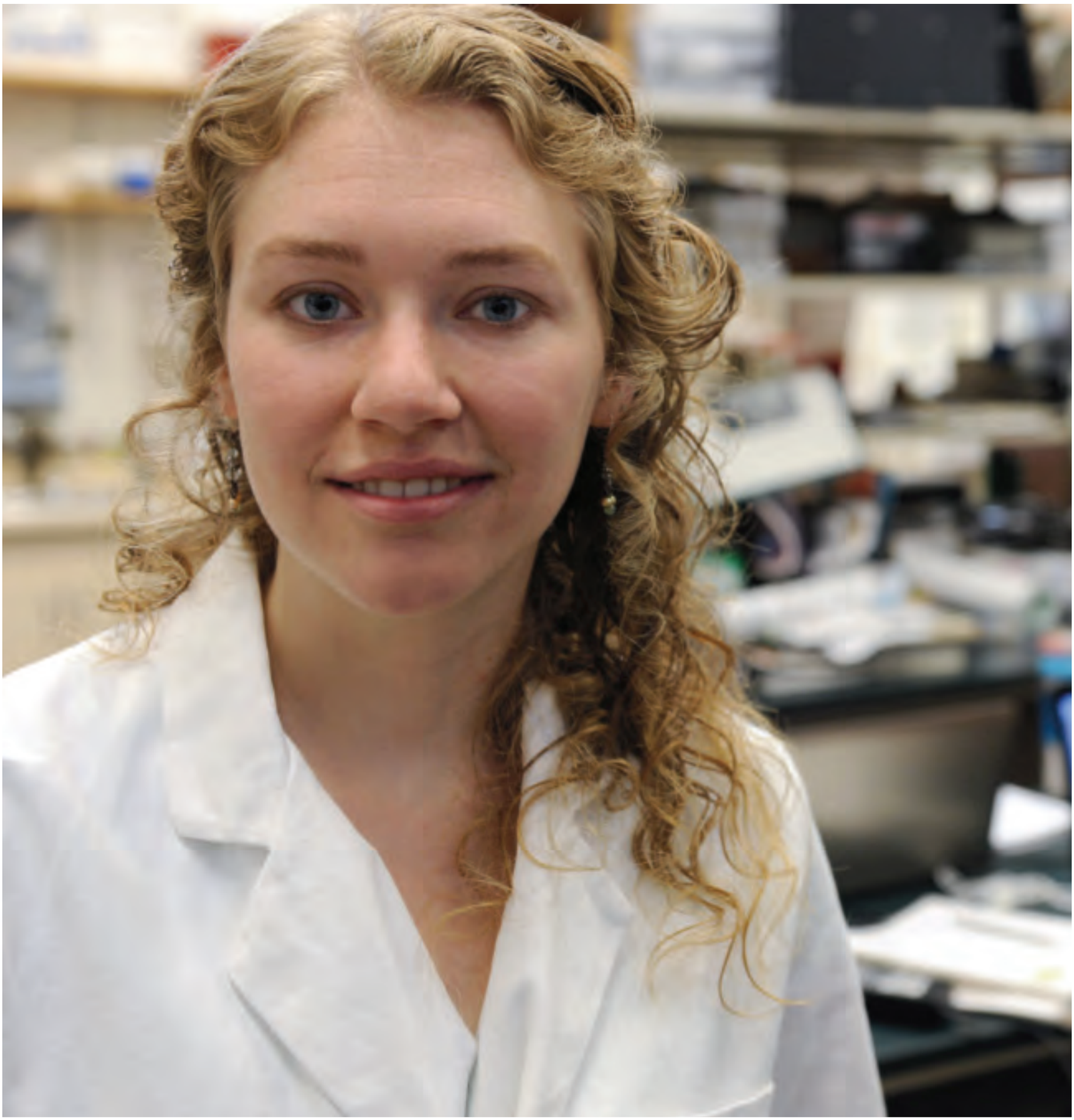

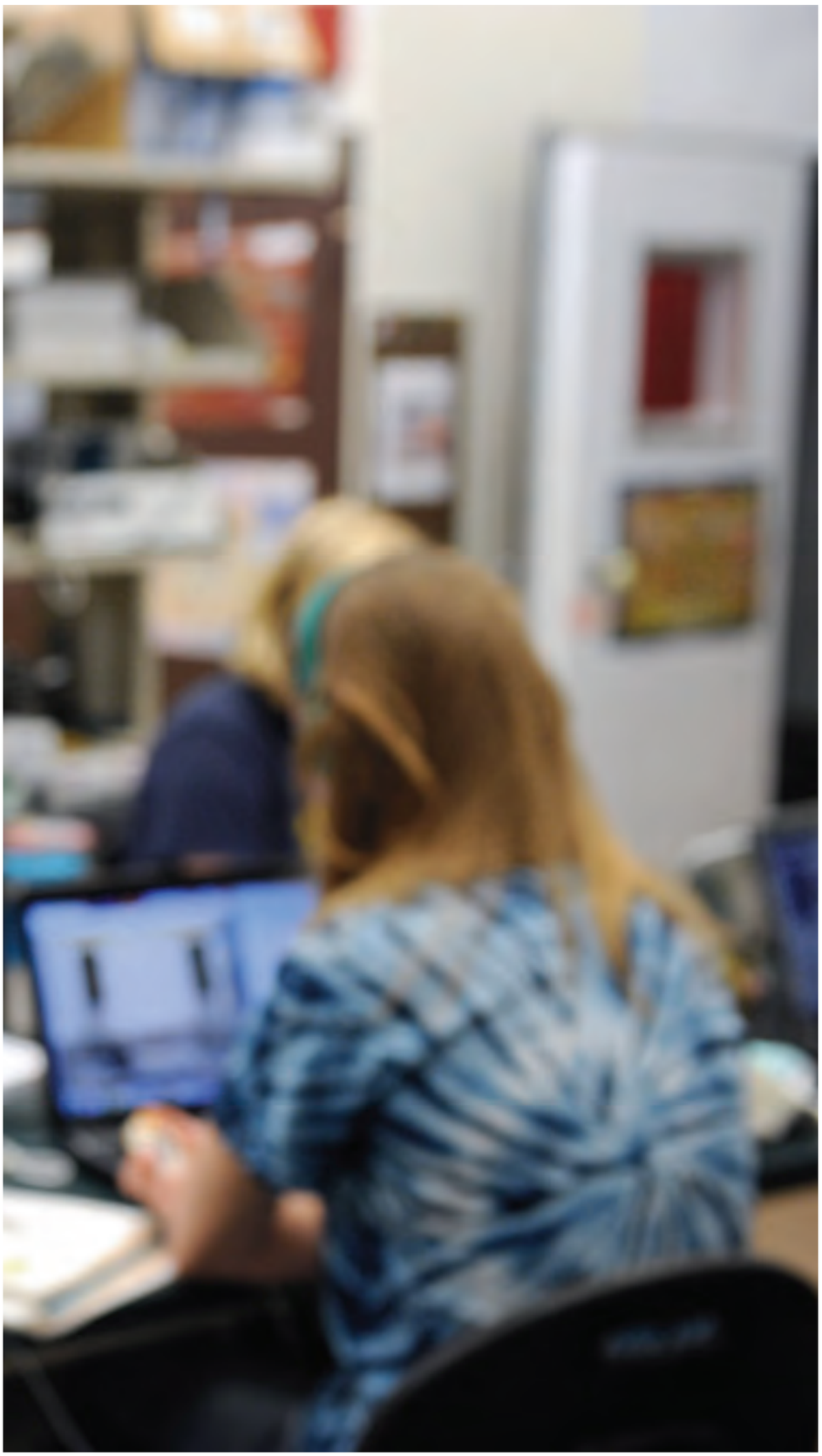

Healthful food = healthy brain

Fulbright scholar explores food as medicine
by Rhea Hirshman

The sweet, bright purple maqui berry grows wild throughout central and southern Chile and in parts of Argentina. Rich in antioxidants and anti-inflammatory compounds, it has been used for generations by the Mapuche people native to that area as both a food source and as a treatment for pain and inflammation. Now being marketed as a South American "superfruit," the berry is in increasing demand in this country. A quick Internet search shows dozens of hits, with tags such as "the superfruit of 2012," and "maqui berry secrets revealed."

Although the Internet language may be hyperbolic, the berry offers, according to Jessica Cote '12, "the promise of enormous health benefits." Next year, Cote, who graduated Phi Beta Kappa with a major in neuroscience, will use a Fulbright grant to research the Chilean maqui berry (*Aristotelian chilensis*) at the University of Bío-Bío in Chillán, Chile, with a particular emphasis on its potential neuroprotective effects. "Recent studies have suggested that the maqui berry could slow the progression of some chronic diseases," she says, "including neurological disorders such as Parkinson's disease."

A return to South America

Cote's path to a research laboratory in Chile began in her hometown of Ipswich, Massachusetts, where she considered careers in engineering or architecture. "But when I got to Trinity," she says, "I realized that

neuroscience combined everything I wanted to study—chemistry, biology, philosophy, engineering—in a fascinating field that's new and growing."

During her middle and high school years, Cote immersed herself in the Spanish language and Latin American cultures. A senior year independent study in Spanish gave her the opportunity to read books, online newspapers—"anything my teacher handed me," she says. On her 18th birthday, her brother Chris challenged her further by presenting her with Gabriel Garcia Márquez's *One Hundred Years of Solitude* in the original Spanish. "He expected me to read only a few chapters," she says, "but I read every word."

Not long after, during a family trip to Argentina, Cote was captivated by the spirit and people of the area. "I knew I would find a way to return to South America," she says.

She did return to Argentina during her junior year in the fall of 2010 through the Trinity-in-Buenos Aires program. Working in a molecular biology research laboratory at the University of Buenos Aires, she designed an experiment to investigate the relationship between a specific set of proteins, nutrition, and ageing, while absorbing the country's language, culture, and politics.

That work in Buenos Aires, exploring an aspect of the relationship between nutrition and health, had roots in her sophomore year, when Cote first joined the neuroscience laboratory of Associate Professor of Psychology and Neuroscience Susan Masino, whom Cote describes as the most significant influence during her years at Trinity. In Masino's lab, Cote studied the effects of a specialized high-fat diet on epileptic seizures. "I was fascinated by the properties of the diet and its, to me, mysterious ability to lessen the severity of epileptic symptoms," she says.

Cote stayed on campus the following summer to continue working with Masino through Trinity's Summer Science Program. During the summer after her junior year, encouraged by Masino, she explored neuroscience at the University of California at Berkeley from what she describes as a "more cognitive, rather than biological" angle, researching neural responses to brain injuries.

The effect of food choices

Her Berkeley summer provided more than just a different kind of neuroscience research experience. "I ate a pre-packaged sandwich and French fries for lunch the day I arrived in Berkeley," she says. "By the time I had been there a few weeks, I was eating lunches of local meat and fresh fruit. I was surrounded by people who were conscious about food choices. Berkeley drew me into a culture of healthy eating that I had studied, but had never actually participated in."

While at Berkeley, Cote was also reading materials that Masino had assigned her in preparation for becoming a senior mentor the following fall in Masino's first-year seminar, *The Green Mind*. The seminar explores the interplay among brain function, mental health, food, and the environment. "While I was surrounded by this intentional food community in Berkeley, with people who understood food from a political perspective," Cote says, "I was constantly reading about these topics—and everything hit home."

For her senior thesis, Cote returned to an extension of an ongoing project in Masino's neuroscience lab, investigating the effects of a ketogenic (high-fat, low-carb) diet on autistic behaviors such as deficits in communication, impairments in social interactions, and repetitive behaviors. "This same diet has been used since the 1920s as an effective therapy for epilepsy, especially for children," she explains. "Because many people with autism also have epilepsy, we are looking at whether the diet might work for autism too—and, ultimately, at how it works."

Researcher, student, activist

During her Fulbright tenure, Cote will be not only a researcher, but also a student and a community activist. She will complete an extensive research study examining how the maqui berry affects cellular function in the nervous system of rodents. At the same time, she will take classes in the university's ecological chemistry master's program to further her knowledge of neuroscience, biochemistry, and natural food properties.

And, in conjunction with a local chapter of Slow Food, an international organization that focuses on promoting the growth and appreciation of natural foods, Cote will offer free community nutrition and cooking programs that are based on scientific knowledge about healthy eating and about the role of food in brain health.

That educational component is central to what Cote sees as the significance of her research. "It sounds obvious," she says, "but everyone has to eat. "What's less obvious is that, a lot of the time, we don't think about what we put into our bodies. Researchers have associated certain chronic diseases with high consumption of processed foods. These diseases are especially prevalent in the U.S., where people tend to eat foods loaded with chemicals and preservatives, and are rising rapidly in other countries, including Chile, that have adapted the so-called Western diet. People need to be aware not only of the dangers of poor choices, but of the opportunities for improved health that come with positive choices."

Cote's Fulbright experience will also further prepare her for undertaking a Ph.D. program in neurobiology. "I'm not totally sure what I'll do with that degree," she says. "But I'm particularly interested in the area of natural and dietary therapies for disease, and I could certainly see being a research professor at a college like Trinity. We have a phenomenal science program here that's full of opportunities for anyone who has a passion for their work."