Following Your Gut

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Dordt College students and professors are finding themselves connected to one of the most interesting developments in human health research today—the human microbiome and how it helps keep people healthy. While most people have heard about the Human Genome Project, fewer seem to know about the Human Microbiome Project or related efforts like the American Gut Project.

The human microbiome is made up of hundreds of strains of microbial species and millions of bacteria. These microorganisms make up 90 percent of our bodies and inhabit everything from our exposed skin to the deepest crevices of our intestines. Researchers are mapping the human microbiome by studying and identifying the bacteria in healthy people. What they are finding, many believe, has the potential to dramatically change how we think about health and healing.

Google "microbiome" and you'll find an assortment of popular articles with titles designed to get your attention: "Findings from the Gut," "Some of My Best Friends are Germs," "The Pit in Your Stomach is Actually Your Second Brain," "The Zoo We Bear," and "Nose-y Bacteria Could Yield a New Way to Fight Infection." New York’s American Museum of Natural History has even created an exhibit on the topic: The Secret World Inside You.

Scientific journals also have published numerous academic articles on the topic, albeit with far less imaginative titles. And Amazon has pages of titles related to the microbiome and gut health.

These sources identify and describe what scientists have learned about the role "bugs," "germs," or, more politely, "good bacteria" play in human health. Research in this area has taken off partly due to a variety of cultural practices that adversely affect gut health, including widespread use of antibacterial products, diets that include few fermented and cultured foods, and a general aversion to dirt. Researchers are finding that the microorganisms that share our body space hold an important key to overall health. The microbes thought to promote a healthy balance of bacteria in the gut—what we’ve come to know as "probiotics"—may improve digestion, regulate the immune system, protect against disease-causing bacteria, control weight, counter autoimmune disorders, impact mental health, and more.
MICROBIOLOGY’S CONTRIBUTION

So what does all of this have to do with Dordt College students and faculty?

Last year, a local start-up company, entegro, asked Dr. Jeff Ploegstra for help interpreting reports they had received from a lab hired to monitor the growth of the diverse strains of microbes in their mixed-culture probiotic product, flourish. Ploegstra immediately suggested that an easier and cheaper way to monitor the proportions of the specific strains they wanted included was through genetic testing.

There are two main options for monitoring the diversity of organisms in flourish, according to Ploegstra. “One is to grow everything on agar plates that select for specific groups of bacteria and count the colonies. This is time consuming and imprecise,” he says. “The second is to use a genetic approach—to quantify the copy number of unique genetic thumbprints from each species in the mix.” Entegro officers Jerod Work and Carlos Bahena opted to take Ploegstra’s advice and go the genetic route. But rather than purchase the equipment they would need themselves and only use it occasionally, they decided to donate to Dordt a quantitative PCR (qPCR) thermocycler, an instrument that amplifies and detects DNA. Ploegstra then found the genetic sequences needed for the strains in flourish and worked with advanced microbiology students to identify strains and monitor their proportions in the mix.

“This arrangement has both educational and equipment stewardship benefits,” Ploegstra says. And Work notes that collaborating with Dordt people has been fun. He and his colleagues are pleased that Dordt science faculty and students have a qPCR to use for a broad range of

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— Microbiology student Shannon Vander Berg

Recent graduate Shannon Vander Berg (’17) helped culture and establish lab stocks of good bacteria.
During this academic year, senior Shannon Vander Berg helped culture and establish long-term lab stocks of the various species of bacteria present in entegro’s product. She then ran preliminary tests of the genetic probes designed by Ploegstra to verify their match to each of the organisms. Ploegstra expects to have a working assay (a quantitative determination of the amount of a given substance in a particular sample) ready by the end of June.

“Working on the entegro project helped me learn new lab skills and challenged me to pair them with previously acquired knowledge,” says Vander Berg, who has been a teaching assistant in Dordt microbiology classes for the past three years. “The lab equipment and procedures were familiar, but the materials and conditions I was using were new,” she says. “This project gave me the opportunity to design a course of action, implement it, and then troubleshoot. I was able to pull from all aspects of my education to develop solutions.” She also likes contributing to research that has the potential to improve people’s health.

“What I find exciting about the entegro project is that it fosters connections between Dordt’s academics and the community,” says Vander Berg. “Professors provide expertise, students develop lab skills and get the opportunity to use new equipment that entegro helped fund, and in the end entegro will have a more accurate method for testing their product.”

“I’m very interested in health-care sustainability,” Ploegstra says. “Management of gut health is one of the primary ways to manage overall health. Entegro is responding to this, and I’m happy to contribute to a product that may improve people’s health.”

MARKETING GETS INVOLVED TOO

Dordt’s partnership with entegro hasn’t been limited to the sciences. Business faculty and students have contributed to the effort, too—although the two
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— Marketing Professor Dale Zevenbergen

departments didn’t know of the other’s contributions at first.

Last year, entegro managers consulted with Business Professor Dale Zevenbergen about how to market flourish. Zevenbergen, a friend of Work and a customer with family health issues resolved by flourish, helped the company create a distribution system that includes two channels (a network of consultants and a series of professionals) that capitalize on the quality of their product and the impact of their customers’ success stories. Senior Brianna Kroeze got involved and helped implement some of Zevenbergen’s recommendations through an internship that turned into part-time work while she completed her education.

“It was an unique opportunity to work with a small company; I was able to see more areas of the business than just marketing,” says Kroeze. “I am so thankful for the opportunities that I had by working with the people at entegro. This internship was a great way to start my career in business.”

Zevenbergen’s marketing students also got involved. Each fall, Zevenbergen has students in his marketing class take on a project for local businesses or organizations—or sometimes alumni businesses. Last fall one team of students compared entegro’s flourish with similar products made by its top competitors. They learned as much as they could about the competition, looking at how the product was presented and marketed, and at the end of the semester presented their findings to the company.

“I don’t micromanage, and bringing their project from start to finish can be a stressful experience for students. But they come out of it having learned what they need to do and what they can do. It’s a great experience for all involved,” says Zevenbergen.

“Working with entegro for our marketing project was a great experience because we created something that was useful to them,” says senior Courtney De Wolde. “That ‘real-life’ experience taught me more about marketing research and what it actually looks like in the business world than any amount of notes I have taken in class. Entegro provided educational feedback to our group that we are able to take into our future business careers.”

“I see this as a win-win-win,” says Zevenbergen. “Small companies usually have something on their back burner that they’d love to work on to more effectively market their product, but have no time to pursue; students get real experience designing and finishing a project and working as a team; I stay aware of what is going on in the business world and Dordt gains the respect of the local community.”

One of Ploegstra’s favorite phrases has long been: “Healthy people come from healthy places.” That includes where they live, what they eat, and how they relate to others. “Working toward that goal connects directly to our calling to work for shalom in our world,” he says. He sees the partnership with entegro as a way to take what they and others are learning about the human microbiome and do just that.

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