

ABBOTT

Nicole Ramsey

Bitten by the Science Bug

Already a veteran researcher, MD-PhD student Nicole Ramsey is preparing to battle malaria from bench to bedside

The package arrived just in time for Nicole Ramsey to do the research that would become the final chapter of her doctoral thesis. Known as the Malaria Box, the small rectangle represents some big ambitions: it's a stack of plastic trays containing dozens of drugs with the potential to fight a disease that, according to the WHO, kills one African child every minute of every day.

Compiled by the nonprofit Medicines for Malaria Venture, the box is much in demand among researchers worldwide. They can get it free of charge—but first, they must prove that their project merits it. Ramsey, an MD-PhD student studying the effects of promising antimalarials on the cellular membranes known as lipid bilayers, passed muster. She's currently wrapping up her thesis, which explores how a drug's effect on lipid bilayers may

predict toxicity—steering researchers away from compounds likely to prove undesirable. “It’s a validation that the people who give out the samples believe this approach will be helpful in making decisions about what drugs to develop further,” says Olaf Andersen, MD, director of the Tri-Institutional MD-PhD Program and Ramsey’s thesis adviser. “One of the problems with the treatment of malaria, and many other diseases of the developing world, is that there’s not a lot of money available for drug development. So the more hints you can get to reduce the risk of failure later on, the better off you are.”

This fall, it’s back to medical school for the future physician-scientist, who’s planning a career in academic medicine. After completing her MD she’ll specialize in pediatrics, with a likely concentration in infectious disease; even as a busy graduate

student, Ramsey took time each week to shadow that subspecialty service at Weill Cornell. “As much as I love research, I also love interacting with patients and taking care of them,” says Ramsey, whose favorite leisure activity is finding online discounts for the city’s cultural and culinary delights. “Someday I’d like to see my research helping people—to be part of the whole process.”

Ramsey grew up in Canarsie, Brooklyn, in a medical household: her mother is a visiting nurse, her father a respiratory therapist. (Her younger sister is following in her MD-PhD footsteps, matriculating at Albert Einstein this summer.) Ramsey attended high school at Bronx Science—commuting two hours each way—and earned an undergrad degree in biology at Howard University. She first came to Weill Cornell the summer after her freshman

year through the Gateways to the Laboratory Program, which encourages underrepresented minorities to pursue an MD-PhD through a ten-week immersion in medicine, surgery, and bench science.

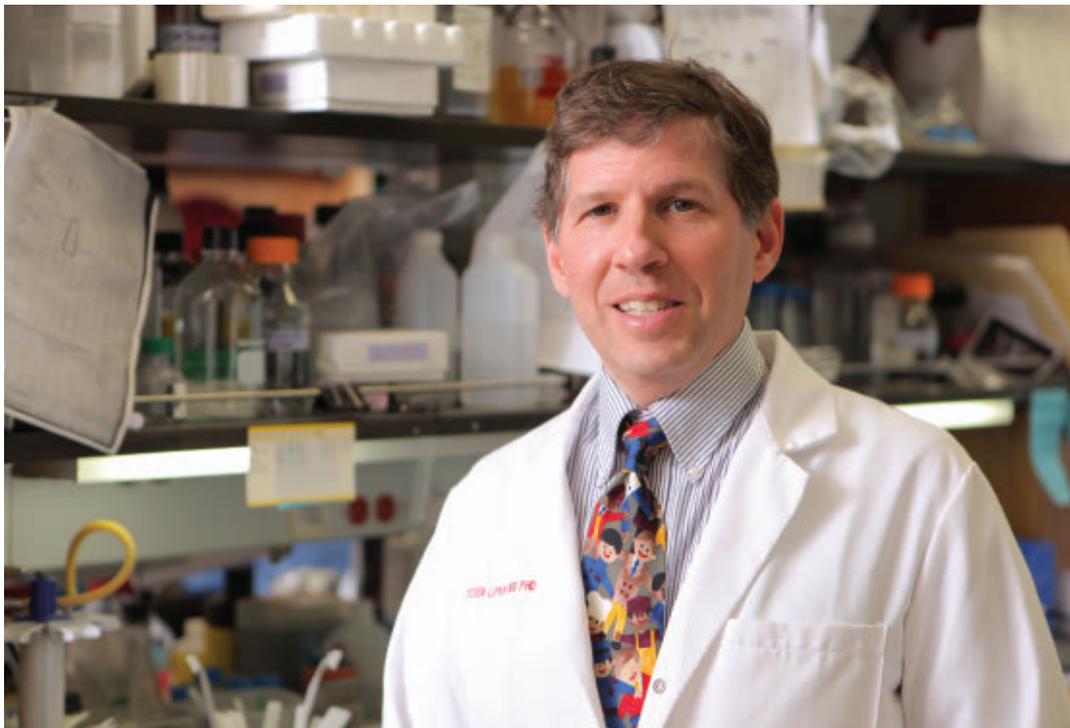
Ramsey already had some research experience; as a high school student she'd interned in the nutrition department at Columbia, doing obesity-related work on yeast that, a decade later, would garner an author credit in the *Journal of Biological Chemistry*. She continued to pursue research throughout college, including a summer in the West African nation of Mali, where she was inspired to focus on malaria. In 2011 she won a United Negro College Fund/Merck Institute for Science Education Fellowship, a highly competitive award that carries a grant of more than \$50,000. "She will achieve great things," says Carla Boutin-Foster, MD, MS '99, the Nanette Laitman Clinical Scholar in Public Health/Community Health and assistant dean for faculty diversity, who was Ramsey's first-year medical school mentor. "She's an excellent student and role model. As a young African American woman, an MD-PhD, she is a wonderful example of scholarship, intelligence, and patient advocacy."

On top of her thesis work and medical studies, Ramsey has been active in Weill Cornell student outreach groups. She's the head of Motivating Action through Community Health Outreach (MACHO), which combats the childhood obesity epidemic by encouraging exercise and healthy eating among kids in minority neighborhoods. Inspired by another initiative, known as Achieving Successful and Productive Academic Research Careers (SPARC), that Boutin-Foster established to offer career development for women and underrepresented minorities on the junior faculty, Ramsey pitched a version for high school and college students. The result, an annual conference at Weill Cornell, draws busloads of participants from as far away as Rochester and Philadelphia. "We often think of research as being siloed, not connecting to the population," Boutin-Foster observes. "But Nicole is creating a paradigm where we're able to translate skills and understanding of basic science, like teaching kids about nutrition in a way that resonates with them. That's what we're advocating for—more students like Nicole, who believe their science degree can change the world."

— Beth Saulnier

Message Received

Working with an Ithaca-based engineer, Steven Lipkin, MD, PhD, has revealed 'GPS genes' that can drive colon cancer metastasis



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Steven Lipkin, MD, PhD

According to the American Cancer Society, this year more than 140,000 Americans will learn they have colorectal cancer. Early detection and treatment can provide a five-year survival rate of nearly 100 percent, but more than four in ten Americans skip the colonoscopies that can catch the disease before it metastasizes. As a result, many tumors are detected only after they have spread—making it imperative for researchers and physicians to understand why cells metastasize and how to stop the process. "All too often, if there are multiple metastases we have little hope of curing the patient and can only try to slow down the whole process," says Steven Lipkin, MD, PhD. "There's a critical need to study the biology of metastasis, so we can develop new drugs that could save patients whose tumors have advanced."

Lipkin, an associate professor of medicine and of genetic medicine, has devoted his career to studying a range of gastrointestinal maladies. He became interested in colon cancer because of its ubiquity—it's the second most common cancer in the U.S.—and because many aspects of the disease remain a mystery. "We still don't understand colon cancer very well and have only scratched the surface, unfortunately," says Lipkin. "It's a complex problem. All kinds of receptors and cell messaging systems are involved."

Throughout the body, chemical messengers called chemokines shepherd cells to different locations in the body through a complex series of signaling pathways, guiding the immune response. For example, immune cells migrate to the skin when you nick your fin-