

of ways. For example, the bacteria can cause all an insect's offspring to develop as females or allow only infected insects to reproduce. The bacteria live inside insect cells and are passed from generation to generation through the eggs. *Wolbachia* may also play a complex role in human diseases such as river blindness.

"The interesting thing is that one can use fire ants and other insects as investigative tools to find out if only some of them are infected with *Wolbachia* and why," says Reznikoff, who helped McKone design the *Wolbachia* portion of the fire ants project.

Back in McKone's large, bright classroom, the seven students huddle in three groups, smashing ants with the sealed end of a pipette tip. They make sure to crush the ant's abdomen, where *Wolbachia* are typically found. The next step comes straight from a molecular biology textbook: finding the bacterial DNA (if it is present) inside the fire ant cells. Using polymerase chain reaction machines borrowed from Florida A&M University—the same thermal cyclers that so puzzled McKone in 2005—the students go through the step-by-step process of extracting the DNA samples.

McKone occasionally stops to quiz the students on what they're doing, making sure they know what each chemical does or why they are heating up the sample. "They love it. They like understanding why."

Getting her students interested in fire ants has been easy, McKone says. She doesn't have to push them to read research papers or ask questions. They are motivated to learn because they are already interested in fire ants. "I didn't know there were so

many types of ants," says student Jerry Fry. "I thought an ant was just an ant."

So far, four ants from Bogue Chitto have tested positive for the *Wolbachia* parasite, all from the mound outside the cafeteria. Ants from another mound at the school and from two mounds off campus had no evidence of the parasite. When the students get the full *Wolbachia* DNA sequence back from MBL, McKone hopes it will tell them how these fire ants are related to those elsewhere or provide some insight into how the bacteria might manipulate fire ants' reproduction.

This summer, McKone, her fellow teachers, and the scientists will assess what they have learned and then finalize the five-part curriculum. They plan to make it available to teachers wherever fire ants are found.

Rockhold hopes the students' *Wolbachia* research can eventually be combined with that from other students throughout the South to help scientists find out what makes fire ants infected with the bacteria different from those not infected. "If there are enough folks doing the work at different sites, it might ultimately become a comprehensive and meaningful addition to the science," he says.

Meanwhile, McKone is happy her students have learned about molecular biology using a subject close to home. Perhaps it will inspire them to become researchers—and find a solution to a local problem, she says. "They would love for somebody—and I would love for them to be a part of it—to find a way to control fire ants." ■

—ANDREA WIDENER

2008 Holiday Lectures: Making Your Mind



HHMI investigators Eric Kandel (left) and Thomas Jessell (second from left) headlined the 2008 Holiday Lectures on Science, an annual December seminar that welcomes Washington, D.C.-area high school students to the Institute's headquarters in Chevy Chase, Maryland. This year's lectures delved into the complexities of the mind, memory, and movement. For fun, the students got to dabble in the ancient, now debunked, art of phrenology (far right). To learn more, visit www.hhmi.org/biointeractive/.