Report to the Community



2011–2012 Year in Review



"Through Harley Hotchkiss' unique vision and overwhelming generosity, the HBI has become an internationally recognized centre in neurological and mental health research and education.

Harley's commitment and support for the institute went well beyond his generous gifts. Through his inspiring leadership and actions he taught us that we share a responsibility to give back to the community and to contribute to the care of those in need.

Harley's spirit of friendship, generosity and collaboration will forever be the heart and soul of the HBI."

—Samuel Weiss

Report to the Community

2011–2012 Year in Review



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On the cover

Mrs. Rebecca Hotchkiss and Mrs. Brenda Mackie (left to right, mother and daughter) are pleased to represent this year's *Report* to the Community in honour of the late Harley Hotchkiss. His legacy, vision, leadership, and commitment to excellence will long be remembered.

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MESSAGE FROM THE HOTCHKISS FAMILY

Message from the **Hotchkiss family**

respect, and I know this influenced Ron and Tara's decision to support the HBI. As well as enabling strong translational research into mental health causes and treatment, the Mathison Centre will be a training facility for the next generation

Ron and my father shared a mutual

community support for the a collaborative space that brings together scientists, clinical researchers and trainees to study from many disciplines and allows

with the HBI for many reasons. He supported the institute's ethic of collaboration and partnership. He had a love of learning and understood that solid medical research leads to better patient outcomes and a healthier population. He strongly believed in giving back to the community. Most of all, he was proud of the vision of excellence shared by everyone at the HBI.

y father was proud

of his association

Over the past year, there has been memorable support from the community which allows the HBI to continue to strive for excellence, and for which our family is profoundly grateful. Ron and Tara Mathison's generous gift that created The Mathison Centre for Mental Health Research & Education provides a foundation to develop innovative treatments and early interventions for child and youth mental health issues.

of scientists and clinicians. The HBI has also found Healthy Brain Aging Laboratories, all aspects of brain aging. This new facility also brings together scientists

"The HBI continues to attract world-class minds in neurological and mental health."

the recruitment of additional scientific leaders to strengthen the foundation of excellence established at the HBI. It will be of great value as our life expectancy continues to rise.

My father was extremely proud of the achievements of the 400+ scientists and students who continue to work to improve neurological and mental health care for Albertans, now and into the future. The HBI continues to attract world-class minds in neurological and mental health.

Perhaps the most joy Dad found in his association with the HBI was in his relationship with Dr. Samuel Weiss. They spoke regularly (and not always about hockey!) and shared a vision for the HBI to become a world-renowned research and education facility. Sam works tirelessly to engage the community, to encourage his members and staff, and to lead the HBI into the future.

This past year has been difficult, and I know Sam feels the loss of The Chief deeply.

Our family will continue to support Sam and the HBI as best we can, and hopefully with our combined efforts will make up

in a small way for the one who is missing. We will work to ensure that Dad's legacy will be well stewarded and his passion for the HBI carries on. We miss him every day, but his wisdom and integrity continue to guide us.

Bonarai Brenda Mackie

Brenda Mackie and grandchildren Dora and Peter Mackie with photo of their great grandfather, Harley Hotchkiss.

Message from the Director



As I reflect on the HBI's accomplishments of this past year and the remarkable growth of our activities over the past eight years, I often marvel at what we've been able to achieve. The research and educational successes that have occurred within these walls are a great source of pride, and we are honoured to offer them in service to our community.

Ithough it has been a year of remarkable accomplishments, sadly it has also been a year of loss. The passing of Harley Hotchkiss has left a huge void in our institute, community and nation that will not soon be filled. Harley's unique vision, warmth and overwhelming generosity was at the foundation of the HBI and has shaped the centre of excellence in neurological and mental health research and education it is today. Through his inspiring leadership and selfless deeds, Harley taught us that we all share a responsibility to give back to the community and to contribute to the care of those in need. Now more than ever, we hold steadfast to his vision and the outstanding commitment to excellence that is exemplary of the Hotchkiss name.

As we look to the future with ambition and purpose, we can point to some very significant achievements. This year we have recruited outstanding new brain researchers, established a worldclass mental health research facility and reached out to the international neuroscience community to form new and meaningful partnerships. All this, while continuing to train the next generation of brain and mental health researchers and translate our research discoveries to practical and meaningful health outcomes.

A few highlights:

1 The recruitment of Drs. Grant Gordon and Matthew Hill which has dramatically bolstered our fundamental brain research activities. Dr. Gordon's research into the control of brain blood flow has been recognized with major awards from the Canada Research Chairs (CRC) program, the Canada Foundation for Innovation and the Heart and Stroke Foundation of Canada. Dr. Hill's research into

the brain's mechanisms that control stress has also been recognized by the CRC program and the Canada Foundation for Innovation, as well as with major award from the Canadian Institutes for Health Research. How gratifying it is to see our two most recent recruits becoming immediate, national success stories, with a great jump-start to their young careers!

2 The establishment of the new Mathison Centre for Mental Health Research & Education through the outstanding support of community leaders, Ron and Tara Mathison. As a state of the art clinical research

facility, this centre will transform our capabilities in mental illness prediction, prevention and early intervention. With a specific focus on adolescents - the most vulnerable population for developing life-long mental health challenges - new imaging and behavioural research conducted in the centre will offer great hope to our community and will allow us to recruit new mental health researchers in the years to come. Yet another example of tremendous community partnership with the HBI, we are most grateful to the Mathisons and commit our institute's best research and education efforts in return.

3 The creation of the Rebecca Hotchkiss International Scholar Exchange Program aimed at positioning the HBI on the global stage for brain research and education. Through the generosity and tireless efforts of John Lamacraft, our community established a major endowment that honours Rebecca Hotchkiss and is supporting international research and education partnerships with leading institutions around the world. Over the past year the HBI has forged collaborations with the Universities of Oxford and Cambridge in England, the University of Melbourne in Australia, and the Chinese Academy of Science's Institute of Neuroscience in Shanghai. Expansion of these collaborations will allow our students and faculty to work with the best and brightest international scholars in the neurosciences-and will dramatically extend the impact of our research and education efforts.

In closing, it is with pride and gratitude that I acknowledge the outstanding contributions of our faculty members, trainees and staff, who make the HBI a great place to learn and work. Together, we are committed to enhancing the neurological and mental health of our community through our research and education efforts. I am looking forward to another year of ground-breaking discovery and innovative education activities at the HBI.

Sincerely,

Samuel Weiss, PhD, FRSC Professor and Director Hotchkiss Brain Institute

Researchers give new hope to those suffering with Crohn's disease



Roger Thompson, Brian Gulbransen, and Keith Sharkey (left to right), have reached a major milestone for developing future therapies for those living with Crohn's and other gut related diseases.

Understanding the mechanisms of how cells are dying in Crohn's disease gives HBI researchers insight into treatment. t started with a conversation in the hallway. Two researchers were discussing their work when they came up with an idea for a new research question. From that moment, the seeds of collaboration were planted and a two-year interdisciplinary research project was about to take root.

Roger Thompson, PhD, and Brian Gulbransen, PhD, both focus their research on understanding the functioning of neurons— Thompson looks at the neurons in the brain and Gulbransen looks at neurons within the gut. Together with Keith Sharkey, PhD, Deputy Director of the HBI, and a team of researchers from the Snyder Institute for Chronic Diseases, they set out to investigate the hows and whys of neuron death—specifically in the gastrointestinal tract.

The result, as published in the prestigious journal *Nature Medicine*, was a breakthrough that offers hope to people suffering from Crohn's disease and ulcerative colitis.

These diseases—collectively known as Inflammatory Bowel Disease (IBD)—are chronic, lifelong conditions. Characterized by inflammation in the gut, IBD leads to a host of debilitating symptoms like abdominal pain, cramping, diarrhea, nausea, vomiting and weight loss.

Treating inflammation is one of the only options currently available

"I think this type of research gives patients considerable hope. What our discovery will lead to, we hope, are novel ways to treat the very severe, life-long, disabling symptoms of these disorders."

for patients, but unfortunately it doesn't solve the problem. "Symptoms will persist even after the inflammation has been relieved because once the cells have been damaged or die, you can't get them back," Sharkey says. "The patient still suffers."

Although it's long been known that IBD leads to the damage or death of neurons within a patient's gut, no one knew why.

"I think this type of research gives patients considerable hope," says Sharkey. "What our discovery will lead to, we hope, are novel ways to treat the very severe, life-long, disabling symptoms of these disorders."

The team's research reveals the mechanism that causes neuron death during gut inflammation. By studying mice with chemically induced colitis, the team was able to identify the presence of proteins called "pannexins"—one of the culprits behind gut neuron death. By blocking this protein they were able to considerably reduce neuron death.

Normally people suffering with IBD are plagued with a lifetime of digestive disorders. "It's like a staircase disease where you get sick and you get better but inevitably you will always get sick again," Thompson says. "What we found

is when we're able to stop the cells

The pannexins involved in the

death of mouse gut neurons are also

"I think this whole study is just

the beginning of our understanding,"

Gulbransen says. "Hopefully, once

we have a better grasp on how this

works in humans we'll be able to

From a conversation in the

hallway, these researchers have laid

the groundwork for developing new

therapies and have provided hope

for more than 200,000 Canadians

"Work like this speaks to

teamwork," says Sharkey. "Either

of our institutes could not have

done this alone. This is the kind

of collaboration that was at the

exceptional collaboration and

who suffer with IBD.

develop treatments to target it."

present in human gut neurons.

from dying, we can bring health

back up to the baseline."

forefront with Harley Hotchkiss. From it, great things happen."

IAME Roger J. Thompson, PhD

DEGREES (INSTITUTIONS)

BSc (Queen's University) PhD (McMaster University)

RESEARCH INTEREST

Mechanisms of neuronal death during stroke and other neurodegenerative disorders

WHY DID YOU CHOOSE THE HI

Because Calgary and the HBI are national and international leaders in stroke research

IAME Brian Gulbransen, PhD

DEGREES (INSTITUT

BS (University of Wyoming) PhD (University of Colorado)

ESEARCH INTERES

Interactions between neurons and glia in the enteric nervous system

NAME Keith Sharkey, PhD

DEGREES (INSTITUTIONS)

BSc (Honors) (University of London, UK) PhD (University of Liverpool, UK)

RESEARCH INTEREST

The role of nerves in the gut and brain-gut communication

Predicting who's at risk for a second stroke



Shelagh Coutts showing an iPad image of a CT scan identifying a blocked artery in the neck of a patient at high risk of a second stroke.

Every second counts in a stroke, but many Canadians live hours from a major health centre. Thanks to HBI researcher Dr. Shelagh Coutts, doctors in rural settings can now use widely accessible technology to predict recurrent strokes. r. Shelagh Coutts' early fascination with stroke research was both personal and professional. On a personal level, her beloved grandmother had a stroke and sadly passed away. On a professional level, she became fascinated with the subject when she observed a fellow physician's unconventional use of a clot-busting medication as stroke treatment. "I thought that was cool," says Coutts, who was quickly hooked on this area of neurological study. In 2001, she accepted a fellowship at the Foothills Medical Centre's Calgary Stroke Program. "I loved it and never looked back."

Of particular interest to Coutts are transient ischemic attacks (TIAs) and minor strokes which impact hundreds of thousands of Canadians a year. "My emphasis is on predicting what per cent of patients who have suffered minor episodes are at high risk of having a major stroke. How can we see those patients more quickly and deal with them appropriately?"

A recent study by Coutts the CATCH study as published in the journal *Stroke*—added simple dye tests to CT scans to locate blocked and narrowing vessels anywhere from the heart up to the top of the brain. After studying 510 patients over two years, it was determined that patients who had evidence of blockages or narrowed vessels were at high risk for a recurrent stroke.

Although doctors currently use MRI scans (magnetic resonance

"My emphasis is on predicting what per cent of patients who have suffered minor episodes are at high risk of having a major stroke. How can we see those patients more quickly and deal with them appropriately?"

imaging) to predict if a TIA patient is at high risk for a second stroke, Coutts' study shows that a CT scan, which is more widely available for most of Canada's population, including rural hospitals, is able to predict recurrent strokes with the same accuracy.

"Many physicians may not have access to an MRI machine to see what is happening in the brain," says Coutts. "This study could allow medical interventions to be more widely available than in just the specialized centres that have access to an MRI."

Coutts has received three major awards for her work: the inaugural Heart and Stroke Foundation of Canada's Distinguished Clinical Scientist Award; the American Academy of Neurology's Michael S. Pessin Stroke Leadership Award; and the American Heart Association's Siekert Award. While she appreciates

the awards, the stroke neurologist and associate professor in the Departments of Clinical Neurosciences and Radiology is excited that practices are beginning to change. She says colleagues have told her they're altering the way they work as a direct result of her findings.

Next year, watch for results from the ASPIRE Project—a provincial

approach to preventing stroke after

But for now, it is about identifying

TIAs. "I am really excited about

risk and targeting intervention.

what we are starting to see."

"Stroke is the most common cause of disability in Canada," Coutts says. "If we can prevent disability, we have done our job."

IAME Dr. Shelagh B. Coutts

ACADEMIC RANK Associate Professor

BSc Honours, MBChB Honours, MD (University of Edinburgh) FRCPC, FRCP (University of Glasgow)

RESEARCH INTERE

Acute imaging in triage and treatment of stroke and TIA patients

WHAT ORIGINALLY MADE YOU INTERESTED IN YOUR DISCIPLINE?

My grandmother passed away from a stroke. Soon after I worked with a physician who was thrombolysing stroke patients with great results.

WHAT DO YOU LIKE DOING OUTSIDE WORK (HOBBY) Mountain biking, hiking, skiing

HBI discovery sets new direction for Alzheimer's treatments

By revealing a mechanism that kills brain cells, researchers have made a breakthrough that will lead to new treatments for Alzheimer's patients.

t the heart of neurological and mental health research is the desire to serve the community a vision shared by Harley Hotchkiss that percolates within the HBI. Each discovery enhances understandings of the functioning of the brain; the enigma of disease; and ultimately informs new treatments, better outcomes and healthier communities.

Alzheimer's and an aging population

Study into neurological dysfunctions in our aging population is just one way researchers at the HBI are serving the community. With the first of the baby boomers hitting retirement age, there are an increased number of Canadians facing the risk of age-related health issues such as dementiathe most common form of which is Alzheimer's disease.

The progressive and eventually fatal disease destroys basic thinking, mood, memory and reasoning skills in its victims, making it difficult to perform even the simplest of daily tasks. Most commonly diagnosed in adults over the age of 65, there are more than 100,000 new cases of dementia diagnosed each year in Canada.

The discovery

Published in the prestigious journal *Proceedings of the National Academy of Sciences*, a discovery by Dr. Peter Stys and Gerald Zamponi, PhD gives us a new understanding about how brain cells die in Alzheimer's patients.

In people with Alzheimer's disease, the key receptor responsible for memory and learning the NMDA receptor—malfunctions. These two researchers discovered that the NMDA receptor is strongly regulated by copper. If the copper is prevented from regulating the receptor, brain cells become over stimulated and, with time,

become sick and ultimately die.

"Not only is this a really interesting and important biological discovery," says Stys, "but because this particular mechanism was previously unknown, it could have fundamentally important therapeutic implications in the treatment of Alzheimer's."

Efforts are already underway to find a drug that acts on the NMDA receptor to mimic the effect of copper in the brain.

Community spirit

Discoveries at the HBI, like those of Stys and Zamponi, happen with the support of the community, strong leadership and a dedication to excellence in neurological research. Both Stys and Zamponi acknowledge that a large factor in the institute's success comes from the commitment and vision of Harley Hotchkiss and his family.

"What he did was not just give money," says Stys. "In combination with his philanthropy, he exuded vision, community spirit and support for the things he held dear. That's part of the reason why the HBI has reached such high levels of success."



Researchers Peter Stys and Gerald Zamponi (left to right) have made a discovery that will potentially lead to new treatments for Alzheimer's.

"We don't live in isolation. We live in a community and we're all in it together. If you become successful you pass on your success to others and help them achieve their goals. That builds your community and makes the world a better place. That was Harley Hotchkiss in a nutshell." -Peter Stys

NAME Dr. Peter Stys

ACADEMIC RANK Professor

DEGREES (INSTITUTIONS)

MD (University of Ottawa) FRCP (C) (University of Toronto)

RESEARCH INTEREST Understanding normal physiology and cellular/ molecular injury mechanisms of axons, myelin and glial cells.

WHAT ORIGINALLY MADE YOU

I always wanted to do nuclear physics, but neuroscience turned out to be quite interesting and a more practical alternative. Juxtaposition with clinical neurology is quite fascinating as it shows us how little we really know, and how much there is to learn still.

NAME Gerald Zamponi, PhD

ACADEMIC RANK Professor and Head, Department of Physiology and Pharamacology

DEGREES (INSTITUTION

Dipl. Ing (Johannes Kepler University), PhD (University of Calgary), FRSC

ESEARCH INTEREST

Neuronal voltage-dependent calcium channels

WHAT ORIGINALLY MADE YOU

I really stumbled into it. It seemed like a better alternative to my previous job as a soil compaction tester at residential construction sites.

On the RHISE – advancing neurosciences **beyond borders**



New HBI initiative unites the best and brightest neuroscientists from around the world.

new initiative named in honour of Rebecca Hotchkiss—the Rebecca Hotchkiss International Scholar Exchange (RHISE) Programis strengthening ties between the HBI and leading neuroscience research centres around the globe. Offering bilateral learning opportunities, the program brings international neuroscience leaders to the HBI for up to three months of in-depth and intensive research residencies. In turn, HBI clinicians, researchers and trainees can also spend up to three months at partner institutions, exchanging ideas and learning from the best neuroscientists in the world.

The program started with businessman John Lamacraft. Motived by his desire to honour

the Hotchkiss family, he brought together close to 50 friends and supporters who believed in the importance of neuroscience and mental health research and education. Inspired by the level of science and strong vision of the HBI, the group—including the Hotchkiss children—created an endowment to keep the knowledge exchange program alive in perpetuity.

The late Harley Hotchkiss offered much praise for the program named for his wife. "Through this program, the HBI's global reputation as a leader

"Interacting and exchanging knowledge with top researchers from leading centres around the world allows us to gain invaluable techniques and absorb and exchange critical knowledge."

in neuroscience research and education will be enhanced, as will its capability of translating research discoveries into health care applications."

Keith Sharkey, PhD, Deputy Director of the HBI, notes that in this day of instant global communications and advanced technologies, there is still no substitute for personal interaction and hands-on training.

"Doing science at the highest level requires a great deal of trust," he says. "A program like this—with face-to-face connections—will be the gateway to that trust."

The unique learning opportunity of this program allows HBI members and their trainees to work with the most outstanding colleagues

in their field, regardless of their location. The value of these enriched educational opportunities is immeasurable. Through interactions with visiting scholars, the RHISE Program allows numerous opportunities to learn new techniques, engage in new methods, and forge alliances with the best and brightest neuroscientists in the world.

"Interacting and exchanging knowledge with top researchers allows us to gain invaluable techniques and absorb and exchange critical knowledge," Sharkey says. "The impact of these exchanges has great potential."

The list of neuroscience centres involved in the research residency program is growing. To date, partner organizations

include Cambridge and Oxford in the United Kingdom; the Institute of Neuroscience in Shanghai and the Florey Neuroscience Institutes in Melbourne. "This program is the epitome

of collaboration. From its origins with John's commitment to rallying community supporters, to its mandate of forging international relationships in the name of bettering science, it exemplifies the power of partnership," says Rebecca Hotchkiss. "I am honoured to have my name attached to a program like this."

A RHISE success story



NAME V. Wee Yong, PhD

POSITION HBI member and Professor in the Departments of Clinical Neurosciences and Oncology since 1996

RESEARCH SPECIALTY Multiple sclerosis and spinal cord injury

RESEARCH DESTINATION The 2012 Oxford Neuroscience Symposium and the 24th Cambridge Neuroscience Seminar. Translational Neuroscience, in the United Kingdom

MESSAGE GIVEN Delivered a talk to Cambridge University about the HBI's recent discovery of molecules affecting myelin repair and potential medications to promote it

PROMISING CONNECTION While in the UK, Dr. Yong learned about new research on nanocomplexes that could improve cell to cell communication. He also met with the director of the MS Society Cambridge Centre for Myelin Repair, Robin Franklin, PhD, who is also studying myelin repair using stem cells.

Rebecca Hotchkiss

HOTCHKISS BRAIN INSTITUTE

neuroArm 2 brings neurosurgery to new heights

The neuroArm project started from a simple idea-how can we make neurosurgery safer? Now, after the robot's 35th case, the innovation continues with the development of neuroArm 2.

he freedom to dream big and bring ideas to life, according to Dr. Garnette Sutherland, is given to HBI researchers as a direct result of community support. As the creator of the world's first MRI-compatible surgical robot, he should know. Dr. Sutherland championed a unique collaboration between community leaders, scientists, engineers and doctors to build a world-class neurosurgical robotics program -neuroArmfrom the ground up. And now with five years and 35 neurosurgical cases under its belt, he is bringing the neuroArm project to the next level in its evolution: neuroArm 2.

Since its inception, neuroArm has revolutionized neurosurgery the world over. With its origins right here in Calgary, it continues

to receive tremendous community support and public praise. "When I see a patient in the clinic and I tell them we're going to operate on them, one of the first things they ask is whether I'll be using the neuroArm on them," says Sutherland. "They're very excited to be a part of the success."

The next generation of neuroArm

Just when we thought the field of advanced neurosurgical robotics couldn't get any better –it does. With IMRIS, neuroArm's industrial partner, project plans for the second generation of neuroArm are now underway. neuroArm 2 will provide surgeons with exceptional detail and control. With a more compact, ergonomic console, it will have an improved sense of touch, better image quality, more accurate manipulator positioning and smaller manipulator size. These features enable surgeons

The international scope of the project will benefit neurosurgery teams and their patents from around *the world.*

to manipulate tools on a microscopic scale. The greater integration of imaging and surgical technologies means heightened precision, accuracy, and ultimately this means unprecedented care and safety for patients.

The international scope of the project will benefit neurosurgery teams and their patients from around the world. Because of the tremendous community, provincial and federal support, Sutherland and his team are committed to commercializing neuroArm 2 through a Canadian company. He says it's important that neuroArm's impact flows back into the community where it all started.

So far, IMRIS employs more than 150 people in western Canada. It's anticipated that the secondgeneration neuroArm will add several hundred more operating rooms and has the potential to create thousands of jobs.

Support from the community

Sutherland explains that Calgary's philanthropic community played an instrumental role in helping bring the ambitious project to life.

"When we decided we wanted to build a robot that was capable of performing imageguided neurosurgery, I approached Harley Hotchkiss to ask his advice on how to make it happen," says Sutherland.



Garnette Sutherland holding neuroArm's irrigating bipolar forceps: a neurosurgical tool used during operation.

Hotchkiss' advice led Sutherland to contact Doc, B.J. and Don Seaman, philanthropists who had already put their support behind the Seaman Family MR Research Centre at the University of Calgary. The Seaman family helped secure the initial project funding that allowed Sutherland to take the next step—partnering with aeronautical engineers MacDonald, Dettwiler and Associates, makers of the Canadarm, the remote shuttle manipulator system used on the international space shuttle. With further funding from the community, Western Economic Diversification and the Canada Foundation for Innovation,

project neuroArm was born.

"Support from our community leaders such as the Seaman and Hotchkiss families has sent a strong message to funding agencies about the tremendous support that the Calgary community has for its researchers," says Sutherland. "That support ultimately allows us to create solutions that come back to benefit the community."

Sutherland has been recognized for his achievements on the iMRI (intraoperative magnetic resonance imaging) and neuroArm projects with an appointment to the Order of Canada—an accolade that he says reflects the efforts of those around him.

Dr. Garnette Sutherland

CADEMIC RANK Professor

MD (University of Manitoba) MD-Neurosurgery (FRCS) (University of Western Ontario)

Intraoperative MRI and MR-compatible robotic systems

171 peer-review, 26 monographs/ book chapters, 13 patents, 1 trademark

I was intrigued by the challenges of understanding the brain and using surgical techniques to have a positive impact on those affected by neurological disease.

Theodore Rasmussen (Montreal), Dwight Parkinson (Winnipeg), and Charles Drake (London, Ontario).

"The Order of Canada acknowledges all of the talented people I've had the pleasure to work with and it highlights the tremendous support from the community. It's thanks to people like Harley Hotchkiss and the Seaman family, who together really made these projects happen."

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Unexpected discovery gives new hope for youth mental health



Jean Addington investigates the use of omega-3 (commonly found in fish oil) to reduce the development of psychosis.

As a major player in the HBI's Depression and Psychosis Translational Research Program, Jean Addington looks to novel interventions for youth psychosis patients. pproximately three in 100 Canadians will experience psychosis—a mental disorder in which a breakdown between thoughts and emotions causes people to lose touch with reality. Schizophrenia is the most common form of psychosis, which manifests as hallucinations, delusions and mental fragmentation. Perhaps the most severe and debilitating of mental illnesses, psychosis can have a profoundly negative impact on patients, their families and the community.

Early intervention

Given its impact on society, the HBI has developed a Depression and Psychosis Translational Research Program at the new Mathison Centre for Mental Health Research & Education. One of the program's core members, Jean Addington, PhD, is helping distinguish the HBI as a leader in mental health research with an early psychosis research project.

In 1997 Addington played a major role in setting up one of the first and most successful early intervention clinics in Canada to study the progression of mental illness. Now, she and her research group look to understand psychosis at the earliest stages. By focusing on high risk youth who are showing early signs of psychosis, they are

"We think it will be of most benefit to younger individuals or those earlier in the development of the illness because it may provide protection using the brain's own systems. The best part is, it's natural and has no obvious side effects."

looking to intervene before the person even becomes ill. However, because psychosis develops at an early age, finding at risk youth can be a challenge. Therefore, ongoing public health education and outreach form a critical part of the centre's activities.

"We have a set of established criteria that help predict who will likely develop a psychotic illness before it happens, but it's really important to treat those symptoms as early as possible. Even if we are unable to prevent psychosis, we can still treat it before it starts to interfere with their lives too much."

The unexpected discovery

One of the unexpected discoveries in psychosis treatments comes from the use of omega-3 fatty acids. Addington and her team found that providing patients with omega-3s (commonly found in fish oil) over a 12 week period significantly reduced the development of psychosis. The mechanisms are unclear, but researchers believe that omega-3s, which play a role in brain development, might work at a cellular level in the brain to influence the same systems targeted by antipsychotic drugs-the dopamine and serotonin signalling systems that control our mood. Addington

says this treatment may be effective

"We think it will be of most

benefit to younger individuals

or those earlier in the development

of the illness because it may provide

systems," she says. "The best part is,

protection using the brain's own

it's natural and has no obvious

if administered very early in the

course of the illness.

side effects."

The early psychosis

Addington's early psychosis research project is part of a unique

eight site North American study

that's taking an in-depth look at

the clinical and biological changes

occurring in people's brains several

episode. With psychosis developing

most commonly in late adolescence,

years before their first psychotic

Addington and her colleagues

The study, funded by the

U.S. National Institutes of Mental

Health, is a collaboration between

are looking at individuals

as young as 12.

research project

at leading universities including UCLA, Yale and Harvard. Addington plays a lead role in the clinical and social risk assessments of the study's hundreds of participants from all eight sites as well as managing data collection for the entire study. The part of the study that involves brain imaging also includes fellow HBI members Richard Frayne, PhD, and Brad Goodyear, PhD.

the HBI and its counterparts

Addington believes the HBI is a major part of her group's ongoing success because of the strong focus on youth mental health.

"Through the Depression and Psychosis Program, the HBI is really helping us to translate our research findings into health care practice and that's really improving the impact of our work."

NAME Jean Addington, PhD

ACADEMIC RANK Professor

DEGREES (INSTITUTIONS)

PhD (University of Calgary) MA (Edinburgh University) BEd (University of Saskatchewan)

RESEARCH INTERES

Early detection and intervention for psychosis

WHAT ORIGINALLY MADE YOU

INTERESTED IN YOUR DISCIPLINE? I've had a longtime interest in developmental psychology. It was the next logical step.

WHAT DO YOU LIKE DOING OUTSIDE WORK (HOBBY) Running, biking, swimming

UNEXPECTED DISCOVERY GIVES NEW HOPE FOR YOUTH MENTAL HEALTH

The next generation of neuroscientists at the HBI



he HBI provides worldclass training and education for the best and the brightest minds in neuroscience. The educational opportunities cover all aspects of the research spectrum—from introductory research for undergraduate students to postgraduate and postdoctoral fellowship training in both basic and clinical science research. Trainees at the HBI like PhD student Jordan Engbers represent the future of neuroscience.

"When I interviewed at the HBI, I found the environment to be open, productive and conducive to learning. I saw that the HBI produces great research and researchers, and that was where I wanted to be." -Jordan Engbers

ME Jordan Engbers

CADEMIC RANK PhD Student

DEGREES (INSTITUTIONS) Bachelor of Health Sciences,

Honours with Distinction, major in Bioinformatics (University of Calgary)

SEARCH INTEREST

Understanding how cerebellar neurons process information

WHAT ORIGINALLY MADE YOU INTERESTED IN YOUR DISCIPLINE? With a background in both computer science and biology, I wanted to understand how the brain processes information and produces our complex behaviours.

what be rob like bond outside work (Hobby) Reading, computer programming, practicing jiu jitsu

Ray Turner, PhD, former HBI trainees: Hamish Mehaffey, PhD, and Bruce McKay, PhD

NUMBER OF PUBLICATIONS Six, including The Journal of Physiology and Proceedings of the National Academy of Sciences

AWARDS AND GRANTS Silver Medallion in Bioinformatics, Keith Cooper Award, AI–HS Studentship, Canada Graduate Scholarship Banting and Best Doctoral Award (CIHR), Dr. T. Chen Fong Doctoral Scholarship (HBI).

A look to the future

he mission of the HBI is to be a centre of excellence in neurological and mental health research and education, translating discoveries into innovative health care solutions. The HBI focuses on knowledge creation and the development of improved ways to prevent, detect and treat neurological and mental health conditions.

An overarching goal of the HBI is to be relevant to the community and engage them as partners in our work. As a result, the support from the community significantly contributes to the HBI's accomplishments and ultimately to its impact. Together, with the support from our partner departments and the University of Calgary's academic and scientific leaders, the HBI yields unambiguous success for the neurosciences and mental health in Calgary and beyond.

As we look to the future, we are positioned for further success with new recruitments, new educational programs, new facilities and innovative research. We are proud of our accomplishments and we look forward to another year of excellence in neurological and mental health research, aimed at enhancing the health of our community.



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"We are on the verge of breakthroughs that many of us could never have imagined. I believe our researchers are making a difference for individuals and families living with neurological and mental health disorders."

—Harley Hotchkiss

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Community, we have other ways in which you can keep up to date on HBI research and community events.

- www.hbi.ucalgary.ca
- **hbi@ucalgary.ca** to request newsletters or event notifications
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