



New world-class, germ-free facility strengthens Hamilton's position as an international leader in intestinal disease research

By Liisa Morley

Every human being carries an enormous number of bacteria in the intestine. In fact, we have about 10 times more bacterial cells in our bodies than we have cells of our own. Most of the time we live peacefully with these bacteria which do not cause us damage. In fact, we benefit each other, because the bacteria give us nutrients that help to digest our food while we provide a warm and secure place for the bacteria to live.

"Even if we could eliminate these bacteria with antibiotics it would not be a very good idea," says Dr. Andrew Macpherson, a member of the Intestinal Diseases Research Program (IDRP) at Hamilton Health Sciences. "We would lose the benefits that they give us, and in their absence, dangerous bacteria would be liable to take their place resulting in infection." He also notes that the bacteria are so numerous that antibiotics would only make a small difference to their total numbers.

Although most people live harmoniously with their commensal bacteria, unfortunately some people develop intestinal disease, which is often the result of disrupting this mutually beneficial relationship. For example, patients with inflammatory bowel disease have abnormal inflammatory reactions to the presence of com-



Drs. Stephen Collins and Andrew Macpherson show a visitor the entrance to the germ-free Farncombe Gnotobiotic Facility at the lab's grand opening ceremony last spring.

mensal microorganisms in the intestine, and other intestinal conditions including stomach ulcers, irritable bowel syndrome, altered contractility of the bowels and intestinal cancers, which all arise directly or indirectly from uncontrolled behavior of intestinal microbes.

Traditionally, the interaction between intestinal bacteria and our bodies has been very difficult to investigate. This is partly

because the bacteria are a very complicated mixture, most of which cannot be cultured outside the body. A new specialized laboratory has been constructed at McMaster University Medical Centre in order to research these hard-to-investigate intestinal bacteria. The facility ensures stringent control of the bacterial environment and allows researchers to eliminate all bacteria and then

precisely define and control the bacteria present in order to understand their interaction with the intestine and the remainder of the body in health and disease.

The 3,000 square foot Farncombe Gnotobiotic Facility is the only laboratory of its kind in Canada and was made possible by a generous donation from the Farncombe family. It cost five million dollars to cre-

ate and is one of a handful in the entire world.

"This is the only such facility that is entirely dedicated to studying how these bacteria influence the expression of intestinal diseases, and how alterations in the exposure to gut bacteria predispose us to allergy and autoimmunity including diabetes," says Dr. Macpherson.

Hamilton has long had an international strength in intestinal disease research. The Intestinal Diseases Research Program (IDRP) at the Centre for Excellence for Digestive Diseases at Hamilton Health Sciences was founded in 1983 by a grant from the Crohn's and Colitis Foundation of Canada through the generosity of the Kahanoff Foundation. The IDRP is an integrated group of clinical and basic scientists dedicated to finding better treatment for digestive diseases.

The group includes Drs. Stephen Collins, Andrew Macpherson and Paul Moayyedi. Dr. Collins is one of the world's leading researchers in gastroenterology. Dr. Moayyedi, an expert in determining how clinical treatments in gastroenterology can be better translated into excellence in clinical care, was recruited to the program from the United Kingdom. The Director of the Farncombe Gnotobiotic Facility, Dr. Andrew Macpherson, recently came to Canada from Zurich, Switzerland and is an international expert on how intestinal bacteria interact with the immune system in the gut. Dr. Macpherson is also the inaugural chairholder of the Farncombe Family Chair in Inflammatory Bowel Disease.

The strengths and accomplishments of this team place the Intestinal Diseases Research Program at Hamilton Health Sciences as a global leader in understanding the critical role of bacteria in the maintenance of health and expression of disease. Thanks in part to Dr. Collins' vision and leadership, digestive diseases has been recognized by Hamilton Health Sciences as a Centre of Excellence. The centre has been established at McMaster University Medical Centre and consists of a fully integrated medical surgical unit for the treatment and study of gastrointestinal diseases. Gastroenterology's clinical profilenow matches its already strong research profile.

Liisa Morley is an Infrastructure Development Officer in the Office of Integrated Research Services at Hamilton Health Sciences.

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