with snails infected by a type of parasitic flatworm—can cause anemia, malnutrition, and learning difficulties in children. Kariuki's father was looking for a way to reduce the number of snails in the local ponds and rivers that residents used to bathe and wash their clothes. "It was completely crazy to me at the time that he was so fascinated with snails," she says.

Now that she is planning to become a scientist herself, Kariuki, 27, understands her father’s obsession. She plans to focus on the genetics of systemic lupus erythematosus, a chronic autoimmune disease. She traces her early excitement about science to the adults around her—especially her parents. "That started my inquisitiveness about the human body," she says.

Kariuki attended the all-girls' Kianda High School in Nairobi, which had strong academics and excellent science teachers. "My biology teacher made it fun for us," she says. "She didn't tell us, 'You must go into medicine' or 'You must go into research.’ She just made science so interesting to us that we wanted to look at it as a career option." Her teachers also brought in female physicians and researchers to give career talks to show the girls that they, too, could go into medicine and science.

In Kenya, many university-bound students wait more than a year before beginning college classes. Kariuki was wondering how to spend that time

when she saw an advertisement for the United World College in a local newspaper. She applied to the institution, which recruits students from around the world to its 13 colleges, and was accepted into a two-year international baccalaureate program at the United World College of South East Asia in Singapore.

Kariuki had never been outside of Kenya. "It was just the most amazing experience for me in terms of cultural enlightenment, being exposed to different worlds." The classes also showed her a different side of science. Her biology class took a week-long field trip to Pulau Tioman, an island off the east coast of Malaysia, to study marine and rain forest ecology. She volunteered in a hospital for mentally ill children and a hospice in Singapore, as well as a home for elderly people in Malaysia.

While in Singapore, Kariuki met with a recruiter who was visiting the school from the University of Chicago. Intrigued by the recruiter's description of the university's strong science research program, Kariuki decided to apply. She was accepted and offered a merit scholarship to help defray tuition expenses.

At Chicago, Kariuki wanted to get involved in research quickly. Her academic advisor suggested she apply to the HHMI Exceptional Research Opportunities Program (EXROP) as a freshman—before she had started her biology coursework or worked in a lab. She was accepted and placed in the lab of HHMI investigator Stephen Goff at Columbia University. Goff studies retroviruses, including the mouse leukemia virus and the human immunodeficiency virus, identifying the factors these retroviruses use to integrate into the host’s cells.

“At first, I was a little bit apprehensive about bench research techniques. I was always trying not to screw up," she says. Despite her vigilance, Kariuki's yeast cultures became contaminated by fungus. But things quickly improved, as she studied how a particular gene makes mice resistant to a type of leukemia virus. “Working at the Goff lab was a really valuable first research experience for me. It got me excited about bench research,” she says. Now Kariuki uses those experiences to teach other newcomers that everybody makes mistakes. "It happens to all of us," she says. "One of the most important things I do is to try to make students feel at ease on the bench."

In her sophomore year, Kariuki began research with Donald Steiner, an HHMI investigator who has since retired. She studied enzymes that cleave insulin, a hormone that regulates blood sugar levels. Kariuki also became involved in mentoring African American elementary school students at an after-school science program. She focused on showing kids the fun side of science. "The kids, they're so enthusiastic," she says. "I definitely wanted to encourage them because at the college level, you rarely see people who look like me in the research world."

After graduating in 2007, Kariuki decided she wanted to expand her research experience and found a job working with Timothy Niewold, a rheumatologist at the University of Chicago who studies the genetics of systemic lupus erythematosus. Lupus is an autoimmune disease that causes the body to attack its own DNA. The resulting assault by the immune system can cause stiff and painful joints, fevers, fatigue, rashes, and other symptoms. It affects women disproportionately, particularly African American women. Kariuki has been studying the genetics of the disease and hopes to continue the work in graduate school.

On a visit to Nairobi last year, she was reminded why her work matters. The mother of a friend has lupus, and the friend asked Kariuki about effective therapies, including alternative treatments. "The lack of answers really affected me," Kariuki says. "I wish I knew more about the pathogenesis of the disease and how we can treat it better."

One day Kariuki would like to find the answers. She dreams of running an international research program, and doing work that is relevant to people in Kenya and the United States. The first people who influenced her career choice are pleased, too. "My parents love the idea that I'm pursuing a Ph.D.," she says. "My dad has been encouraging me to do research since day one."