

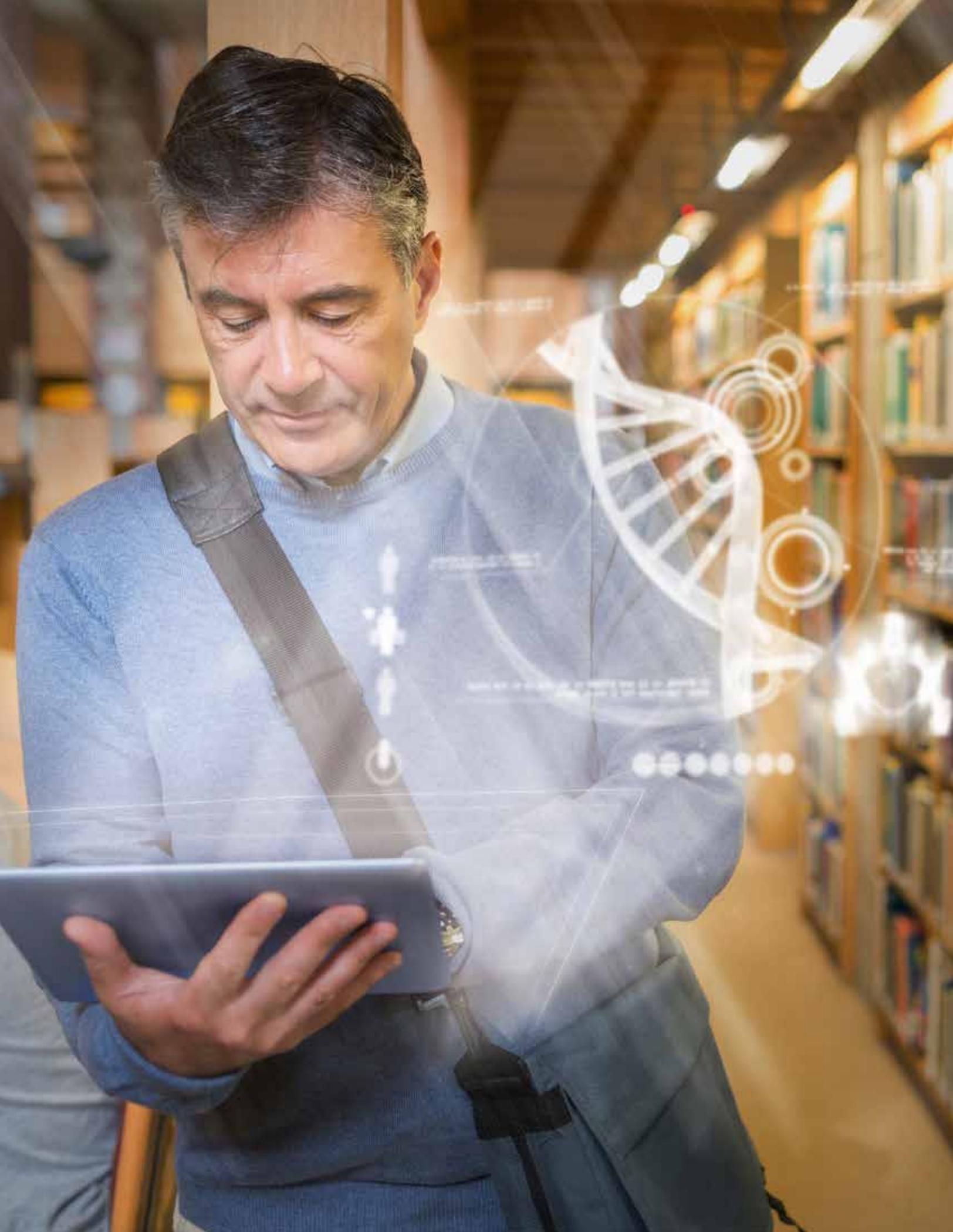
A close-up photograph of a female scientist in a laboratory. She is wearing a white lab coat, safety glasses, and a blue surgical mask. She is focused on a task, holding a pipette with her gloved hands. The background is a blurred laboratory setting with shelves of test tubes.

2014

Research Report



Crohn's and
Colitis Canada
Crohn et
Colite Canada



DEMONSTRATING PROGRESS: A MESSAGE FROM SCIENTIFIC & MEDICAL ADVISORY COUNCIL CHAIR AND CHIEF SCIENCE & EDUCATION OFFICER

Over the past 40 years, Crohn's and Colitis Canada has become a world-leader in the fight against inflammatory bowel diseases (IBD). Investing in the best research has led to significant progress in our understanding of Crohn's disease and ulcerative colitis. We now know more about what causes these diseases, how they develop, and how best to treat patients living with Crohn's or colitis than we did four decades ago – when the organization was first established in 1974. Our research programs have also built a scientific community that is highly competitive in securing additional funding from government and industry and that is regarded as world-class.

In 2013–2014, Crohn's and Colitis Canada invested more than \$7.5 million in leading-edge research supporting 36 research projects, 16 fellowship and studentship training awards, and two scientific conferences aimed at advancing Crohn's and colitis treatments and improving the quality of life for patients across the country. As the largest non-governmental funder of IBD research in Canada, we are leading the fight against Crohn's and colitis.

In 2013/14 Crohn's and Colitis Canada began implementing its new Research Strategy, which aims to hasten discoveries into patient benefits through a balanced and more strategic approach. Research is expensive and time-consuming. It takes years to complete a single study and even longer to move research breakthroughs from the lab into clinical practice. As such, the Research Strategy identifies four key priorities for its research investments:

1. Building Capacity (supports training of young scientists)
2. Moving Knowledge into Practice (supports scientific conferences to share knowledge between researchers and clinicians)
3. Targeting Research (supports partnerships and initiatives in strategic priority areas)
4. Supporting Innovation (supports discovery research through operating grants and pilot projects)

Our Research Strategy will ensure that Crohn's and Colitis Canada's research investments will have maximal impact on the lives of nearly 250,000 Canadian children and adults living with inflammatory bowel disease and reflect the needs of our stakeholder communities. However, there is still more work to be done to deliver on Our Promise. Continued research investments in all of these areas are vital to cultivate research excellence in Canada, contribute to sustaining our economy, and advance new treatments that will improve the quality of life for people living with Crohn's and colitis.

The progress highlighted in this Research Report would not have been made possible without the unwavering support of our researchers, clinicians, donors, partners, sponsors and volunteers. Your commitment to the Crohn's and Colitis Canada ensures that Canada remains a global leader in IBD research. We hope you enjoy learning about our accomplishments.

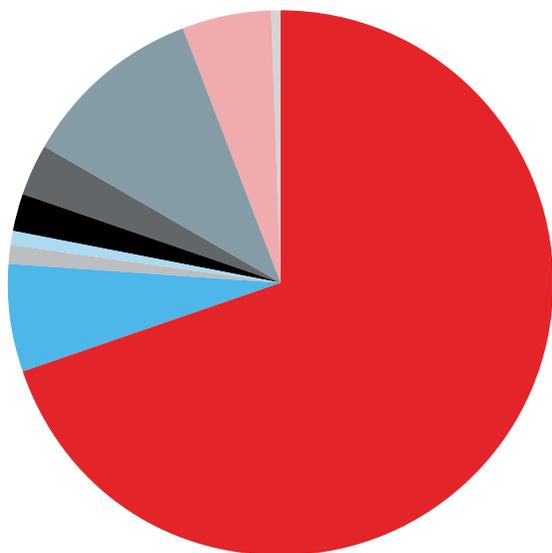


Warmest wishes,

Aida Fernandes, MBA
Chief Science &
Education Officer

Mark Silverberg, MD, PhD
Chair, Scientific & Medical
Advisory Council

Research Investments 1976-2014



- Grants in Aid of Research (66%)
- Federal Partnerships (6%)
- Provincial Partnerships (1%)
- Innovations in IBD Grant (1%)
- Research Scientist Award (2%)
- University Chairships (3%)
- GEM Project (10%)
- Archived Awards (5%)
- Conferences/Travel, Book Awards, Visiting Scientist Award (<0.5%)





40 Years of Progress

Over the past 40 years, Crohn's and Colitis Canada has been leading the way in research to develop more effective treatments and to find the cures. Since 1974, Crohn's and Colitis Canada's national research program has funded:

- more than \$88 million in IBD research
- more than 338 grants that teach us more about preventing, diagnosing and treating Crohn's disease and ulcerative colitis
- two Chairships at University of Calgary and McMaster University (one in IBD Research and the latest in ulcerative colitis) establishing them as internationally-recognized centres of excellence in IBD research
- more than 342 student awards, studentships, and fellowships beginning their careers in order to foster the next generation of IBD scientists
- 10 young investigators, establishing promising researchers to build greater capacity, promote creativity and engage more researchers
- 8 research scientist and visiting scientist awards
- innovative research where investigators test new theories and pursue promising new leads in the global search for better treatments and a cure for IBD

2013/14 Highlights



Building Capacity

27 trainee and young investigator awards



Moving Knowledge into Practice

2 national medical conferences



Targeting Research

11 partnerships, and the GEM Study



Supporting Innovation

26 Grants-in-Aid
4 Innovation Grants



number of additional dollars leveraged from government and industry to match Crohn's and Colitis Canada's investment of \$630,077 in support of IBD research



number of research grants supported by Crohn's and Colitis Canada through our Grants-in-Aid, Innovations in IBD & partnership programs



number of major hospitals and universities supported by Crohn's and Colitis Canada research grants & awards



number of promising trainees and young investigators

Building Capacity

Crohn's and Colitis Canada supports researchers throughout their careers, from undergraduate students working in research labs through to established senior scientists. By co-funding salary awards, fellowships, and student scholarships, we are building research capacity and ensuring that significant research effort remains focused on IBD.

Training awards ensure a reliable supply of highly-qualified personnel develop the knowledge and skills required to become a seasoned investigator. Through co-funding partnerships with other research funding agencies, these awards support top-ranked undergraduate, graduate and post-doctoral trainees who have demonstrated potential for a career in IBD-related research.

Fellowships

Crohn's and Colitis Canada / Canadian Institutes of Health Research / Canadian Association of Gastroenterology

Fellow	Institution	Project	Funding
Cathy Lu	University of Alberta	Does point-of-care abdominal ultrasound improve outcomes in inflammatory bowel disease patients?	Year 1 of 2 \$ 27,500
Galliano Zanello	University of Toronto	Effect of NOD2 and TLR2 signaling on the modulation of T cell function in colitis	Year 2 of 2 \$ 22,500
James Butcher	University of Ottawa	Identifying bacterial taxa and/or metabolic pathways that provide mechanistic insight into inflammatory bowel disease pathogenesis by characterizing the gut microbiota composition of pediatric inflammatory bowel disease patients	Year 1 of 2 \$ 22,500
Laura Greenfield	Hospital for Sick Children	The role of autophagy in inflammatory bowel disease-associated colon cancer	Year 2 of 2 \$ 22,500
Qi Li	Hospital for Sick Children	Understanding very early onset inflammatory bowel disease using whole exome sequencing: functional analysis of novel candidates	Year 1 of 2 \$ 22,500
Sarah O'Donnell	Mount Sinai Hospital	Mechanisms of intestinal inflammation following ileal resection for Crohn's disease	Year 2 of 2 \$ 10,000
Yasmin Nasser	University of Calgary	The role of endogenous opioids and chronic stress in the expression of pain in IBD	Year 2 of 2 \$ 27,500

Studentships

Crohn's and Colitis Canada / Alberta Innovates Health Solutions

Student	Institution	Project	Funding
Christine Hirota	University of Calgary	The role of epithelial protease-activated receptors (PARs) in regulating mediators of intestinal inflammation and cancer	Year 2 of 2 \$ 19,000
James Cotton	University of Calgary	The immunomodulatory effects of <i>Giardia lamblia</i>	Years 2 & 3 of 3 \$ 7,800

Crohn's and Colitis Canada / Michael Smith Foundation for Health Research

Vijay Morampudi	University of British Columbia	Do goblet cell mediators cooperatively prevent gut microbiota from causing spontaneous colitis?	Year 1 of 3 \$ 20,750
Yanet Valdez	University of British Columbia	Dissecting the role of CD248 in inflammatory disease	Year 3 of 3 \$ 19,500

Crohn's and Colitis Canada / Fonds de recherche Santé – Québec

Émilie Degagné	Children's Hospital Oakland Research Institute	Rôle de la sphingosine phosphate lyase dans l'inflammation observée dans les maladies inflammatoires intestinales	Year 2 of 2 \$ 15,000
Stéphanie Bussièrès-Marmen	McGill University	Étudier et comprendre le rôle de TC-PTP dans le développement des lymphocytes B ainsi que sa fonction dans le processus d'inflammation grâce à de nouveaux modèles de souris tissus spécifiques et inductibles	Year 1 of 3 \$ 10,000

Crohn's and Colitis Canada / University of Ottawa

Amanda Starr	University of Ottawa	The microbiota at the intestinal mucosa-immune interface: a gateway for personalized health	Year 1 of 4 \$ 25,000
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**Crohn's and Colitis Canada / Canadian Association of Gastroenterology
Summer Studentships & Prizes**

Student	Institution	Project	Funding
Ariane Langlois	Université de Sherbrooke	Role of SHP-2 phosphatase in intestinal inflammation: mechanisms of action	\$ 5,000
Brandon Sit	Hospital for Sick Children	The role of Rac2 deficiency in inflammatory bowel disease	\$ 5,000
Mitchell Braam	University of British Columbia	Transcriptional repressor Hic1 controls the TH17/iTreg cell balance and regulates the development of inflammatory bowel disease	\$ 5,000
William Buie	University of Calgary	Examining the role of NLRs in regulating IL15 in intestinal inflammation and homeostasis	\$ 5,000
Zheng Yu Zhao	University of British Columbia	Why do people with inflammatory bowel disease fail antiTNFalpha therapy?	\$ 5,000
Zhiyuan Ou	University of Alberta	Breaking the barrier: host-microbial interactions in pediatric IBD	\$ 5,000
Jennifer Beatty	University of Calgary	<i>Giardia duodenalis</i> cysteine proteases modify human microbiota biofilms: a role in post-infectious epithelial dysfunction?	\$ 750
Josie Libertucci	McMaster University	Fecal biotherapy in ulcerative colitis patients causes a common shift in the microbiome associated with remission	\$ 750

Crohn's and Colitis Canada Student Book Awards

Jason Akerman	Memorial University of Newfoundland		\$250
Jessica Downing	Memorial University of Newfoundland		\$250

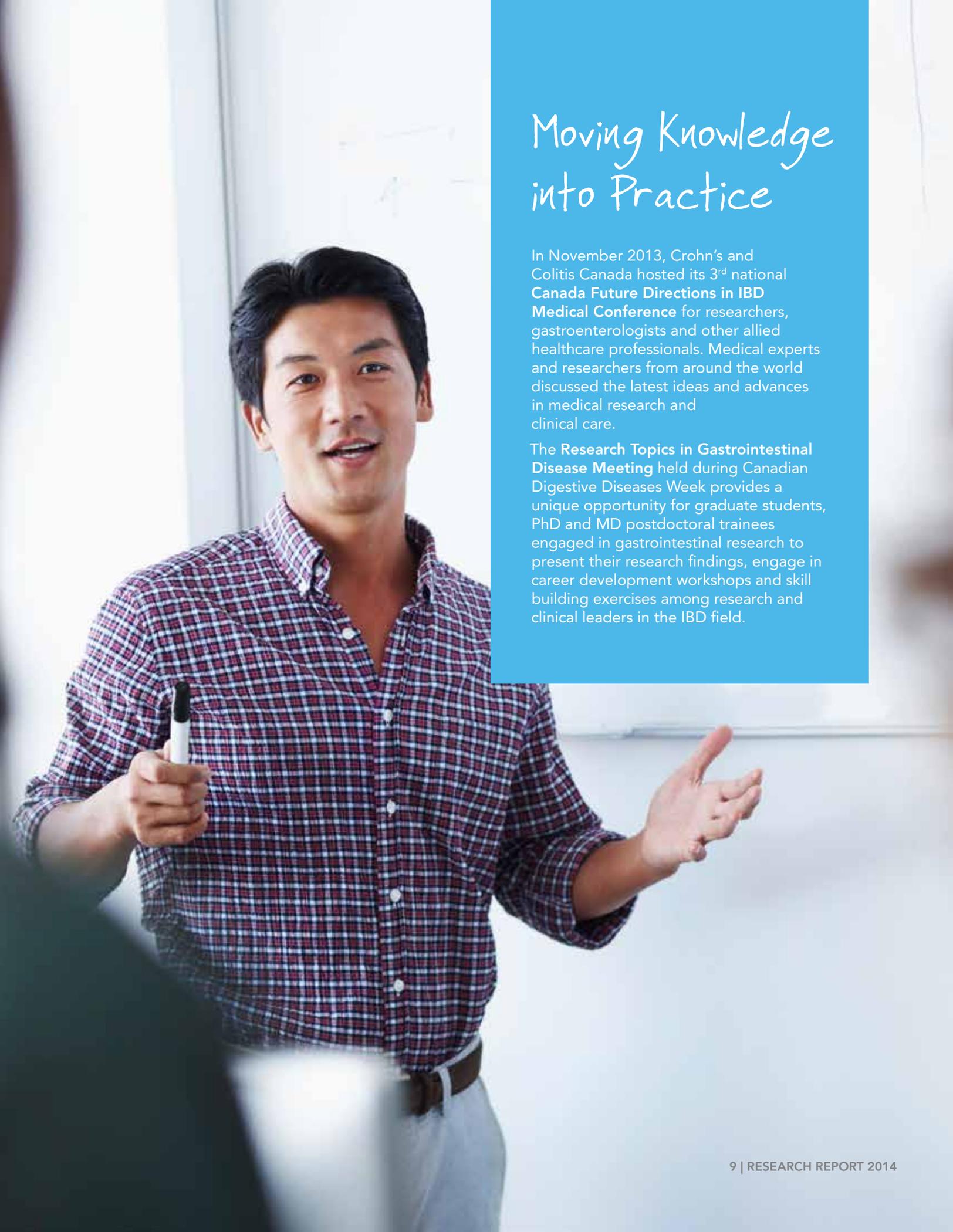
Salary awards provide salary support to young investigators showing outstanding promise of developing an independent career in Crohn's and colitis research. These awards help keep the best and brightest of new researchers focused on our area of research, supporting the new treatments of tomorrow and the search for cures.



Dr. Geoffrey Nguyen, current recipient of a Grant-in-Aid of Research as well as a New Investigator Salary Award, is a Clinical Scientist at the Zane Cohen Centre at Mount Sinai Hospital and an Associate Professor of Medicine at the University of Toronto. His research focuses on how to optimize the delivery of IBD healthcare and improving quality of care. Dr. Nguyen says, "the Crohn's and Colitis Canada/CIHR/CAG New Investigator Salary Award has enabled me to devote my time to research instead of the typically heavy teaching or clinical work loads of physician scientists. With the support of Crohn's and Colitis Canada's Grant-in-Aid, my colleagues and I are conducting research that aims to improve continuity of care and the overall experience for teens with IBD who are transitioning from pediatric to adult IBD care. This is a particularly stressful and confusing time for our young patients as they strive to be more independent and self-reliant. We want to do all we can to ensure that they do not get lost in the system."

CROHN'S AND COLITIS CANADA / CANADIAN INSTITUTES OF HEALTH RESEARCH/CANADIAN ASSOCIATION OF GASTROENTEROLOGY SALARY AWARDS

Dr. Eric Benchimol	Children's Hospital of Eastern Ontario	Year 1 of 5 \$ 30,000
Dr. Geoffrey Nguyen	University of Toronto	Year 3 of 5 \$ 30,000
Dr. Georgia Perona-Wright	University of British Columbia	Year 2 of 5 In name only

A man with dark hair, wearing a red and white plaid button-down shirt and light-colored trousers, stands in front of a whiteboard. He is holding a white marker in his right hand and gesturing with his left hand. The whiteboard behind him has some faint, illegible markings.

Moving Knowledge into Practice

In November 2013, Crohn's and Colitis Canada hosted its 3rd national **Canada Future Directions in IBD Medical Conference** for researchers, gastroenterologists and other allied healthcare professionals. Medical experts and researchers from around the world discussed the latest ideas and advances in medical research and clinical care.

The **Research Topics in Gastrointestinal Disease Meeting** held during Canadian Digestive Diseases Week provides a unique opportunity for graduate students, PhD and MD postdoctoral trainees engaged in gastrointestinal research to present their research findings, engage in career development workshops and skill building exercises among research and clinical leaders in the IBD field.

Targeting Research

In order to generate new ideas to better treat or cure IBD, Crohn's and Colitis Canada supports a number of targeted research programs (Government Partnerships, Industry Partnerships, GEM Project). Our continued investment in these programs ensures a diversified research portfolio and invests strategically in programs that are key issues for our patient community.

Government Partnerships

In collaboration with the **Canadian Institutes of Health Research (CIHR)** and **Genome Canada**, Crohn's and Colitis Canada has leveraged its funds to support cutting-edge team grants related to critical IBD issues.

Researcher	Institution	Project	Our Contribution
Dr. Laura Sly	University of British Columbia	Crohn's disease variants predispose to commensal-driven autoinflammation	Year 1 of 1 \$ 20,000
Dr. Ken Croitoru	Mount Sinai Hospital	Influences of host genome on the HUMAN gut microbiome: studies in a healthy cohort carrying Crohn's disease risk alleles	Year 4 of 5 \$ 25,000
Dr. John Rioux	Université de Montréal	CIHR team in integrative biology of inflammatory disease: IL23R as a confirmed immune disease pathway: a model for translating genetics discoveries into better diagnosis and treatment of common disease	Year 5 of 5 \$ 16,667
Dr. Alain Stintzi	University of Ottawa	The microbiota at the intestinal mucosa-immune interface: a gateway for personalized health	Year 1 of 4 \$ 7,500
Dr. John Rioux	Université de Montréal	IBD Genomic Medicine Consortium (iGenoMed): translating genetic discoveries into a personalized approach to treating the inflammatory bowel diseases	Year 1 of 4 \$ 25,000

Industry Partnerships

The Crohn's and Colitis Canada-Vertex Sponsored Research Program is intended to better our understanding of the underlying biology of IBD and to identify potential targets for future IBD medicines.

Researcher	Institution	Project	Funding
Dr. Dana Philpott	University of Toronto	The role of isoforms in regulating autophagy	Year 1 of 2 \$ 100,000
Dr. Maya Saleh	McGill University	Novel therapeutic targets through genetic and functional analyses of intestinal barrier integrity and cell survival in IBD	Year 1 of 2 \$ 100,000
Dr. Subrata Ghosh	University of Calgary	Aberrant cell functions driven by IBD associated genetic mutations	Year 1 of 2 \$ 100,000
Dr. Scott Gray-Owen	University of Toronto	Exposing the lifestyle of IBD-related <i>E. coli</i> in the gut	Year 3 of 3 \$ 50,000
Dr. Brian Coombes	McMaster University	Adherent-invasive <i>E. coli</i> as a polymicrobial colitogenic	Year 3 of 3 \$ 75,000
Dr. François Boudreau	Université de Sherbrooke	Role of HNF4 α targets during intestinal epithelium regeneration	Year 3 of 3 \$ 90,580





GENETIC
predisposition



ENVIRONMENTAL
influences



MICROBIAL
interactions

GEM

The **Crohn's and Colitis Canada Inflammatory Bowel Disease GEM Project** is a major, multi-centre clinical research study investigating how genetic predisposition, environmental influences and microbial influences combine to trigger the development of Crohn's disease. This study could hold the key to unlocking the mystery of IBD.

In April 2014, Crohn's and Colitis Canada and the Leona M. and Harry B. Helmsley Charitable Trust announced the largest-ever funding commitment to Crohn's disease research in Canada. The \$10 million funding commitment is made possible by a lead gift of \$6 million from the Helmsley Charitable Trust, one of the largest family trusts in the United States, which includes a focus on Crohn's disease amongst its funding priorities. The Helmsley Charitable Trust grant will be matched by a further \$4 million in active fundraising from Crohn's and Colitis Canada, Mount Sinai Hospital, and University of Toronto.

"We saw the value of the GEM Project immediately," said Jim O'Sullivan, Program Director of the Helmsley Charitable Trust's IBD & Crohn's Disease Program. "We are confident that our grant will be an accelerator for this research and help to provide answers sooner for people living with Crohn's and their families."



Dr. Ken Croitoru	Mount Sinai Hospital	GEM II Project	\$ 2,888,184 Year 1 of 4
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GEM Highlights Since 2007:

3,100
subjects recruited
to date

>40
sites to
date

29
new Crohn's
cases to date

\$8,456,584
investments
to date



Supporting Innovation

Discovery Research Grants (Grants-in-Aid) support high-quality research projects that will enhance our understanding of Crohn's and colitis and have the potential to cure or more effectively control the diseases. These grants build on the achievements and strengths of the world-class IBD research community in Canada by supporting the pipeline for discovery of new therapies. The research projects funded by our organization are devoted to finding the causes of Crohn's and colitis (environmental triggers and genetic markers) and developing new treatments (blocking inflammation, treating complications, improving therapy, and creating healthy gut ecosystems).

Finding The Causes And Triggers

ENVIRONMENTAL TRIGGERS

Discovering how what we eat, how we live and what bacteria we have in our guts impacts on Crohn's and colitis.

Researcher	Institution	Project	Investment
<p>Dr. Andre Buret</p> 	University of Calgary	<p>Acute infection with <i>Campylobacter jejuni</i> initiates and/or exacerbates intestinal inflammation in IBD patients. Dr. Buret is studying how <i>Campylobacter jejuni</i> may disrupt the gut microbiome and trigger the IBD disease process in motion. This work may shed new light on the mechanisms responsible for intestinal inflammation in IBD, and will help identify novel therapeutic targets in IBD.</p> <p><i>Keywords: microflora biofilms; IBD pathophysiology; immune misreading mechanism; bacterial infections; Campylobacter jejuni.</i></p>	\$118,705 (Year 3 of 3)
<p>Dr. Scott Gray-Owen</p> 	University of Toronto	<p>In the search to understand a potential link between microbes and Crohn's disease, Dr. Gray-Owen is investigating a bacterial pathogen called "adherent and invasive <i>E. coli</i>" (AIEC). AIEC appears to stick to and penetrate lining of the gut and potentially contribute to the chronic inflammation seen in IBD. These studies will provide new insights into the cause of IBD and may lead to novel strategies to either prevent Crohn's disease or interrupt the inflammatory process.</p> <p><i>Keywords: adherent and invasive E. coli; Crohn's disease; NOD2; bacterial infections.</i></p>	\$119,445 (Year 3 of 3)

GENETIC MARKERS

Discovering which genes are predictors of disease onset and severity.

Researcher	Institution	Project	Investment
<p>Dr. Claude Asselin</p>  <p>Co-Investigator(s): Dr. Fernand Pierre-Gendron</p>	<p>Université de Sherbrooke</p> <p>Université de Sherbrooke</p>	<p>How the cells lining the gut respond to microbes is controlled our genes. Dr. Asselin is studying the role of proteins, which control genetic and epigenetic information in gut cells during inflammation. In the long term, this research program will identify novel targets that could lead to better treatments for IBD.</p> <p><i>Keywords: intestinal epithelial cells; transcriptional regulation; autophagy; genetics; epigenetics.</i></p>	<p>\$119,445 (Year 3 of 3)</p>
<p>Dr. Mark Silverberg</p> 	<p>Mount Sinai Hospital</p>	<p>Dr. Silverberg is evaluating the genes and microbes that are associated with the onset and recurrence of inflammation following ileal resection for Crohn's disease. This information will help healthcare professionals predict which Crohn's disease patients are likely to develop recurrent inflammation after surgery.</p> <p><i>Keywords: Crohn's disease; disease recurrence; gene expression; mucosal inflammation; prognosis; surgery.</i></p>	<p>\$119,445 (Year 3 of 4)</p>
<p>Dr. Thierry Mallevaey</p> 	<p>University of Toronto</p>	<p>Mutations in genes encoding key bacteria-sensing molecules, called NOD1 and NOD2, are associated with the development of IBD. NOD proteins are believed to provide protective signals that prevent or dampen intestinal inflammation during the development of IBD, although their mechanisms of action are just beginning to be unraveled. Dr. Mallevaey is investigating whether NOD-mediated bacterial signals induce iNKT cell activation and afford them with protective functions during the development of IBD.</p> <p><i>Keywords: natural killer T cells; innate immunity; lipid antigens; gene mutations.</i></p>	<p>\$119,445 (Year 2 of 3)</p>
<p>Dr. Nicola Jones</p>  <p>Co-Investigator(s): Dr. Dana Philpott</p>	<p>University of Toronto</p> <p>University of Toronto</p>	<p>Two gene mutations that are associated with Crohn's disease are NOD2 (which senses bacteria within the cell) and ATG16L1 (which is needed for digesting and recycling material inside the cell – called "autophagy"). In cells where NOD2 and ATG16L are not working properly this causes excessive inflammation. Dr. Jones will be studying how these two genes might be involved in causing disease in order to develop better therapies to treat and prevent IBD.</p> <p><i>Keywords: autophagy; miRNA; NOD-like receptors; translational research; gene mutations.</i></p>	<p>\$119,445 (Year 3 of 4)</p>

Discovering Novel Treatments

BLOCKING INFLAMMATION

Discovering how to prevent the inflammation that results in severe pain, diarrhea, and other debilitating symptoms.

Researcher	Institution	Project	Investment
<p>Dr. Alan Lomax</p> 	Queen's University	<p>Dr. Lomax is examining how the sympathetic nervous system, a particular branch of the nervous system, can regulate the immune system and change the severity of inflammation. This work will determine whether targeting the sympathetic nervous system is a viable treatment option for IBD.</p> <p><i>Keywords: neuroimmunology; sympathetic nervous system; immune regulation.</i></p>	\$119,445 (Year 2 of 3)
<p>Dr. Frank Jirik</p> 	University of Calgary	<p>All humans carry a prion protein, which has protective effects in various cell and tissue types. Dr. Jirik is examining the nature of the protective and anti-inflammatory properties of this protein. This study may possibly reveal new targets for drug development that will be able to mimic the striking protective qualities of the prion protein during intestinal inflammation.</p> <p><i>Keywords: colitis; ileitis; endogenous prion protein; macrophages; anti-inflammatory.</i></p>	\$118,850 (Year 2 of 3)
<p>Dr. Derek McKay</p> 	University of Calgary	<p>Dr. McKay is examining patient tissue samples to determine whether bone-marrow derived activated macrophages (AAMs) can be used as a novel treatment for intestinal inflammation. If possible, this could be a novel and safe approach to treat and perhaps ultimately cure IBD.</p> <p><i>Keywords: anti-inflammatory macrophages; adoptive transfer treatment strategy; bone marrow.</i></p>	\$119,445 (Year 2 of 3)
<p>Dr. Waliul Khan</p> 	McMaster University	<p>Dr. Khan is examining what role a hormone called serotonin plays in regulating an immune response. This may lead to improved therapeutic strategies to combat gut inflammatory disorders, including IBD.</p> <p><i>Keywords: serotonin; hormone therapy; immune regulation.</i></p>	\$119,254 (Year 3 of 3)

Researcher	Institution	Project	Investment
<p>Dr. Laura Sly</p> 	University of British Columbia	<p>Dr. Sly is studying macrophages, a type of cell found in blood, that are often thought of as “bacteria killers”. This fight often results in inflammation, which helps to stop and destroy the invaders. However, if not properly controlled, it can lead to chronic inflammation like that seen in IBD. Dr. Sly is looking at how we might use regulatory macrophages to block inflammation at its source and treat or prevent IBD.</p> <p><i>Keywords: regulatory macrophages; animal model; intestinal inflammation; immunotherapy.</i></p>	\$124,080 (Year 1 of 3)
<p>Dr. Theodore Steiner</p> 	University of British Columbia	<p>Dr. Steiner is developing a better approach to dampen unwanted inflammation by using the body's own tools – namely, white blood cells called T-regulatory cells (Tregs). Treg therapy (taking Tregs from patients' blood, stimulating them to multiply, and then infusing them back into the bloodstream) can help control inflammation in other diseases, but this has not yet been successful in IBD. In this project, Dr. Steiner will address the current barriers to Treg therapy in two different mouse models. If successful, Treg therapy for IBD patients may become a reality.</p> <p><i>Keywords: T-regulatory cells; flagellin; inflammasome; cell therapy.</i></p>	\$122,107 (Year 1 of 3)
<p>Co-Investigator(s): Dr. Megan Levings</p>	University of British Columbia		
<p>Dr. Bruce Vallance</p> 	BC Children's Hospital	<p>Dr. Vallance is investigating the immune signals and cell types involved in protecting intestinal tissues in order to better understand how the immune system normally balances inflammation with tissue protection. Ultimately, these studies will help to develop new therapies that will balance the immune response in people with Crohn's and colitis.</p> <p><i>Keywords: intestinal epithelial cells; mucosal integrity; innate immunity; enteric bacteria; tissue protection.</i></p>	\$125,000 (Year 1 of 3)
<p>Dr. John Wallace</p> 	University of Calgary	<p>Dr. Wallace is studying how inflammation is turned off and how the processes might be malfunctioning in IBD. By finding the defect in inflammation regulation, this may lead to better drugs with fewer side effects that will promote healing and reduce symptoms in IBD. Such drugs may also prolong remission and allow patients to stop taking any medications. Dr. Wallace will be testing these experimental drugs in different types of intestinal inflammation to find the best doses and the best routes of administering the drugs.</p> <p><i>Keywords: anti-inflammatory mediators; pro-resolution mediators; translational research; therapeutic targets.</i></p>	\$119,445 (Year 3 of 3)
<p>Co-Investigator(s): Dr. Jose G.P. Ferraz</p>	University of Calgary		

TREATING COMPLICATIONS

Investigating and creating novel treatments for the pain, cancer, scarring and depression that accompanies Crohn's and colitis.

Researcher	Institution	Project	Investment
 <p>Dr. Devendra Amre</p> <p>Co-Investigator(s): Dr. David Mack</p> <p>Dr. Colette Deslandres</p>	<p>CHU Ste-Justine</p> <p>Children's Hospital of Eastern Ontario</p> <p>CHU Ste-Justine</p>	<p>Certain chemical changes in a child's DNA can influence the expression of specific genes that may serve as markers for diagnosing Crohn's disease in children and also help predict which child is likely to suffer from complications and require surgery. Dr. Amre is studying the utility of these DNA markers to possibly assist in the implementation of management of Crohn's disease in children.</p> <p><i>Keywords: DNA methylation; diagnostic markers; pediatric Crohn's disease; prognostic markers; pediatric.</i></p>	<p>\$110,823 (Year 2 of 3)</p>
 <p>Dr. Wallace MacNaughton</p>	<p>University of Calgary</p>	<p>Proteases are enzymes that break down proteins. Some types of proteases can trigger colonic inflammation but how this happens is not known. Dr. MacNaughton is studying protease-induced inflammation in order to identify potential targets for the development of drugs to treat IBD. This work may also help to better understand inflammation-associated colorectal cancer, which occurs in some ulcerative colitis patients.</p> <p><i>Keywords: colorectal cancer; epithelium; apoptosis; resolution of inflammation; ulcerative colitis.</i></p>	<p>\$119,445 (Year 3 of 3)</p>
 <p>Dr. Michael Blennerhassett</p>	<p>Queen's University</p>	<p>The enteric nervous system is a large and complex network of nerve cells present throughout the GI tract, which extend axons to smooth muscle to regulate important intestinal functions. Dr. Blennerhassett is studying how axons and neurons are damaged and how this may lead to stricture formation. Overall, this will improve our understanding of neuron damage and repair in order to prevent stricture formation in IBD.</p> <p><i>Keywords: intestine; stricture formation; neurobiology; smooth muscle; inflammation.</i></p>	<p>\$119,418 (Year 3 of 3)</p>
 <p>Dr. Stephen Vanner</p> <p>Co-Investigator(s): Dr. Alan Lomax</p>	<p>Queen's University</p> <p>Queen's University</p>	<p>Abdominal pain is a debilitating symptom for many patients with IBD and can result in emotional suffering and physical disability. This pain can be difficult to effectively treat, because its underlying cause isn't well understood. This complicates the decision on how to treat such pain, and whether to use strong opiate drugs like morphine. Dr. Vanner will study the mechanisms of pain to determine if existing pharmacological agents can prevent these events and to guide doctors in developing effective treatment plans to manage use of pain medications.</p> <p><i>Keywords: abdominal pain; pain management; neuroimmune interplay; effects of psychological stress; clinical steroids.</i></p>	<p>\$120,112 (Year 1 of 3)</p>

CREATING HEALTHY GUT ECOSYSTEMS

Investigating how to promote healthier gut ecosystems through environmental, genetic and other means.

Researcher	Institution	Project	Investment
<p>Dr. Elaine Petrof</p>  <p>Co-Investigator(s): Dr. Nathan Magarvey</p>	<p>Queen's University</p> <p>University of Minnesota</p>	<p>Dr. Petrof is investigating whether <i>Lactobacillus plantarum</i>, a common gut bacterium which is also a probiotic, has anti-inflammatory benefits that may block the development of colitis. Research into this area may lead to safer IBD treatments that would reduce the negative inflammatory response, while maintaining the body's critical host defenses.</p> <p><i>Keywords: probiotics; host-microbe interactions; colitis; host defenses; Lactobacillus plantarum.</i></p>	<p>\$119,445 (Year 3 of 3)</p>
<p>Dr. Deanna Gibson</p> 	<p>University of British Columbia</p>	<p>Dr. Gibson is investigating the impact of dietary fat intake on the intestinal microflora and is examining how this change affects intestinal immunity and susceptibility to IBD. The goal of the research is to identify dietary fats that promote beneficial microbes and protect the body against IBD.</p> <p><i>Keywords: intestinal immunity; nutrition; enteric bacteria; polyunsaturated fatty acid supplementation; dietary fat.</i></p>	<p>\$119,445 (Year 2 of 3)</p>
<p>Dr. Michael Surette</p>  <p>Co-Investigator(s): Dr. Paul Moayyedi Dr. Christine Lee Dr. John Marshall</p>	<p>McMaster University</p> <p>McMaster University St. Joseph's Healthcare McMaster University</p>	<p>Dr. Surette is using a highly novel treatment where patients with active ulcerative colitis are given fecal enemas to try and replace their stool containing bacteria that may be driving their disease with that from a healthy donor. This study may provide more specific targeted therapies in the future.</p> <p><i>Keywords: fecal biotherapy; microbiome; randomized control trial; ulcerative colitis.</i></p>	<p>\$112,546 (Year 2 of 3)</p>
<p>Dr. Elena Verdu</p>  <p>Co-Investigator(s): Dr. Emma Allen-Vercoe</p>	<p>McMaster University</p> <p>University of Guelph</p>	<p>Dr. Verdu is studying how a specific probiotic, <i>Bifidobacterium breve</i>, can prevent flares in colitis mice. Her studies have shown that adding this probiotic to germ free mice can efficiently increase the production of an antibiotic-like molecule. The efficiency with which this probiotic stimulates the production of this "host antimicrobial" is higher than other normal bacteria living in our gut. Dr. Verdu's work can help identify a new treatment option for IBD that increases the antimicrobial capabilities and protects against gut inflammation in humans.</p> <p><i>Keywords: probiotics; experimental colitis models; commensal bacteria; dysbiosis and IBD; gut homeostasis.</i></p>	<p>\$107,500 (Year 1 of 3)</p>

Researcher	Institution	Project	Investment
<p>Dr. Kris Chadee</p> 	University of Calgary	<p>The large intestine is covered with thick mucus that forms a protective barrier against bad bacteria and substances. However, in IBD the mucus layer is very thin and the inflamed gut becomes susceptible to bacterial invasion and other noxious substances that exacerbate inflammation. Dr. Chadee is studying the role of Muc2 mucin in maintaining a healthy microbiome and protective barrier as a treatment option for IBD.</p> <p><i>Keywords: mucin in host defense; epithelial barrier function; tight junction proteins; permeability; gut leakiness.</i></p>	\$119,445 (Year 3 of 3)
<p>Dr. Kevan Jacobson</p> 	BC Children's Hospital	<p>The cells lining the gut form a physical barrier between the contents of the digestive tract and the underlying immune and nervous systems. This is achieved by tight junction proteins that bind neighbouring cells together. In IBD this physical barrier is impaired. Dr. Jacobson is investigating ways to prevent disruption, and strengthen the barrier to develop new therapies for IBD.</p> <p><i>Keywords: tight junction proteins; barrier function; nervous system</i></p>	\$119,436 (Year 3 of 3)



Getting The Best Care

Exploring new ways to provide the best treatments and new models of care to patients.

Researcher	Institution	Project	Investment
<p>Dr. Geoffrey Nguyen</p>  <p>Co-Investigator(s): Dr. Eric Benchimol</p>	<p>University of Toronto</p> <p>Children's Hospital of Eastern Ontario</p> <p>University of Toronto</p>	<p>The transition to adult care can be a stressful time. Dr. Nguyen and his team are exploring how best to transition teens with IBD to an adult gastroenterologist. This study will determine whether increased contact with an IBD nurse during the transition period can improve patient satisfaction, knowledge of IBD, and continuity of health care</p> <p><i>Keywords: pediatric to adult transition; IBD nursing; resource utilization; clinical care.</i></p>	<p>\$122,380 (Year 1 of 2)</p>
<p>Dr. Laura Targownik</p>  <p>Co-Investigator(s): Dr. Charles Bernstein Dr. Harminder Singh Dr. Lisa Lix</p>	<p>University of Manitoba</p> <p>University of Manitoba</p> <p>University of Manitoba</p> <p>University of Manitoba</p>	<p>Medications are the cornerstone of managing IBD. The decisions on which drugs to use in IBD, and in which situation, are based on the results of large randomized controlled trials. Dr. Targownik will be using the Manitoba IBD database (one the world's largest) to determine the effectiveness of drug therapy in the real world. The results from this research will help guide clinical decision-making for IBD patients across Canada and the world.</p> <p><i>Keywords: pharmacoepidemiology; immunomodulators; anti-TNF agents; clinical care; managing treatments.</i></p>	<p>\$118,279 (Year 1 of 1)</p>

What Lies Ahead - Discovery Grants 2014-2017

In May 2014 our Grant Review Committee met to identify the most promising research to fund in the coming year and we are pleased to announce the additional nine Grant-in-Aid and four Innovations in IBD projects will be funded. These programs support high-quality innovative research projects that will enhance our understanding of Crohn's disease and ulcerative colitis and have the potential to cure or more effectively control these diseases.

Innovations in IBD Grants

Researcher	Institution	Project	Investment
Dr. Charles Bernstein Co-investigators: Dr. Laura Targownik Dr. Hillary Steinhart Dr. John Marshall	University of Manitoba University of Manitoba Mount Sinai Hospital McMaster University	Denosumab (common osteoporosis drug) for the treatment of Crohn's disease	\$50,000 (1 year)
Dr. Stephen Girardin Co-investigator: Dr. David Prescott	University of Toronto University of Toronto	Targeted genome editing in human intestinal epithelial cells	\$50,000 (1 year)
Dr. Andrew Stadnyk Co-investigator: Dr. Anthony Otley	IWK Health Centre IWK Health Centre	An innovative approach to cell therapy for Crohn's disease	\$50,000 (1 year)
Dr. Stuart Turvey Co-investigators: Dr. Laura Sly Dr. Hong Yang	University of British Columbia University of British Columbia University of British Columbia	Development of anti-inflammatory nanomedicine for inflammatory bowel disease	\$50,000 (1 year)

Grants in Aid of Research

Researcher	Institution	Project	Investment
Dr. Wallace MacNaughton Co-investigator: Dr. Paul Beck	University of Calgary University of Calgary	How PAR2 regulates death of epithelial cells that line the intestine and turns off inflammation	\$371,460 (3 years)
Dr. Andre Buret Co-investigators: Dr. Hans Vogel Dr. Joe Harrison Dr. Paul Beck	University of Calgary University of Calgary University of Calgary University of Calgary	How microbiota biofilms cause post-infectious flare-ups in IBD	\$371,460 (3 years)
Dr. Simon Hirota Co-investigator: Dr. Thomas Chang	University of Calgary University of British Columbia	How PXR keeps the inner lining of the gut tight and protects against the damaging effects of inflammation	\$370,930 (3 years)
Dr. Kris Chadee	University of Calgary	How mucin prevents gut microbes and toxins from directly interacting with the underlying gut epithelium	\$371,460 (3 years)
Dr. Aleixo Muise Co-investigator: Dr. Daniella Rotin	Hospital for Sick Children Hospital for Sick Children	How certain genes help control the leakiness of the bowel in IBD	\$371,460 (3 years)
Dr. Mark Lathrop Co-investigator: Dr. Tomi Pastinen	McGill University McGill University	Use high-tech sequencing platform to uncover new types of high-risk genetic risk factors in IBD	\$371,460 (3 years)
Dr. Brian Coombes	McMaster University	How <i>E. coli</i> infection is linked to post-infectious IBS and IBD	\$220,110 (3 years)
Dr. Dean Tripp Co-investigator: Dr. Mike Beyak	Queen's University Queen's University	Understand and improve the psychosocial risk factors of IBD pain and poorer quality of life	\$268,620 (3 years)
Dr. Eric Benchimol Co-investigators: Dr. Harminder Singh Dr. Anthony Otley Dr. Anne Griffiths Dr. Geoffrey Nguyen Dr. Matthew Carroll Dr. Alain Bitton	Children's Hospital of Eastern Ontario University of Manitoba Dalhousie University Hospital for Sick Children University of Toronto University of Alberta McGill University	Describe variation of how and when care is being provided in Canadian children with IBD	\$369,560 (3 years)

How We Fund Research

Every year, Crohn's and Colitis Canada funds progressive and innovative projects that bring together the finest scientific minds to find new approaches and treatments for Crohn's and colitis. Our highly competitive granting process assigns funding applications to an independent peer review panel of scientific experts and lay reviewers who represent the needs and priorities of our community of stakeholders. Applications are evaluated on scientific merit, relevancy and potential benefit to Crohn's and colitis patients. "The Grant Review Committee is dedicated to selecting excellent research that addresses the needs of patients and the Crohn's and colitis community as a whole" says Marla Rosen, a Grant Review Committee lay member and the mother of a child with Crohn's.

NEED FOR MORE FUNDING



Discovery Grant (Grants-in-Aid & Innovations grant) proposals reviewed in 2013/2014 competition



Highly-ranked research proposals eligible for funding



New research projects Crohn's and Colitis Canada could afford to fund



Highly-ranked research projects that remain unfunded



Cost of unfunded research

GRANTS REVIEW COMMITTEE 2014

Dr. Derek McKay (Chair)
University of Calgary

Dr. John Marshall (co-Chair)
McMaster University

Dr. Stephen Vanner (Scientific Officer)
Queen's University

Marla Rosen (Lay Reviewer)

Marc Steinberg (Lay Reviewer)

Ruth Scully (Lay Reviewer)

Dr. Alan Lomax
Queen's University

Dr. Anne Griffiths
The Hospital for Sick Children

Dr. Brian Feagan
Robarts Research Institute

Dr. Charles Bernstein
University of Manitoba

Dr. Deanna Gibson
University of British Columbia

Dr. Emma Allen-Vercoe
University of Guelph

Dr. François Boudreau
Université de Sherbrooke

Dr. Geoffrey Nguyen
University of Toronto

Dr. Greg Gloor
University of Western Ontario

Dr. Hillary Steinhart
Mount Sinai Hospital

Dr. John Wallace
University of Calgary

Dr. Keith Sharkey
University of Calgary

Dr. Laura Sly
University of British Columbia

Dr. Mathieu Lupien
Princess Margaret Cancer Centre

Dr. Megan Levings
University of British Columbia

Dr. Nicola Jones
The Hospital for Sick Children

Dr. Paul Moayyedi
McMaster University

Dr. Peter Ernst
University of California San Diego

Dr. Theodore Steiner
University of British Columbia



How We Fund Research

STEP
1

CALL FOR PROPOSALS

To Canada-based researchers and health care professionals.

STEP
2

GRANT REVIEW

Grant Review Committee, made up of lay reviewers and scientific experts reviews, scores and ranks each application based on merit and relevance.

STEP
3

FUNDING APPROVED

Crohn's and Colitis Canada Board of Directors approves funding for highly-ranked projects based on availability of funds.

STEP
4

ACCOUNTABILITY

Grant recipients provide annual progress reports and financial accounting ensuring projects and expenses are on track.

A photograph of a man and a woman lying on their backs in a field of tall, golden-brown grass. The man is on the left, wearing a blue t-shirt and jeans, with his arms behind his head. The woman is on the right, wearing a red long-sleeved shirt and jeans, with her arms crossed over her chest. They are both looking up towards the sky. The background shows a line of trees under a bright sky.

Thank You

Crohn's and Colitis Canada appreciates the generosity and ongoing support of our donors, partners, sponsors and volunteers, who are making this research progress in inflammatory bowel disease possible. The continued assistance of these individuals has helped Crohn's and Colitis Canada to become the second largest funder of non-governmental research in the world. Crohn's and Colitis Canada-funded research studies will have a monumental impact on improving treatments, cures and quality of life for individuals and families affected by IBD.

Additionally, Crohn's and Colitis Canada is honoured to have the guidance of our Scientific & Medical Advisory Council and Research Committee of the Board that helps shape our future research strategy.

Scientific & Medical Advisory Council

Dr. Mark Silverberg	Mount Sinai Hospital	Chair
Dr. John L. Wallace	University of Calgary	Past Chair
Dr. John Rioux	Université de Montréal & Montréal Heart Institute	Vice-Chair
Dr. Derek McKay	University of Calgary	Research Chair
Dr. John Marshall	McMaster University Medical Centre	Associate Chair Research
Dr. Charles Bernstein	University of Manitoba	Clinical Research Chair
Dr. Subrata Ghosh	Alberta Health Services Gastrointestinal Research Group	Advocacy Chair
Dr. Anthony Otley	Dalhousie University	Chair Research Communications
Dr. Laura Sly	University of British Columbia	Member-at-large
Dr. Elaine Petrof	Queen's University	Member-at-large
Dr. Charlie Lees	University of Edinburgh	Member-at-large
Dr. Gilaad Kaplan	University of Calgary	Member-at-large
Lindee David	CEO, Crohn's and Colitis Canada	Staff Representative
Aida Fernandes	CSEO, Crohn's and Colitis Canada	Staff Representative

Research Committee of the Board

Janet Lambert (Chair)	Mark Ram
Har Grover	Rob Hemminger
Lindee David (CEO, Crohn's and Colitis Canada)	Aida Fernandes (CSEO, Crohn's and Colitis Canada)

Research Investments in 2013/14

BUILDING CAPACITY Partnership Trainee & Salary Awards	\$ 364,050
MOVING KNOWLEDGE INTO PRACTICE Medical Conferences	\$ 190,876
TARGETING RESEARCH Industry Partnerships Government Partnerships GEM Project	\$ 3,497,931
SUPPORTING INNOVATION Discovery Grants	\$ 3,091,830
OTHER Allocated research program costs	\$ 422,366
GRAND TOTAL	\$ 7,567,053

