

Bacteria can't beat Roboguts

BY CAROL MOORE

People with Inflammatory Bowel Disease may have different gut bacterial communities than healthy people. The simulated human intestinal tract allows Prof. Emma Allen-Vercoe to grow and profile these various bacterial colonies.



One in every 160 Canadians suffers from Inflammatory Bowel Disease (IBD), a chronic, debilitating disease that affects the digestive system and causes symptoms including inflammation, abdominal pain, cramping and fatigue. Canada also has among the highest incidence of IBD in the world, costing the economy approximately \$1.8 billion annually.

Now, a simulated human intestinal tract called Roboguts has been developed by University of Guelph researchers to mimic gut conditions in people who suffer from IBD. The researchers' goal is to profile gut bacterial communities and better understand the relationship between gut bacteria and IBD.

The research team, led by Prof. Emma Allen-Vercoe, Department of Molecular and Cellular Biology, is comparing distal (lower gut) bacterial profiles from healthy donors to those from patients suffering from IBD. She's using the Roboguts to grow the bacterial communities found in fecal samples in an anaerobic environment, and then profiling the stability of these bacterial communities.

Allen-Vercoe has found patients suffering from IBD have reduced diversity in their colon bacteria. She reasons that the decline in bacterial diversity impairs the patient's ability to combat different types of stress, whether it's physical or mental.

"Healthy guts have a very diverse colon microflora population and that can absorb a lot of stress," says Allen-Vercoe. "But IBD patients have reduced diversity and can't absorb the stress, which leads to all sorts of health problems."

The researchers are using the Roboguts to monitor what happens when stress is added to the system, and then comparing the stress response in IBD and healthy patients.

The specific stress response currently being examined is to norepinephrine, an acute stress hormone that affects the attention and responding actions in the brain and the flight-or-flight response. Norepinephrine is known to cause changes in gene regulation in some pathogens, such as *E.coli* O157:H7.

Horses go green

So far, Allen-Vercoe has observed that the gut bacterial profiles from healthy people respond to norepinephrine, and she is currently testing whether the changes seen are greater in bacterial communities from patients with IBD compared to healthy people. She believes that the lack of diversity of gut bacteria in IBD patients would skew the gut micro-ecology, and contribute to an imbalance within the gut that then predisposes an individual to a flare-up of their disease.

She wants to find out the mechanism behind the imbalance.

“We know that IBD is the smoking gun and stress is the trigger,” says Allen-Vercoe. “Now, we need to figure out what the bullet is.”

Once the mechanism is found behind the imbalance, Allen-Vercoe wants to be able to research how therapeutic treatment with a pre- or probiotic might help to restore the gut bacteria population to normal. She hopes this will prevent or reduce relapses in IBD patients, increasing the quality of life for individuals affected with IBD.

The research is applicable not only to IBD, but also to other diseases that are increasingly being connected to disturbances in the ecology of the gut microflora, including obesity, *Clostridium difficile*-associated disease, irritable bowel syndrome, and regressive autism.

Collaborators on these research efforts include Dr. Sydney Finegold, University of California at Los Angeles; Dr. Derrick MacFabe, University of Western Ontario; Dr. Elaine Petrof, Queen’s University; and Dr. Cezar Khursigara, University of Guelph.

Funding for this project is provided by the Crohn’s and Colitis Foundation of Canada, Canada Foundation for Innovation, the National Institutes of Health, the Ontario Ministry of Agriculture, Food and Rural Affairs, the Canadian Institutes of Health Research and the Ontario Ministry of Innovation. ■

BY JACKIE BELLAMY

Horse owners are playing their part in contributing to a healthy environment. As the number of horse owners increase, so does the need for stewardship of the equine environment. Equine Guelph has responded to this need with new and innovative initiatives.

The *Stewardship of the Equine Environment* course, winner of Horse Journals’ Green Horse Award (featured in the Equine Consumers’ Guide 2010), promotes awareness and strategies for landowners to develop plans benefiting the health of horses while protecting land and water resources.

This course was born from a need identified by Equine Guelph’s Healthy Lands for Healthy Horses program committee. The program offers popular weekend workshops, teaching landowners to make environmentally friendly improvements on horse farms.

Equine Guelph believed that even greater knowledge and awareness could be developed through the creation of the *Stewardship of the Equine Environment* course, which includes an action plan for reducing the environmental hoofprint by protecting wells from contamination, properly managing nutrient waste, reducing energy use, and preserving habitats, wildlife and plant life.

Active participation is an important part of the course to create healthy lands for horses and their human counterparts.

Says Prof. Stew Hilts, program advisor: “Thousands of landowners have now participated in stewardship programs across Canada, learning the best way to care for their

own land, or contributing to stewardship of public land and waters. Horse owners and their horses can benefit directly by taking this course to learn about stewardship practices that enhance equine operations.” ■

Stewardship of the Equine Environment



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