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RESEARCHERS IN THE MAKING
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FOLLOWING UP
Study reveals people with multiple sclerosis lack neurosteroids in the brain.

Let’s Talk about Value
Making Connections Conference 2012
Alberta Innovates – Health Solutions is hosting a conference for Alberta’s health research community June 17–19, 2012 in Jasper, Alberta.

The evaluation of research performance and innovation impact is a continually evolving science that seeks to answer many questions. The 2012 Making Connections Conference will provide researchers, policy-makers, practitioners, and research partners the opportunity to network, debate, and explore the art, science, and future directions of this topic.

Visit www.aihealthsolutions.ca/connects/conference/ or call 780-429-9335 for more information.
Mental health rights in Alberta

Alberta’s Mental Health Patient Advocate outlines how the province protects the rights of patients involuntarily detained at psychiatric facilities

STORY BY CONNIE BRYSON / IMAGE BY CORBIS

Every year, about 7,500 Albertans with mental disorders are involuntarily detained at psychiatric facilities for examination, assessment, and treatment. The Mental Health Act of Alberta provides the authority, protocols, and procedures for admitting and treating these patients. The act also safeguards them against wrongful or malicious detention and protects their rights.

Given the history of how people with mental illness have been treated and the portrayal of psychiatric hospitals in popular movies, it’s no surprise that many of us would rather “forget” these facilities exist. But they shouldn’t be a mystery, says Fay Orr, Alberta’s Mental Health Patient Advocate, because lack of knowledge of the mental health system can contribute to the stigma (negative attitudes) around mental illness.

“One in five Canadians will experience a mental illness in their lifetime. Stigma prevents many people from seeking help or delays them from seeking help until their issue is critical.”
Alberta is a leader in protecting the rights of the most seriously mentally ill

I think it’s important for people to have an idea of how the system works, the process of committing someone to a hospital, and the assurances they have that patients are treated properly and respectfully.”

Alberta is a leader in protecting the rights of the most seriously mentally ill. The province established the Mental Health Patient Advocate Office in 1990; now, the Alberta office is still the only provincial investigative body in Canada created specifically to deal with complaints from or related to people who are involuntarily detained at mental health facilities. The jurisdiction of the Advocate was recently broadened to include people under a community treatment order, a tool to help individuals comply with their treatment while living in the community. The Advocate’s position is appointed by cabinet and reports directly to the Minister of Health and Wellness.

“By protecting the rights of the most seriously mentally ill, we help create an atmosphere of understanding and hope for everyone on the journey of recovery to mental well-being,” says Orr. “We help those struggling with mental illness feel less alone by treating them with dignity and respect—something many of us take for granted.”

Patients who are involuntarily detained at psychiatric hospitals are among the most vulnerable in our healthcare system. Although some of their civil liberties are suspended during their detainment, they do retain important rights. These rights include the right to information, such as why they are in the hospital; the right to consent to treatment (if deemed competent to make treatment decisions); the right to appeal to an independent review panel; and the right to a lawyer. Another key right is that these patients—or those acting on their behalf—may contact the Mental Health Patient Advocate if they have a concern with their rights, detention, treatment, or care.

The Advocate’s office hears from roughly 750 patients per year.

The Advocate’s office hears from roughly 750 patients per year. Complaints range widely, including issues around legislated rights, hospital food, and allegations of physical assaults. All complaints are investigated. Most investigations are informal and are resolved in a short time; a handful of cases result in formal investigations and written reports. Alberta Health Services is asked to respond to recommendations made in these reports. Recommendations have included improved training for staff, changes to policy and procedures, and in rare cases, disciplinary action for staff.

“Over the past 20 years, the Advocate’s recommendations have helped improve the patient experience,” says Orr. “Our track record demonstrates to patients that there is someone who will listen. They won’t be dismissed, and their complaint will be resolved fairly.”

In recent years, the Advocate’s role has broadened beyond investigating complaints and providing patients with information about their rights. The office works with other organizations to promote a better understanding of mental health and addictions, provides education and outreach services, and provides input to government on legislation and policy. Says Orr: “Our office’s vision is to be a leader in providing respect, hope, and support for individuals and families living with mental illness. Care, treatment, and support have improved, and we continually strive to make things better.”

Fay Orr is the Alberta Mental Health Patient Advocate. The Advocate’s office website is www.mhpa.ab.ca.
Our bodies are under constant threat of invasion and rely on a coordinated system of defenses to combat everything from colds to cancer. Immunologist Dr. Troy Baldwin studies what he calls “the assassins of the immune system.” These assassins are a class of white blood cells known as T cells. These cells identify and attack cells that could prove harmful to the body, such as cancerous cells or cells that are infected with a virus or other pathogen.

But like all assassins, T cells need to be properly trained so that they will be able to detect and attack enemy cells but refrain from attacking the body itself. When T cells mistakenly attack the body’s cells—a type of “friendly fire”—autoimmune diseases, such as multiple sclerosis or celiac disease can occur.

The training ground for T cells is in the thymus gland, which sits behind the breastbone. Only one to three percent of young T cells survive the rigorous selection process, which consists of two phases, before being released into the bloodstream. In the first phase, T cells must demonstrate that they can recognize and attack foreign substances. The second phase tests whether they can avoid attacking when they encounter substances produced by the body itself. Only T cells that have proven to be successful against foreign substances without being overly “trigger-happy” are released into the bloodstream.

Dr. Baldwin’s research focuses on the second phase of the selection process, in which T cells that are aggressive toward the body are eliminated or neutralized through a series of complex signals involving various proteins. His recent findings provide insights about a genetic mutation that disrupts the signaling process, leading to a multiple-organ autoimmune disease known as autoimmune polyendocrine syndrome (APS 1), or Whitaker syndrome. In Whitaker syndrome, the thymus releases aggressive T cells that enter and attack tissues, such as the pancreas, the thyroid, and the adrenal gland. The release of these cells compromises the functioning of the organs, which can lead to diseases such as hypothyroidism, Addison’s disease, and Type 1 diabetes.

Autoimmune diseases

Autoimmune diseases occur when the immune system mistakenly identifies healthy cells as invaders and attacks them. There are more than 80 types of autoimmune diseases, which can affect many different areas of the body. Women of childbearing age, people with a family history of autoimmune disorders, and people of certain ethnic backgrounds are at greater risk for these diseases, but they can affect anyone.
But Dr. Baldwin’s work suggests that disease isn’t inevitable even when the thymus fails in its selection process. For example, he studied mice that didn’t have a specific protein crucial for eliminating T cells that would attack insulin-producing cells. He found that these mice did have many more of the rogue T cells in their blood, but to his surprise, they did not develop diabetes. “What this suggests,” he explains, “is that there are some failsafe mechanisms that are able to deactivate the T cells even if they do get into the bloodstream. We’re now trying to figure out how these backup systems work.” The results are likely to reveal something important not just about Whitaker syndrome but about how the immune system operates.

The existence of backup systems is reassuring, showing that the body has ways of compensating for certain breakdowns in its defense system. At the same time, it poses a challenge: when things do go awry and autoimmune disease results, it’s likely due to the failure of multiple systems—or the communication between them—rather than a single one that can be easily identified. This makes it that much less likely that there will be a single simple remedy.

Scientists like Dr. Baldwin are not discouraged by the intricate complexities of the immune system—in fact, he is especially intrigued by them. This is fortunate, because a better understanding of the immune system will undoubtedly have a significant impact. There are currently more than 80 known autoimmune diseases that affect about 5% of the population. These illnesses can be very difficult to diagnose and usually present lifelong symptoms that need to be constantly managed. There is clearly much to be gained in learning how to reduce the occurrence of “friendly fire” in the body’s immune system.

Autoimmune diseases can be very difficult to diagnose and usually present lifelong symptoms.
Dr. Sofia Ahmed’s research explores the link between poor sleep and kidney disease.

SEARCHING FOR WAYS TO IMPROVE KIDNEY FUNCTION

STORY BY JULIE SEDIVY / IMAGE BY CORBIS
We all know that getting a good night’s sleep is important for overall health and happiness. But for some people, trouble sleeping can be associated with very serious health risks, such as an increased risk of hypertension and stroke. Recent research by Dr. Sofia Ahmed suggests that poor kidney function could play an important role.

The kidneys help regulate blood pressure through a hormone system known as the renin-angiotensin system. This system strives to maintain a healthy blood pressure by controlling how tightly blood vessels constrict and by determining how much salt is retained in the body. However, blood pressure can rise to unhealthy levels and damage the kidneys if hormonal activity is too high.

Previous research has shown that lack of oxygen can put the renin-angiotensin system into overdrive. For example, another research group demonstrated that, when rats were intermittently exposed to lowered oxygen levels for seven hours a day, the activity of their renin-angiotensin systems increased, which led to higher blood pressure. But what does this have to do with poor sleep?

Obstructive sleep apnea is a common disorder that causes breathing problems during sleep. The air passages become obstructed when the muscles in a person’s throat and tongue relax, which partially or completely cuts off the air supply. For some people, this can happen as often as hundreds of times a night; although they suffer very disrupted sleep, people are rarely aware of the cause of these disruptions. But the end result is intermittent oxygen deprivation, which is very similar to what the rats experienced in that earlier study. Could the link between sleep problems and hypertension be the result of oxygen deprivation affecting renin-angiotensin activity?

To find out, Dr. Ahmed and her colleagues recruited patients with suspected sleep apnea and tested their oxygen levels during sleep as well as their kidney function. They found that patients with reduced oxygen levels in their blood were more likely to show loss of kidney function, even when other variables (such as age, body mass index, or diabetes) were taken into account. It was

Obstructive sleep apnea

Obstructive sleep apnea is a common sleep disorder that causes shallow breaths or frequent pauses in breathing during sleep. It is one of the leading causes of excessive daytime sleepiness, and can increase the risk of diseases such as hypertension, heart attack, stroke, obesity, and diabetes.

Source: National Institutes of Health
Did you know that some of the most pioneering research in obstructive sleep apnea treatment and diagnosis comes from Alberta? Dr. John Remmers, a researcher at the University of Calgary, was the first investigator to show that sleep apnea is caused by an anatomical narrowing of the pharynx. Dr. Remmers and his company, SagaTech, commercialized a device called the Remmers Sleep Recorder. Sleep apnea is normally diagnosed in a sleep clinic, where long wait times can delay diagnosis. The sleep recorder is the first portable diagnostic tool that patients can use at home. It measures data such as heart rate, respiratory airflow, and blood oxygen saturation, and doesn’t require a technician or specialist to be present.

Source: SagaTech

Dr. Ahmed’s current goal is to look more closely at how the kidneys respond to oxygen deprivation and to explore the implications of these results for treatment. Fortunately, there is treatment available for obstructive sleep apnea: continuous positive airway pressure therapy. While sleeping, patients wear a face mask connected to a machine that increases the air pressure in the throat, preventing the airway tissues from collapsing. Dr. Ahmed would like to know whether treating sleep apnea, which may be a cause of abnormal kidney activity, can prevent or help treat kidney disease and hypertension. She is now investigating kidney function in patients with sleep apnea, both before and after continuous positive airway pressure therapy. If her study finds an improvement in kidney function following treatment, this will be an important link for developing a potential therapy for kidney disease. This is part of a series of research studies by Dr. Ahmed and others that began with a suggested relationship between poor sleep patterns and serious health problems.

Exploratory research often points to possible explanations for health problems, but it can take a while for these ideas to be translated into action plans for patients. Dr. Ahmed sees her research as a bridge between scientific research and potential treatments that will directly affect people’s health. Her research is poised to have a huge impact as the need for a scientifically sound action plan for kidney treatment becomes increasingly important: Dr. Ahmed points out that about two million Canadians currently suffer from chronic kidney disease, and the incidence of the disease is on the rise.

About the researcher
Dr. Sofia Ahmed receives funding from Alberta Innovates – Health Solutions. She is an assistant professor in the Division of Nephrology in the University of Calgary’s Department of Medicine.

Selected publication

Recommended websites
The Kidney Foundation of Canada
www.kidney.ca/

Public Health Agency of Canada: What is the Impact of Sleep Apnea on Canadians?

Hypertension Canada
www.hypertension.ca/
Although an estimated one in five Canadians are expected to experience a mental health or substance abuse problem in their lifetime, many don’t seek help because of feelings of shame or fear. Research aimed at understanding the mechanisms behind mental health could help combat this stigma.
Opening minds on mental illness and addictions

Calgary psychiatrist Dr. Scott Patten has seen first-hand the devastating effect of negative attitudes around mental illness. Many of his patients have struggled for years, some even for decades, before seeking help. “Because of stigma, many people are ashamed of their illness,” explains Dr. Patten. “They don’t understand their mental illness in the same way they understand other health conditions. So they try to tough it out. But in the case of depression, for example, the longer you struggle, the deeper it gets its claws into you. Self-esteem and self-confidence suffer. In addition to depression, patients often develop conditions like social anxiety that may evolve into social phobia. Relationships and careers suffer, which causes other stressors. It’s a vicious cycle. Anything we can do to diminish the stigma around depression would likely make a big difference because people would get help early.”

Stigma is both a clinical concern to Dr. Patten and one of his research interests in his academic career as a psychiatry professor at the University of Calgary. He is collaborating with the Mental Health Commission of Canada on Opening Minds, a systematic effort to reduce the stigma of mental illness across the country. The initiative, launched by the Commission in 2009, is designed to change the attitudes and behaviours of Canadians towards those living with mental health problems. At present, there is no best practice for reducing the stigma and discrimination associated with mental illness. One of the goals of Opening Minds is to scientifically evaluate the effectiveness of anti-stigma programs.

Dr. Patten is involved with the Opening Minds for Health Care Professionals project, which develops and evaluates programs that target negative attitudes by health professionals. “We know that stigma is an issue in the healthcare system and that it affects professionals in two main ways: if healthcare professionals have negative attitudes to mental illness, this will often
Mental illness can affect people of all ages, genders, cultures, ethnicities, and social classes. However, many people with a mental illness state that the stigma they experience can be worse than the illness itself. The Mental Health Commission of Canada’s Opening Minds initiative is the largest effort to reduce mental health stigma in Canadian history. In collaboration with 65 partners and with 45 active projects across the country, Opening Minds aims to identify and evaluate anti-stigma programs to determine their effectiveness. The projects are aimed at the following initial target groups: healthcare providers, youth between the ages of 12 and 18, the workforce, and the media. People in these groups are either the most at risk for mental illness, or have the most influence in combating mental health stigma. For example, people who seek treatment for mental health issues report that they typically experience the most stigma from healthcare workers.

Source: Opening Minds - Mental Health Commission of Canada

Dr. Aliya Kassam, one of Dr. Patten’s former postdoctoral students and now an assistant professor at the University of Calgary, developed a questionnaire to measure stigma in health professionals. It has been used in more than 20 studies across the country and has proven to be highly useful for comparing and evaluating different strategies for combating stigma. It has also allowed researchers to identify key characteristics of effective interventions. One of the most promising practices is contact-based education, where people who have experienced mental illness share their stories and engage health professionals in discussions. “This approach is all about breaking down barriers and understanding that a person with a mental illness is a person like yourself,” says Dr. Patten.

“The cumulative effect of this project and many others is that we are making inroads combating stigma. But old beliefs run deep, like thinking that people with mental illness should be able to pull themselves out of it. You don’t hear that with other conditions—for example, no one would tell someone to will their thyroid gland to pump out more hormones. One can speculate about why these beliefs are so entrenched but whatever the reason, it’s got to change.”

Opening minds

Mental illness can affect people of all ages, genders, cultures, ethnicities, and social classes. However, many people with a mental illness state that the stigma they experience can be worse than the illness itself. The Mental Health Commission of Canada’s Opening Minds initiative is the largest effort to reduce mental health stigma in Canadian history. In collaboration with 65 partners and with 45 active projects across the country, Opening Minds aims to identify and evaluate anti-stigma programs to determine their effectiveness. The projects are aimed at the following initial target groups: healthcare providers, youth between the ages of 12 and 18, the workforce, and the media. People in these groups are either the most at risk for mental illness, or have the most influence in combating mental health stigma. For example, people who seek treatment for mental health issues report that they typically experience the most stigma from healthcare workers.

Source: Opening Minds - Mental Health Commission of Canada

Dr. Scott Patten receives funding from Alberta Innovates – Health Solutions. He is a full professor in the departments of Community Health Sciences and Psychiatry at the University of Calgary.

Selected publication

Recommended website
Opening Minds – Mental Health Commission of Canada
www.mentalhealthcommission.ca/English/Pages/OpeningMinds.aspx
MENTAL HEALTH AT WORK

Although Canadian businesses are required by law to protect the health and safety of their employees, these laws traditionally pertain to physical health, not mental health. Now, the focus is shifting; there’s widespread recognition of the human toll and monetary cost of mental illness in the workplace. For example, a report for the Mental Health Commission of Canada estimates that between $3 billion and $11 billion could be saved every year in Canada if mental injuries to employees—attributable in whole or in part to negligent, reckless, and intentional acts and omissions of employers, their agents, and fellow employees—were prevented. The pressure is on companies to maintain psychologically safe work environments.

Dr. JianLi Wang, a psychiatry professor at the University of Calgary, has a long-standing interest in the epidemiology of mental illness in the workplace. One of his current projects is a longitudinal study of about 4,000 employees in Alberta, which began in 2008. They are interviewed by telephone every year to collect data about workplace characteristics, depression, anxiety, and other health issues.

Interestingly, data collection began at the start of the global economic crisis, and Dr. Wang’s study shows how the increase in mergers and acquisitions and the accompanying job insecurity took its toll on workers in Alberta. There was a marked increase in the prevalence of major depression. Previous work by Dr. Wang and his colleagues linked high work stress with major depression. In addition to work stress, employees who reported an imbalance between work and family lives had an exponentially higher probability of having a depressive or anxiety disorder.

This study was slated to end in 2012 but recently received funding for another two years. Dr. Wang looks forward to collecting more data about the impacts of work environmental factors on job performance and on the risk of depressive and anxiety disorders. Another objective is to develop a screening tool so employers can easily monitor the psychological safety of the work environment.

Dr. Wang notes that one of the ways to reduce the burden of mental illness in the workplace is through changes in organizational policy. “Accommodating mental health in the workplace does not have to be a huge undertaking,” he says. “Employers must first assess the work environment for possible triggers—that’s where our screening tool will come in. In observational studies, we’ve asked employees what they think...
“Improving the work environment can go a long way to reducing work stress.”

needs to be done to improve the psychological health of their workplaces. They suggest actions like frequent meetings with supervisors to clarify job expectations, opportunities to exchange tasks with colleagues, and opportunities to take courses. Improving the work environment can go a long way to reducing work stress and making a positive impact on mental health.”

**IMPROVING THE OUTCOMES OF ADDICTION TREATMENT**

- Health services practitioners and researchers typically assume that people receiving treatment for addictions seek help voluntarily because they have concerns about their health. However, in addiction treatment, this is only partly true, notes Dr. Cameron Wild, director of the Addiction and Mental Health Research Laboratory (AMHRL) at the University of Alberta. “Increasingly, societies around the world use ‘social controls’ to pressure, persuade, or coerce people to seek addiction treatment. These social control tactics include court orders, mandatory treatment referrals by employers, and ultimatums issued by friends and family. Although these tactics are commonly used, we don’t know much about their impact on the effectiveness of addiction treatment.”

From 2008 to 2011, Dr. Wild, his team at the AMHRL, and colleagues from the Centre for Addiction and Mental Health in Ontario launched a series of projects to fill in some of the knowledge gaps around social controls. One of the projects explored the relationship between drop-out rates and engagement in addiction treatment. About half of all people who enter addiction treatment drop out before the program ends, regardless of whether they enrolled voluntarily or involuntarily. This project, which was funded by the Canadian Institutes for Health Research, tracked more than 350 clients as they entered selected addiction treatment programs in Ontario and Alberta and

**About the researcher**

**Dr. JianLi Wang** receives funding from Alberta Innovates – Health Solutions. He is an associate professor in the departments of Community Health Sciences and Psychiatry at the University of Calgary.

**Selected publication**


**Recommended website**

**Dr. Wang’s website**

www.ucalgary.ca/jwang

**Quick Facts**

Approximately 20% of people with a mental illness have a co-occurring substance abuse or addiction problem.
If the motivation isn’t there, positive outcomes are much less likely—even if the justice system says clients have to be in treatment. The results suggest that better outcomes may be possible by using the motivational questionnaire as part of routine assessment procedures when clients enter treatment. “Externally motivated clients can be helped with an intervention to transform the feeling ‘I’m here because I’m under someone’s thumb’ to a feeling that they can truly benefit from treatment,” says Dr. Wild. “There are well-established interventions for helping people achieve this transformation, and so systematically assessing treatment motivation holds potential to improve retention and ultimately client outcomes.”

followed them for six weeks. The team measured the treatment motivation of these clients using a specially developed questionnaire to determine why they were in the addiction program. Motivations can range from “I’m here because I want to make a change in my life” (a type of motivation called identified motivation) to “I’m here because someone made me get help” (external motivation).

Preliminary results support Dr. Wild’s previous research, which showed that the referral source doesn’t predict the outcome of treatment. For example, when the team looked at clients required by the legal system to enter a program, the deciding factor for retention was the client’s motivation for treatment. Some clients welcome the use of social control because they are ready to commit to treatment—these clients have low drop-out rates. For others, the situation is the opposite. They see the use of social control as a coercive imposition and are more likely to drop out of treatment. If the motivation isn’t there, positive outcomes are much less likely—even if the justice system says clients have to be in treatment.

About the researcher
Dr. Cameron Wild receives funding from Alberta Innovates – Health Solutions. He is a full professor in the Centre for Health Promotion Studies in the School of Public Health at the University of Alberta. He is also Director of the Addiction and Mental Health Research Laboratory.

Selected publication
MENTAL ILLNESS IN CHILDREN

For decades, it was thought that mental illness did not affect children. “Now, nobody would say mental illness in children isn’t real,” says Dr. Frank MacMaster, a pediatric neurobiologist at the University of Calgary. He points out that symptoms develop in childhood or early adolescence for more than 70% of adults living with mental health problems. “Adolescence is the battleground. It’s when the biggest negative impact takes hold. For example, depression in adolescence affects school outcomes, occupational outcomes, social life, and family life. Suicide is a huge risk. Mental illness is not just robbing kids of their teen years, it’s robbing them of their future.”

To make things worse, standard treatment with antidepressants is effective for only about half of adolescent patients. Dr. MacMaster’s research is focused on uncovering how the biology of the brain plays a role in mood disorders, which include depression and bipolar disorder. There is growing evidence that mental illness alters brain structure, function, and chemistry. Dr. MacMaster wants to use that information to develop new ways to treat children with mood disorders.

Of particular interest to him is a characteristic of the human brain called plasticity—the ability of the nerve cells in the brain to reorganize themselves. The younger you are, the more plastic your brain is, and Dr. MacMaster is exploring how to take advantage of plasticity to “rebuild” the regions of the brain that are affected by mental illness. One promising approach is transcranial magnetic stimulation (TMS), a non-invasive procedure that uses magnetic fields to stimulate nerve cells in the brain. TMS is an emerging treatment for depression in adults but is not widely used in children. The theory behind using TMS for mood disorders is that it stimulates nerve cells in the front part of the brain, which is involved in mood control. “Essentially, we want to use TMS to kick start this part of the brain so that it regains control of mood and reaction to stimuli,” explains Dr. MacMaster.

By mid-2012, Dr. MacMaster expects to begin a clinical trial of TMS for adolescents suffering from treatment-resistant depression. The trial will use the facilities of the Pediatric Transcranial Magnetic Stimulation Laboratory at the Alberta Children’s Hospital as well as the hospital’s recently acquired 3T magnetic resonance imaging machine. The equipment will be used to look at brain structure, function, and chemistry before and after TMS treatment. “When this study is complete, we’ll have a really good picture of whether TMS will work clini-

Quick Facts

People between the ages of 15 and 24 are the most likely to suffer a mental disorder or substance abuse problem.

Source: Public Health Agency of Canada
Cool tools

When Dr. Adam Kirton established the Pediatric Transcranial Magnetic Stimulation (TMS) Laboratory at the Alberta Children’s Hospital in 2010, he knew its applications would go beyond pediatric stroke, his primary interest. “This non-invasive brain stimulation technology, which has been around for more than 20 years, has rapidly expanding applications in all kinds of neurological disorders and psychiatry. I knew we’d be collaborating with others. Our collaboration with Dr. Frank MacMaster on depression is one cutting-edge example.”

In Canada, the TMS laboratory is the only lab of its kind dedicated to children and one of only a few such facilities in the world. TMS uses a focused magnetic field, which enters a small area of the brain and activates the nerve cells in that area, to study the electrical properties of brain cells. TMS measures and “maps” how a child’s brain functions and can provide information on how the brain may have recovered from an injury, such as stroke.

Dr. Kirton is also studying the therapeutic use of TMS in children with a special machine (called repetitive or “rTMS”). Studies done in adults suggest that repeated applications of TMS may have some lasting effects on brain function. Evidence of the benefits of rTMS in children has not yet been established, but it is an active area of investigation in Dr. Kirton’s lab. “These are early days for TMS, but it’s an exciting time to be in this field,” says Dr. Kirton.

Dr. Kirton is an assistant professor in the departments of Pediatrics and Clinical Neurosciences at the University of Calgary, attending pediatric neurologist at the Alberta Children’s Hospital, and director of the Calgary Pediatric Stroke Program.

About the researcher
Dr. Frank MacMaster is an assistant professor in the departments of Psychiatry and Pediatrics at the University of Calgary.

Selected publication

Recommended website
Rethink Child and Adolescent Mental Health
www.facebook.com/RethinkChildMentalHealth

Transcranial Magnetic Stimulation

About the researcher
Dr. Adam Kirton is an assistant professor in the departments of Pediatrics and Clinical Neurosciences at the University of Calgary, attending pediatric neurologist at the Alberta Children’s Hospital, and director of the Calgary Pediatric Stroke Program.

Recommended website
Calgary Pediatric Stroke Program
www.perinatalstroke.ca
STUDY EXPLORES RECOVERY FROM MARIJUANA DEPENDENCE

Given the fact that marijuana is the most widely used illicit drug in the world, it’s not surprising that Jonathan N. Stea’s research has generated some controversy. Stea, a Ph.D. candidate in the Clinical Psychology program at the University of Calgary, leads a study investigating recovery from marijuana dependence. The idea of “dependence” has been an issue for debate for some, but Stea has stayed focused on the science.

“There is a wide range of opinions about marijuana use, and one of the biggest misperceptions is that there is no such thing as marijuana dependency. While it’s true that most people who smoke marijuana will never develop a dependency, some do. That dependency causes harm because it interferes with key aspects of their lives and they deserve good information about what can help them.”

Although some say that cannabis (the name of the plant that marijuana comes from) is not at all addictive, Stea notes that the literature does not support this opinion. Instead, it is estimated that 1 in 10 people who try cannabis at least once will develop a dependency. That number is higher in youth: 1 in 6. People who use marijuana more frequently are at higher risk of becoming dependent.

Stea is aiming to recruit 120 people into the study (he is more than halfway to meeting that goal). Participants must have had a cannabis use disorder in the past and have been problem free for at least one year. They can either have recovered on their own or have received treatment. Participants are interviewed about their reasons for stopping or cutting back their cannabis use, how they achieved and maintain recovery, and the role of life events in recovery. The study also wants to determine differences between recovery where abstinence is the goal and recovery where moderation is the goal, as well as differences between recovery without professional help and recovery with professional help.

“The whole area of cannabis recovery is understudied compared to other addictions,” says Stea. “So there’s a lot to learn. This study is an early step toward developing a scientific understanding of the recovery process from cannabis use disorders. I see it as an exploratory project that I hope will further refine hypotheses, spark more research, and create a scientific foundation for future questions. If there is a resounding consensus around actions that help people recover, then these could be used for treatment strategies or self-help materials.”

Marijuana study in Calgary

If you have had a marijuana problem in the past and have been problem free for at least one year, you could provide valuable information about your recovery by participating in a research study. Confidentiality of all those applying or participating in the study will be strictly maintained.

For more information:
visit www.Calgary-Marijuana-Study.ca
email: Calgary-Marijuana-Study@ucalgary.ca
or call (403) 210-9580

1 in 10 people who try cannabis at least once will develop a dependency

About the researcher
Jonathan N. Stea receives funding from Alberta Innovates – Health Solutions. He is a doctoral candidate in the Clinical Psychology program at the University of Calgary.

Selected publication
INDIVIDUALIZED TREATMENT FOR DEPRESSION

According to the World Health Organization, depression is the leading cause of disability and the second leading contributor to the global burden of disease for people 15 to 44 years of age. "Simply put, depression places an enormous burden on society," says Dr. Katherine Aitchison, the recently appointed Alberta Centennial Addiction and Mental Health Research Chair at the University of Alberta. “There's opportunity in Alberta to build on existing strengths and enhance capacity in clinical research so that we can make a significant impact on the treatment of mental illness.”

Dr. Aitchison is a leading researcher in pharmacogenomics, the study of how an individual’s genetic inheritance affects the body's response to medications, diet, and toxins. This represents a way to optimize drug therapy and is a basis for personalized medicine.

One of the best ways to understand the potential of pharmacogenomics in mental illness is to look at a large European multi-centre project called GENDEP (Genome-based Therapeutic Drugs for Depression).

Dr. Aitchison co-led this project when she was at King's College London’s Institute of Psychiatry.

GENDEP’s goals included finding a way to use information about patients’ genes to help doctors decide which antidepressant treatment would work best and have the least side effects for which patient. Although antidepressants are effective for many patients, they don’t work for some, and side effects can cause patients to stop taking their medication. Currently, prescribing a drug to achieve the best response with minimum unwanted effects is largely an educated guess.

GENDEP studied escitalopram and nortriptyline, two antidepressants that have contrasting mechanisms of action and routes of metabolism and, therefore, are representative of most available antidepressants. In the clinical trial component, patients with major depression were randomized into two groups and given one of these drugs, with an option to switch to the second if the first one prescribed was ineffective or had too many side effects. Results indicated that some specific effects may be predicted by certain genetic markers. The study also yielded information on clinical predictors of response and side effects. For example, if negative thoughts were a prominent symptom of depression, then escitalopram appeared to be more effective. Scientific papers continue to be published on the results.

“Studies like GENDEP provide tools to aid targeted, rational prescribing of medication,” says Dr. Aitchison. “There’s a lot of potential in Alberta to do similar studies that can be the foundation of personalized treatment of mental illness. It's so important to find better ways to treat depression.”

About the researcher
Dr. Katherine Aitchison is a full professor in the Department of Psychiatry in the Faculty of Medicine and Dentistry at the University of Alberta.

Selected publication

Recommended websites
Dr. Aitchison’s website
www.psychiatry.med.ualberta.ca/AboutUs/FacultyMembers/Pages/default.aspx?P=225

Mental Illness and Addictions Research Chair
www.mentalhealthresearch.ca/KeyInitiatives/Chairs/Pages/MentalIllnessandAddictionsResearchChair.aspx

Depression is the leading cause of disability
Unraveling the mystery of germ line stem cells

Dr. Ina Dobrinski’s research on germ line stem cells could provide insight into treating infertility and diseases that damage the body’s tissues and cells.

STORY BY CAITLIN CRAWSHAW
ILLUSTRATIONS BY BYRON EGGENSCHWILER

**Stem cells** are the body’s version of a blank slate; they are cells that lack distinguishing features and are simply waiting for the right time and place to develop into a cell the body requires. Although most people equate stem cells with embryos, you can find them in many different places in an adult body, including bone marrow, skin, and even the testes. In the testes, special stem cells known as germ line stem cells wait their turn to transform into sperm cells.
“**Germ line stem cells** are the only stem cells in an adult mammal that can divide and pass on their genetic material to the next generation,” explains Dr. Ina Dobrinski, a University of Calgary researcher. These stem cells can also differentiate into many different kinds of tissue when removed from the testes and placed into a new environment.

“That’s what’s so unique about these cells: they can do what they’re supposed to do in nature—support male fertility. But, if you take them out of their niche, and put them under the right conditions, they’ll basically revert to this broader potential,” she says.

The potential of these cells for regenerative medicine is tremendous. Regenerative medicine is the process of replacing or repairing damaged tissue and organs in the body using living, functional tissue and cells. Germ line stem cells could eventually provide an alternative to pluripotent or embryonic stem cells. Germ line stem cells can be derived from an adult body, and therefore, are more ethical and practical than embryonic stem cells because embryonic stem cells require an embryo.

Dr. Dobrinski has dedicated much of her career to understanding the basic science underlying these stem cells. While she was drawn to reproductive medicine early in her academic career, she turned her attention to germ line stem cells during her graduate studies after reading a pioneering research paper. The study proved that germ line stem cells could be transplanted in mice to restore fertility. “It struck a chord in me,” she says. “I’ve never looked back. It’s the field that fascinates me to this day.”

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**Quick Facts**

Infertility affects approximately 10% to 13% of Canadian couples.

*Source: Assisted Human Reproduction Canada*
After finishing her Ph.D., Dr. Dobrinski worked with Dr. Ralph Brinster, the author of the study that first inspired her interest in germ line stem cells. In 2002, she developed a technique to transplant germ line stem cells in animals other than mice. It was the first time the cells had been transplanted in non-rodent models.

Since coming to Alberta in 2008, Dr. Dobrinski has continued to apply germ line transplantation to non-rodent models. Using xenografting techniques that she’s created, she studies how genetic changes are passed down to the next generation. Xenografting allows tissues from other animal species—which more closely resemble human physiology—to be transplanted into rodent models. “Xenografting allows us to study a species of interest, while using a mouse model,” says Dr. Dobrinski.

Dr. Dobrinski’s work focuses on basic science but has a number of applications within reproductive medicine. She explains that germ line stem cells could one day correct infertility in both men and women. For example, Harvard researchers recently discovered that women may have germ line stem cells in their ovaries.

This reproductive technology isn’t here yet, but it probably won’t be long, suggests Dr. Dobrinski. “This is a very, very fast-moving field.”

Stem cells are the body’s version of a blank slate; they simply wait for the right time and place to develop into a cell the body requires.

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**About the researcher**

**Dr. Ina Dobrinski** is a professor and head of the Department of Comparative Biology and Experimental Medicine in the Faculty of Veterinary Medicine at the University of Calgary.

**Selected publications**


**Recommended website**

National Institutes of Health – Stem cell basics

[www.stemcells.nih.gov/info/basics/]
Science and medicine in the media

AIHS 2011 Media Fellows recall their summer experiences at CBC Radio

STORY BY TARA NARWANI / PHOTOS BY LAUGHING DOG AND TRUDIE LEE

and met a celebrity rock star, Jim Cuddy of Blue Rodeo—all within his first week at CBC Radio Edmonton. “It was cool to see that they were throwing me in the deep end,” says Yang.

Every summer since 1991, AIHS has granted Media Fellowships to two students with strong biomedical backgrounds—one from the University of Calgary and one from the University of Alberta—to intern with CBC Radio for 12 weeks. The intention of the program is to introduce the fellows to the media process—how ideas and events are communicated to the public—and provide them with an opportunity to use their particular expertise and skills to enhance science and medical reporting in the media.

Yang’s counterpart at CBC Radio Calgary was Cody Mann, who recently completed his Master’s degree in zoology at the University of British Columbia and is currently in his second year of law school at the University of Calgary. For Mann, the Media Fellowship allowed him, “to go back to some science-related work but with a different focus.” He was even able to use some of his knowledge of the law while working at the CBC.

Media Fellows experience a steep learning curve. They are quickly introduced to many of the technical aspects of how a radio show or news
story is produced. These aspects include how to find people to interview, run a concise and focused interview, write scripts, collect and edit sound files, and narrate their own radio stories. However, perhaps most daunting for new interns, Yang and Mann were also encouraged to contribute ideas during their newsroom’s daily meetings where story ideas are pitched to the group, debated, and assigned to individuals.

Mann’s favorite assignment was one that allowed him to touch upon both public health and legal issues. In Alberta, anyone under the age of 18 is required by law to wear a bike helmet. Mann interviewed Dr. Brent Hagel, an AIHS researcher who investigates children’s head injuries at the University of Calgary, and asked him what criteria should be used when evaluating a bike helmet. Mann learned and helped communicate to a public audience that a higher price doesn’t mean a safer helmet. “As long as it’s accredited,” he says, “it’s going to be safe regardless of whether you spend $300 or $40 on it.”

Yang discovered that he was most captivated by stories that had an emotional component. As a result, he produced stories he believed would have an emotional and hopefully lasting impact on the listener and pitched a series entitled “Conquering medical hardship” to CBC Edmonton’s afternoon show Radioactive. “I wanted to showcase individuals who went through medical hardship but were still able to be happy and successful,” he explains.

Since 1991, the Media Fellowship Program has helped 39 students enhance the coverage of science and technology in Alberta. Visit www.aihealthsolutions.ca/grants/training-and-early-career-development-programs/media-fellowship for more information.
The intention of the program is to introduce the fellows to how ideas and events are communicated to the public.

The people featured during Yang’s series were Dr. Michael Chatenay, a general surgeon who suffers from Tourette’s syndrome; Dr. Austin Mardon, the first Canadian with schizophrenia to receive the Order of Canada; Tyler Playford, an actor with Down’s syndrome who also graduated from Grant MacEwan University; and Dean Krawec, a double amputee and board president of the Edmonton Sled Hockey Club. The experience of putting these stories together definitely had a significant impact on Yang. “Just listening to each of their struggles and then their journeys to where they are now was mind-blowing,” he says. “Each one was equally inspiring for me.”

The Media Fellowship often has long-lasting value for its participants. For example, working under short deadlines teaches time management, and having to explain complex ideas in a few sentences demands clear and concise writing. Mann especially values the communication, interview, and story-writing skills he developed as a Media Fellow.

Yang is currently in his second year of medical school at the University of Alberta and his future patients will also likely benefit from his media experience. “They really teach you how to write concisely and how to get to the point,” he says. “I think the media training will help me thoroughly explain things to patients and in a way they’ll understand.”

Tara Narwani, the writer of this story, is an alumna of the Media Fellowship Program.

Funding that makes research happen

It takes a lot of resources to support the health research that you’ve read about in this magazine. Alberta Innovates – Health Solutions has committed more than $1.2 billion to Alberta’s health research community. In addition to our support, researchers featured in this issue of Research News want to recognize the many entities that support their funding, including the following:

- Alberta Access to the Future Fund
- Alberta Cancer Foundation
- Alberta Centennial Addiction and Mental Health Research Chairs Program
- Alberta Centre for Child, Family and Community Research
- Alberta Children’s Hospital Foundation
- Alberta Children’s Hospital Research Institute
- Alberta Health Services
- Alberta Health & Wellness
- Australian Research Council
- Canada Research Chairs
- Canadian Institutes of Health Research
- Children’s Hospital Aid Society
- Collaborative Research Grants Initiative
- Heart and Stroke Foundation of Alberta
- Heart and Stroke Foundation of Canada
- Hotchkiss Brain Institute
- Institute of Health Economics
- Joanne Cuthbertson and Charlie Fischer
- Killam Trusts
- Multiple Sclerosis Society of Canada
- National Institute of Mental Health
- National Institutes of Health
- Natural Sciences and Engineering Research Council of Canada
- NeuroDevNet
- Nexen Inc
- Norlien Foundation
- University of Calgary
Following up

Study reveals people with multiple sclerosis lack neurosteroids in the brain

STORY BY KAREN THOMAS / PHOTO BY LAUGHING DOG

“NEUROSTEROIDS help brain cells talk, grow, and repair themselves,” says Dr. Chris Power, lead author of a paper published in the September 2011 issue of the international academic journal *Brain*. “These steroids are produced in the brain. They are not the steroids most people associate with building big muscles or suppressing the immune system.”

This discovery could be a new avenue for treating multiple sclerosis

Dr. Power’s team screened thousands of genes, comparing the genes of people with multiple sclerosis with those who don’t have the disease. They discovered that the genes of people with multiple sclerosis act differently, which leads to reduced levels of one specific neurosteroid, allopregnanolone. Previous studies have shown that neurosteroids play a critical role in how the brain functions.

Dr. Power’s team reports that allopregnanolone reduced inflammation in the brain and helped prevent the breakdown of communication between brain cells when given to mice with multiple sclerosis. “This is one of the few times in my career we have discovered a new scientific strategy that might directly benefit my patients,” says Dr. Power, a neurologist who works at the multiple sclerosis clinic at the University of Alberta Hospital.

The next step is to see if the same benefits could occur in humans. “Some neurosteroids are being tested in clinical trials for people with psychiatric disorders, and man-made neurosteroids are in clinical trials for people with epilepsy,” says Dr. Power. “I am talking with colleagues at the University of Alberta about a clinical trial for multiple sclerosis.”

About the researcher

**Dr. Christopher Power** receives funding from Alberta Innovates – Health Solutions. He is a full professor in the Department of Medicine in the Faculty of Medicine and Dentistry at the University of Alberta and holds a Tier 1 Canada Research Chair in Neurological Infection and Immunity.

Selected publication