

Issue 1, December 2013

RESEARCH FOR HEALTH

SUPPORT ▶ SCIENCE ▶ IMPACT



When it comes
to stroke,
seconds count
p.25

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the province **3**

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that holds
water **15**

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of health care
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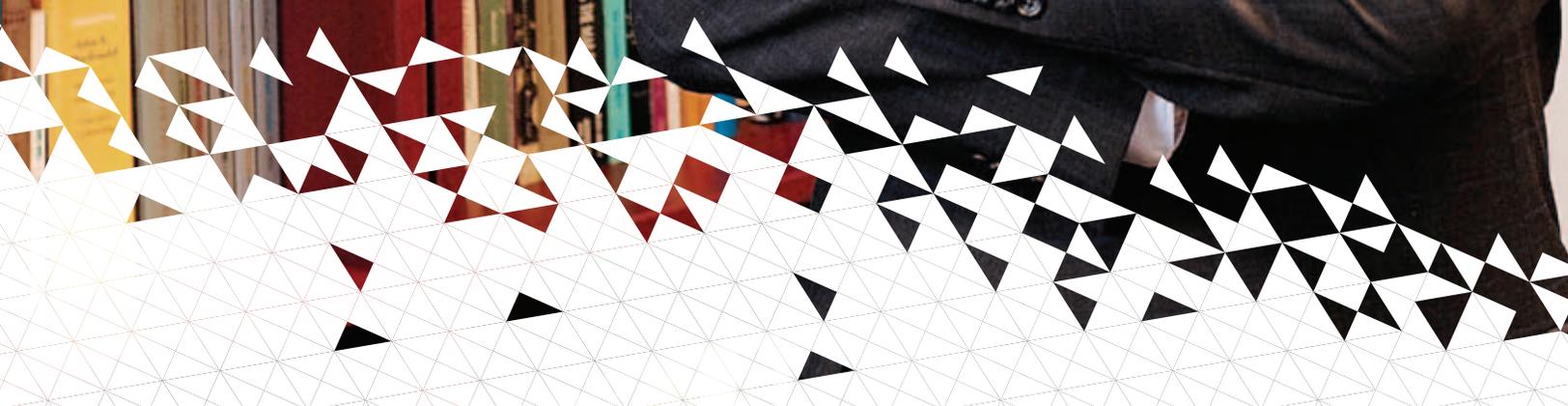
SHRF Achievement Award 2013

Recognizing leadership

The Saskatchewan Health Research Foundation (SHRF) is pleased to present the SHRF Achievement Award to Dr. Gregory P. Marchildon. His contributions to health policy and economics, as well as health services research and history make Dr. Marchildon a perfect recipient for this year's award.

Congratulations Dr. Marchildon!

For more information visit www.shrf.ca



Building a healthy Saskatchewan through health research



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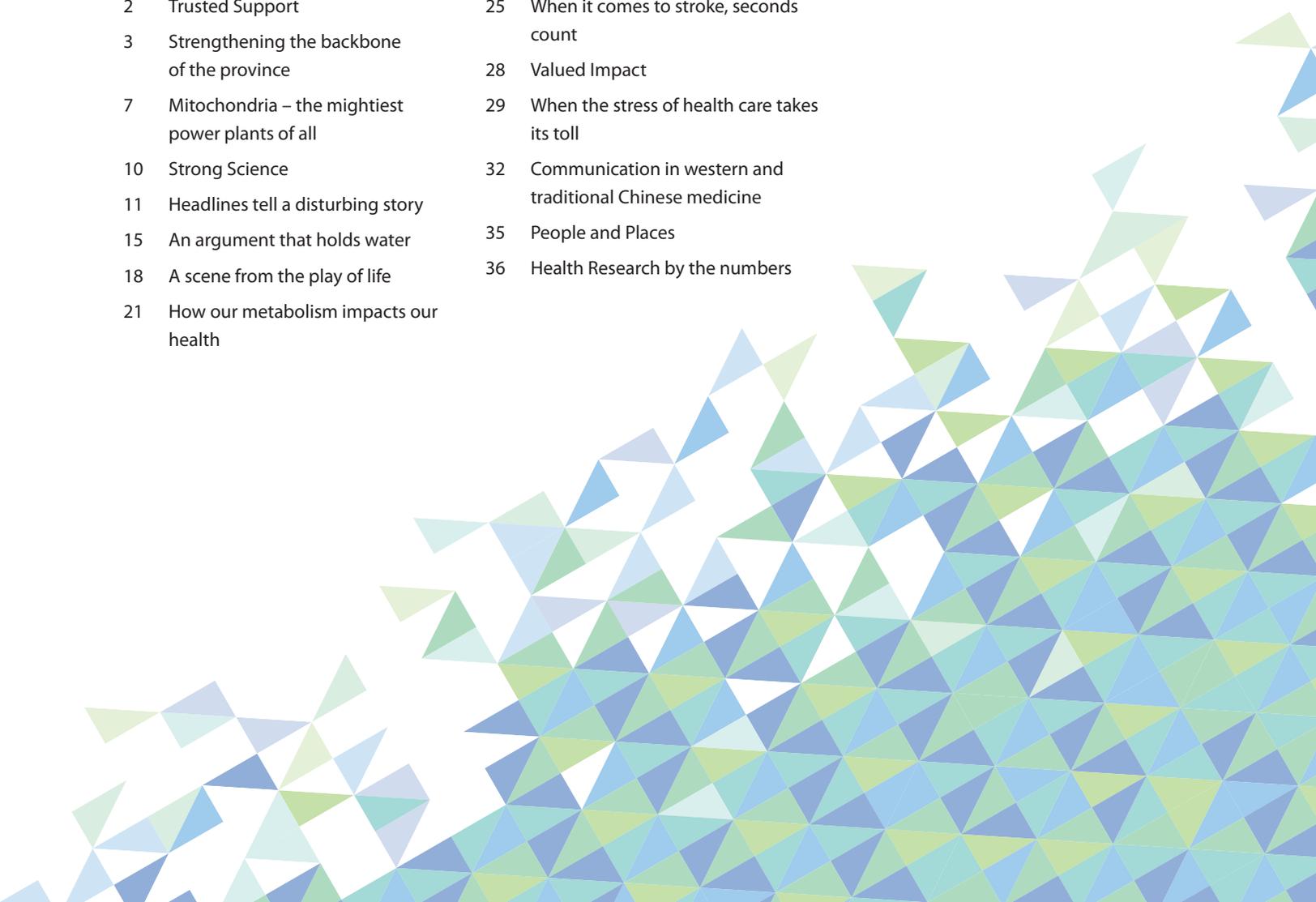
RESEARCH FOR HEALTH



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Interested in providing some story ideas for the next edition?
Contact us at communications@shrf.ca

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For information on advertising rates contact SHRF at communications@shrf.ca.

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From the CEO's desk



We've talked a lot this year about the past decade of health research funding by SHRF. Since opening our

doors in 2003, we've seen a lot of changes occur to Saskatchewan's health research landscape.

Over the past 10 years there have been new faces attracted to Saskatchewan to pursue early years careers in health research discovery. Established experts in their respective fields of inquiry have made this province their home. World-class facilities exist in Saskatchewan, which strengthen our domestic health science footprint. SHRF has been a consistent supporter of new researchers and new research, helping establish careers and groups, to study key health issues for Saskatchewan and leverage additional funds to advance their research.

SHRF works hard to develop and sustain trust. That's something that hasn't changed. Not only do we define our support in terms of dollars, which is a very important contributor to growing Saskatchewan's health research enterprise, we also define it through our success at building a healthy Saskatchewan through health research.

To achieve success, we've focused on three strategies:

- ▶ Build partnerships with public and private sector organizations to increase resources for health research (trusted support);
- ▶ Lead and co-ordinate strategic health research opportunities for the province (strong science); and
- ▶ Facilitate linkages across research, innovation, and practice (valued impact).

This magazine is something new for SHRF. Each year we work with all of our funded researchers, groups, and agencies to learn more about their work. This magazine is made up of some of their stories. We're planning on continuing this magazine every year, sharing even more of the activities of this vibrant sector that contributes to the health of Saskatchewan people.

I'm proud of the health research commitment I see everyday in Saskatchewan. The knowledge gained, healthy lives promoted, environments improved, and the positive impacts to our societies, often start and with research. I hope you enjoy the stories we've selected, for this, our first issue of *Research for Health*.

June M. Bold , CEO

Trusted Support

Health research success is about working together

Health research funding isn't one pot of money. SHRF plays an important role with its contributions – nearly \$5 million in 2013 in grants alone – and there are many players in the health research sector. National agencies like the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council of Canada, and the Social Sciences and Humanities Research Council contribute. Many disease-specific organizations at the provincial and federal level contribute. Private donors and corporations contribute. Educational institutions and hospital foundations contribute. Health research funding is an inter-related and inter-dependent world. Often funding for any one health research project is either dependent upon additional funding being found, or is used as leverage to attract additional funding.

Partnerships and collaboration rule this environment.

As SHRF has developed and grown as a funding agency, so has our ability to grow, leverage and direct funds to key areas of need to enhance Saskatchewan's health research capacity. In the last two years alone we've collaborated on some unique health research opportunities to enhance the health of Saskatchewan people, examples include:

- **Research Chair in Health Quality Improvement Sciences.** SHRF, the University of Saskatchewan's College of Pharmacy and Nutrition, and the Health Quality Council welcomed Dr. Thomas Rotter from the Netherlands to this Chair position in 2012. Dr. Rotter will focus on a number of activities centred around

health quality including safety, patient-centred care, timeliness, effectiveness, and access to health care.

- **Partnership with the Canadian Chiropractic Research Foundation.**

This three-year co-funded Establishment Grant for Dr. Paul Bruno at the University of Regina will focus on the fields of motor control and rehabilitative exercise therapy for low back pain.

- **Saskatchewan Research Chair in Multiple Sclerosis (MS) Research.**

This chair is being supported by SHRF, the Saskatoon City Hospital Foundation, and the University of Saskatchewan's College of Medicine. Currently under recruitment, the Chair will focus on clinical research to identify the cause of MS, develop new or improved treatments and therapies, and ultimately find a cure.

SHRF continues to develop new partnerships for collecting input, strengthening opportunities, and building capacity. All of the research supported by SHRF undergoes rigorous review by expert panels and must meet accepted scientific standards of excellence.

Health research is a strong positive investment, and we are always looking for new partners. If you or your organization is interested in making a health research investment or donation, please contact our partnership office or visit our website for more information. [↗](#)

HEALTH RESEARCH
FUNDING IS AN
INTER-RELATED AND
INTER-DEPENDENT
WORLD.

A portrait of Dr. Catherine Trask, a woman with dark curly hair and blue eyes, smiling. She is wearing a black blazer over a white top, a bright red scarf, and large silver earrings. Her arms are crossed, and she is wearing a black digital watch on her left wrist. The background is a rustic setting with a green wooden post on the left and a wall of straw on the right.

Dr. Catherine Trask
Assistant Professor at the Canadian
Centre for Health and Safety in
Agriculture, University of Saskatchewan

Strengthening the backbone of the province

Farming isn't what it used to be. There was a day when a section of land would support a family comfortably. Now the average farm in Saskatchewan is over two sections. Where a large livestock operation used to boast several hundred head of cattle, the numbers are more likely to be in the thousands today.



That means grain farmers are spending much more time on their tractors and livestock farmers are maintaining many more animals. The demand for labourers has grown, balanced by advances in mechanization. Farming is no longer the family business it once was – it's become part of a competitive industry that trades in world markets.

Some things haven't changed, though. It's still not unusual to see a farmer crawl down off the tractor, pull his hat off his head so he can wipe the sweat and dirt off his brow, look up into the sky and let go with a stream of curses at an approaching thunderhead.

They're certainly allowed that concession. Especially since they still wake up at the crack of dawn and punch out at sunset. They're always on hand for their families and they regularly drive a country mile to help out their

neighbours. They're bastions of their communities, all while raising the food that is needed to nourish the world. Farmers still epitomize the qualities that shaped the province and the ideals that are shared by everyone who lives here.

In a nutshell, farmers are truly the backbone of Saskatchewan.

That's a statement that Dr. Catherine Trask takes very literally. She is trying to keep that backbone healthy and strong. She and her team are working to discover the causes of musculoskeletal injuries among agricultural workers. An Assistant Professor with the Canadian Centre for Health and Safety in Agriculture (CCHSA) in the University of Saskatchewan's College of Medicine, Dr. Trask is also the Canada Research Chair in Ergonomics and Musculoskeletal Health at the University of Saskatchewan.

Dr. Trask was the recipient of a SHRF Establishment Grant in 2012-13. The grant provides \$119,991 over three years to help her establish her research program and achieve a level of

WHILE THE RESULTS OF THIS WORK WILL DIRECTLY HELP AGRICULTURAL WORKERS, THE RESEARCH IS ALSO CONTRIBUTING SIGNIFICANTLY TO THE HEALTH AND WELLBEING OF WORKING CANADIANS IN MANY DIFFERENT INDUSTRIES.



productivity necessary to obtain major funding from national and other external agencies. Dr. Trask was the recipient of the Top Researcher Award in 2012 in SHRF's Socio-Health Establishment Grant competition.

Dr. Trask is studying the occupational determinants of health such as vehicle vibration, heavy lifting and awkward postures as they relate to the development and progression of lower back disorders. "In some ways, farming has become increasingly mechanized with less physical labour," she says. "Being in a static position for hours on the tractor, especially

during seeding and harvest, leads to back injury because of whole body vibration."

While mechanization has had an impact on the health of farmers, so has the increase in livestock specialization. "Years ago, on a traditional pig farm with 500 or fewer animals, workers exercised a fairly standard range of motions in caring for livestock," says Dr. Trask. "When the operation is scaled up to 5,000 pigs, workers spend more hours doing the same task – such as docking pigs' tails – so overuse of muscles and joints has become more common." As a result, the team is also examining carpal tunnel syndrome and shoulder problems like bursitis, which occur when the same movements are done repetitively.



"I think that anyone who has worked in pig farming for any amount of time will probably have aches and pains at the end of the day," says Dr. Trask. "I think there's probably a great deal of acceptance that these aches and pains are just part of the job. They're unaware of what might be done to prevent some of those risk factors and to feel healthier and stronger at the end of the day."

In addition to studying risk factors to understand how they contribute to lower back disorders in Saskatchewan farmers, Dr. Trask is also investigating the impact of the pain and the level of disability associated with lower back disorders. In Saskatchewan, these issues have not been thoroughly investigated since farmers and their workers are often not eligible for workers compensation, even though they play a critical role in Saskatchewan's economy.

Dr. Trask and her colleagues began the project by mailing a survey to farmers to gauge the scope of the injury problem. They travelled to 30 Saskatchewan farms to measure equipment vibration and observe lifting practices and posture during the farmers' regular workdays. Farmers are being interviewed about any pain or disability, as well as safety measures they have implemented at their farm, such as modified tools or equipment.

According to Dr. Trask, modifications to the work environment or to safety equipment are a much more effective means to improve safety on the farm than attempting to modify worker behavior. "The types of controls that we most like to implement are those that modify the environment or the tools that are used so that we're not requiring workers to remember at any particular moment, for example,

that there's one safe way to lift something," she says.

Dr. Trask says farmers have been very positive about the idea of implementing change and making workplaces healthier and safer. The interest is not just from a loss prevention perspective, but also from the perspective of keeping workers healthier and happier and making the workplace a better place to be. "Making those changes requires some investment on the part of the employer, or on the part of the producer," she says. "If you're going to make a big investment, you want to really make sure that you're making the right change."

By identifying safety measures, Dr. Trask believes her study will allow future research to evaluate the effectiveness of prevention. While the results of this work will directly help agricultural workers, the research is also contributing significantly to the health and well-being of working Canadians in many different industries. In the meantime, farmers and agricultural workers in Saskatchewan can rest assured that Dr. Trask and her research team "have your back." 

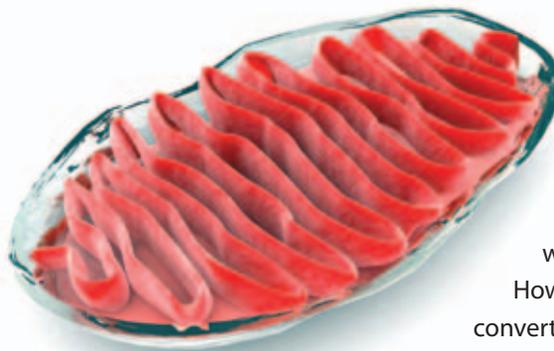
“... it’s the body’s mitochondria that allow all of the enzymes to be oriented in the right way to break down food and turn it to useful energy.”



Mitochondria – the mightiest power plants of all

It’s not often that we stop to think about the many amenities we enjoy; in fact, we tend to take them for granted. We don’t generally take the time to ponder how our morning routines are made so much easier by curling irons, hair dryers, electric razors, and battery-operated toothbrushes. We don’t frequently switch back and forth between the hot and cold water taps, wondering how it is that they can deliver water in two different temperatures. And it’s a rare occasion that someone will get into their car and marvel over the fact that it starts with the turn of a key or, these days, a push of a button. But it’s not just our microwave ovens, big-screen televisions and mp3 players that we take for granted. It’s also our bodies. What makes them tick?

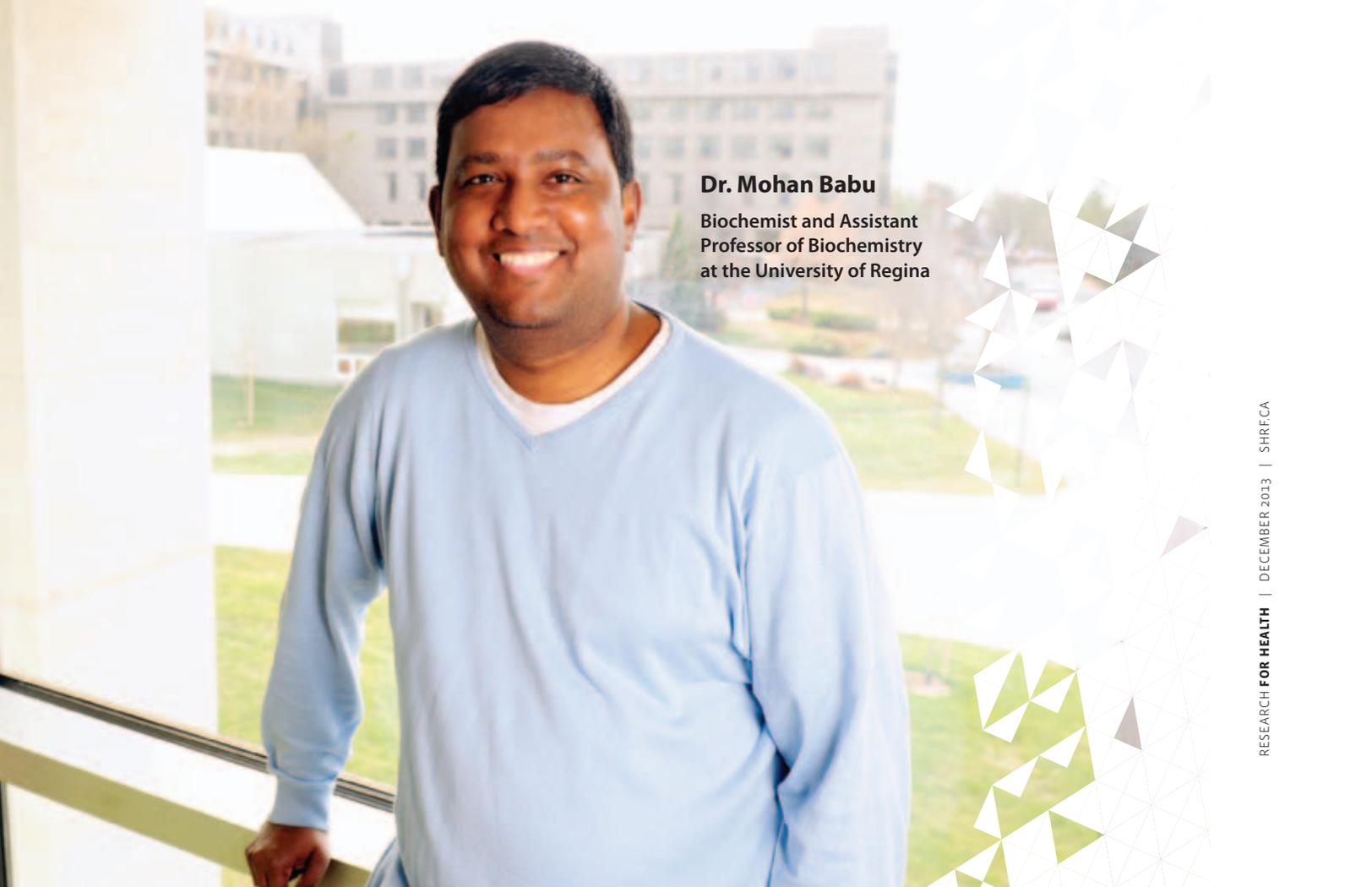
If we do stop to think about it, we know that all of our conveniences are powered in some way



or form by a natural resource. But what we don’t ask ourselves is what happens in between. How is that resource converted to energy?

In places where there is a lot of fast running water, hydroelectricity dams harness the mechanical energy of the moving water. In windy settings, you may see windmills producing electricity. In places where there is lots of coal, natural gas or oil in the ground, the fuel is burned to make steam, which rotates a turbine. A nuclear reaction is another way to make the steam to turn the turbine.

Now, how does all of this apply to our physical makeup? We know our bodies need to be fed at regular intervals with a variety of fuels. Those fuels are the equivalent of the natural resource used to produce electricity, and they’re largely chosen according to the palate of the individual.



Dr. Mohan Babu

Biochemist and Assistant Professor of Biochemistry at the University of Regina

Whether you can consider donuts or poutine a natural resource certainly merits consideration, but it's a debate best saved for another day.

Today, there are two questions that arise. First, what sort of generator is used to convert the food consumed by an individual into the energy required for day-to-day activities? And second, what happens if it breaks down?

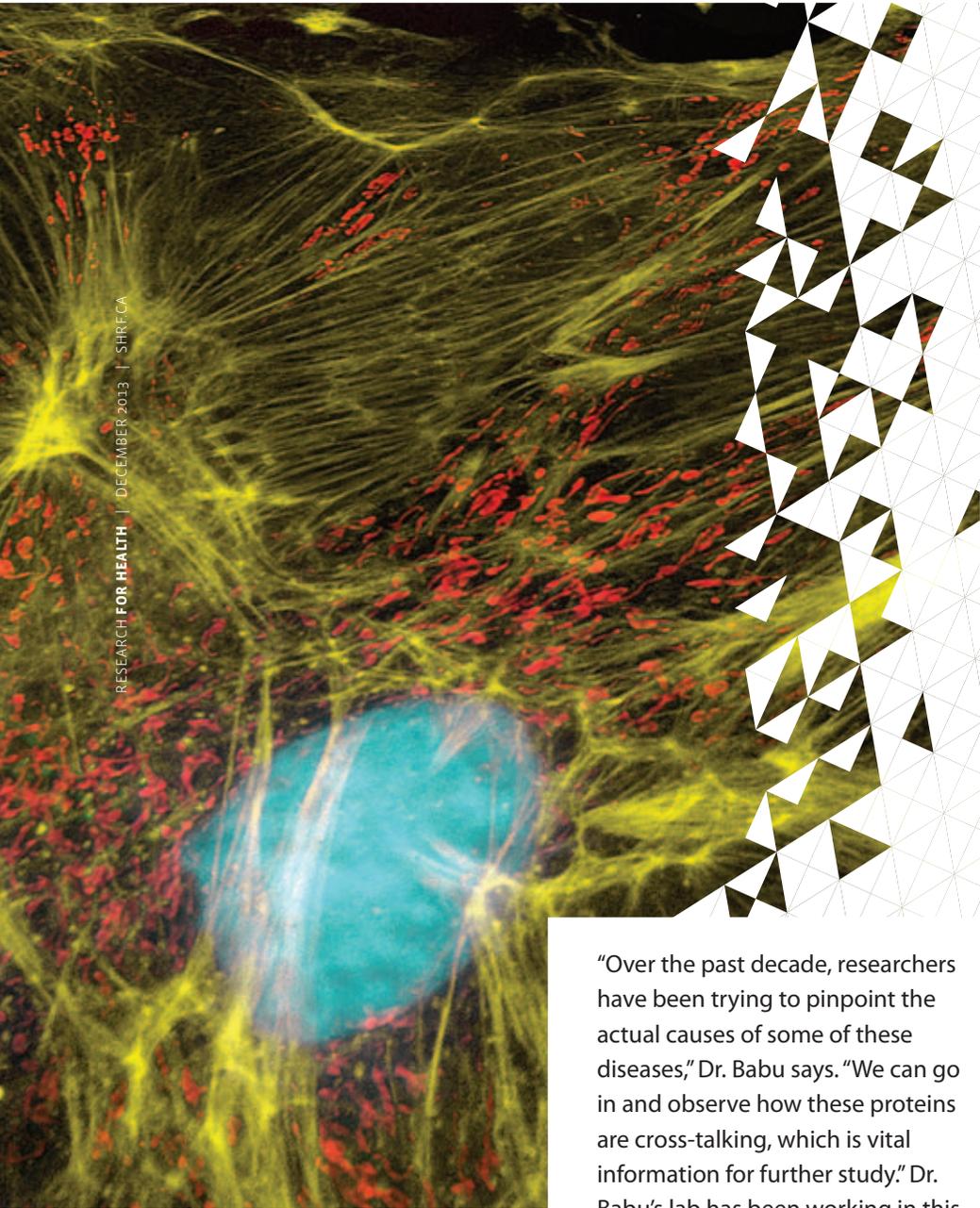
According to Dr. Mohan Babu, Assistant Professor of Biochemistry at the University of Regina, it's the body's mitochondria that allow all of the enzymes to be oriented in the right way to break down food and turn it to useful energy. When a defect in mitochondria occurs, it changes the energy dynamics of the cell and results in disease.

Mitochondria are contained within every cell in the human body and are often called "cellular power plants" because of their crucial role in generating the energy that their host cell requires. Because mitochondria serve a wide range of crucial cellular functions, any dysfunction within the cell usually causes cancer or neurodegenerative disorders like Parkinson's, Alzheimer's, or Huntington's. They've also been implicated in cardiac diseases and may even play a role in the aging process. Worldwide, mitochondrial diseases affect about one in 10,000 people, and the incidence is especially high among infants.

Dr. Babu is taking the approach of studying the larger picture of

mitochondrial interactions in order to accumulate data and provide it to researchers and scientists who are exploring specific disorders. Studies in yeast have been instrumental to discovering the fundamental mechanisms underlying mitochondrial biology and disease. Mitochondria in yeast and human cells are physically associated with over 1,000 distinct nuclear-encoded mitochondrial proteins.

Dr. Babu and his team of researchers are using the link between yeast and humans to monitor the interactions between mitochondrial proteins and genes to create what he calls an "interaction map," which will, when it is finished, map over 700,000 interactions that have potential disease associations.



MITOCHONDRIA IN YEAST AND HUMAN CELLS ARE PHYSICALLY ASSOCIATED WITH OVER 1,000 DISTINCT NUCLEAR-ENCODED MITOCHONDRIAL PROTEINS.

“Over the past decade, researchers have been trying to pinpoint the actual causes of some of these diseases,” Dr. Babu says. “We can go in and observe how these proteins are cross-talking, which is vital information for further study.” Dr. Babu’s lab has been working in this area of study for more than 10 years and has achieved a level of expertise that is very well-respected in the research community.

“I strongly believe that this kind of study will create a lot of breakthroughs,” says Dr. Babu. “We will create the interaction map, but one person cannot explore the endless possibilities that will come from this data. This information will

give the community the chance to use the data we are generating to make important discoveries.”

By concentrating on the overall biological system, this innovative research is providing an unprecedented view of the properties of mitochondria and addressing the critical question of how mitochondrial processes are highly integrated with one another and with other cellular pathways.

The opportunity to participate in system level research of this calibre is attracting interest from far afield and drawing some of the world’s finest scientific minds to work in Saskatchewan. Their efforts are creating avenues for identifying novel therapeutic targets as well as therapies for the treatment of mitochondrial diseases. Dr. Babu was the recipient of a SHRF Establishment Grant in 2012-13. The grant, which provides \$119,296 over three years to continue pursuing and advancing this research.

So the next time you finish an especially intense workout, don’t give all the credit to the power breakfast you ate that morning. Save some for the mighty mitochondria. 

Strong Science

A strategy for provincial health research

Health research is a broad topic. When you think of it, all disease states, treatments, the health care system, how we live, and all of the ways our human health systems work, is really the world of health research! If you tried to fund or make an impact on everything related to health research, you would quickly run out of time, money, and patience. So you have to prioritize, because ultimately, the outcomes of health research require sound science.

In Saskatchewan, SHRF led the development of a Health Research Strategy that was identified through broad impact. A thorough provincial consultation process resulted in the recognition that as a small province, we needed to focus research resources and energies in areas critical to the health and well-being of our population and build on the strengths and unique advantages at that point in time. The Strategy focused on five priority areas:

- the health needs of specific populations with an emphasis on Aboriginal People and seniors;
- health systems and policy research that emphasizes health human resources, quality improvement, health service delivery in primary care and mental health, and rural and remote health service delivery;
- the determinants of health status, including early childhood development and the prevention and underlying causes of chronic and lifestyle-related diseases;
- public health including infectious diseases, water safety, and food safety; and
- synchrotron-based health research.

A lot of progress and success has been due to the focus of this Strategy over the last 10 years, but times change. The province has grown considerably in the past decade. Our health research environment and our health system have also changed considerably.

Ensuring strong science requires an equally strong roadmap. That's why SHRF is now undertaking another province-wide consultation to take the pulse of health research today and develop an updated Health Research Strategy for the province. We need a strong strategy that drives strong science.

Think about what strong science leads to. It produces health discoveries that lead to better products and health care services. It provides evidence for sound health care decisions and policy making. It helps address critical health issues and creates a healthier, more productive population. It gives all of us healthier lives, in healthier families, in healthier communities.

Now that's a strategy worth investing in. 

YOU HAVE TO PRIORITIZE, BECAUSE ULTIMATELY, THE OUTCOMES OF HEALTH RESEARCH REQUIRE SOUND SCIENCE. OUR STRATEGY FOCUSES ON FIVE PRIORITY AREAS IDENTIFIED THROUGH BROAD INPUT.



WORLD TB CASES FALL, BUT DRUG-RESISTANCE A WORRY: WHO

The number of people in the world newly infected with tuberculosis fell again last year, dropping by 2.2 percent, but the burden of TB looms large and the pace of diagnosis of drug-resistant strains of the infection is slow...

Reuters, October 17, 2012

ANTIBIOTIC-RESISTANT BACTERIA SPREADING IN N.W.T.

A superbug skin infection has been spreading in the Northwest Territories since January. By August, there were 462 recorded cases of MRSA, which is the highest it has ever been in the territory...

CBC News, October 3, 2012

GONORRHEA EVADES ANTIBIOTICS, LEAVING ONLY ONE DRUG TO TREAT DISEASE

There's some disturbing news out today about a disease we don't hear about much these days: gonorrhea. Federal health officials announced that the sexually transmitted infection is getting dangerously close to being untreatable...

NPR Health, August 9, 2012

OVERUSE OF HOSPITAL ANTIBIOTICS LED TO DEADLY SUPERBUG OUTBREAK

The widespread use of antibiotics in hospitals triggered the emergence of two resistant strains of the Clostridium superbug that has killed thousands of people worldwide over the past two decades...

The Independent, December 11, 2012

NIH SUPERBUG CLAIMS 7TH VICTIM

A deadly, drug-resistant superbug outbreak that began last summer at the National Institutes of Health Clinical Center claimed its seventh victim Sept. 7, when a seriously ill boy from Minnesota succumbed to a bloodstream infection...

The Washington Post, September 14, 2012

GENOME DETECTIVES SOLVE A HOSPITAL'S DEADLY OUTBREAK

The ambulance sped up to the red brick federal research hospital on June 13, 2011, and paramedics rushed a gravely ill 43-year-old woman straight to intensive care. She had a rare lung disease and was gasping for breath. And, just hours before, the hospital learned she had been infected with a deadly strain of bacteria resistant to nearly all antibiotics...

The New York Times, August 22, 2012



Headlines tell a disturbing story

One need only scan the headlines of newspapers and medical publications to see that there is widespread antibiotic overuse and misuse in both humans and animals. While antibiotics have saved the lives of millions of people and are inarguably the greatest medical advance of the 20th century, there is concern that their popularity could mean their demise.

Since the development of antibiotics in the 1940s, the applications have grown tremendously. Animals that are already healthy are treated with antibiotics to boost production. The use of growth hormones to increase milk production is approved for use in the United States and many countries of Asia.

In developing countries, poor infection control and weak regulatory practices have contributed to making antibiotics too easily attainable. Over-the-counter antibiotics are readily available, allowing patients to self-diagnose, determine their own length of treatment and generally overuse their medicines.

According to the World Health Organization (WHO), modern society has created several perfect environments for superbugs to develop and then travel overseas through mass migration and global travel. One of the biggest challenges in global health is overcoming those superbugs (antimicrobial resistance) that are more powerful than the antibiotics available to treat them.

Even in Canada, antibiotics are overprescribed for ailments such as colds, sore throats, ear infections and respiratory tract infections. Hospitals have become a literal breeding ground for antibiotic-resistant infections. Based on WHO numbers, roughly a quarter of a million Canadians come down with life-threatening infections every year while they're in hospital, and as many as 12,000 of those people die.



Dr. Elizabeth Vanderlinde

Postdoctoral Research Fellow in
Microbiology in Medicine at the
University of Saskatchewan



Before the superbugs have a chance to mature further, before minor infections become fatal and before surgeries are too dangerous to perform, an effective alternative to antibiotic use needs to be found. Dr. Elizabeth Vanderlinde, a microbiologist at the University of Saskatchewan, is studying the secretion systems used to transport bacterial protein toxins, such as enterotoxin and cholera toxin, which are some of the most potent poisons known, and are a major factor in human disease worldwide.

“In Saskatchewan, bacterial protein toxins threaten food and water safety, and negatively impact human health” says Dr. Vanderlinde. “Toxins are actively secreted by bacteria into their human hosts and can cause illness and even death.”

Dr. Vanderlinde is studying how bacteria transport toxins into human hosts by developing a model of how the individual proteins assemble into a functional secretion complex. “Using biochemical and genetic approaches to purify the individual components,” she says, “I can then



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determine the conditions required to reassemble them.”

By targeting the secretion systems – instead of the bugs themselves – Dr. Vanderlinde believes she can offer an alternative antimicrobial therapy. Think of it in terms of a car-chase movie – when the heroine can’t get a clear shot at the villain, she shoots out his tires instead.

It’s hard to imagine a world without antibiotics. But when the time comes, it will be alternative therapies like the one being developed by Dr.

Vanderlinde and her supervisor Dr. Peter Howard that will contribute to the next generation of antimicrobial drugs, therapies and treatments to combat the infectious diseases that threaten human health. 

An argument that holds water

Pretty well everyone can tell you that you should drink at least eight glasses of water every day to stay healthy. But how many people can tell you exactly what you're getting in those eight glasses? How can you be sure there isn't an odd bacterium or parasite sneaking through?

It depends largely on where your drinking water comes from. If you're in Saskatoon or Regina, you can turn on the nearest tap and know that you're getting safe, drinkable water. If you're in rural Saskatchewan, you can't be so sure.

Water that comes directly from nature, either from underground sources such as aquifers, or from surface waters such as lakes and rivers, is rarely pure. As it travels, it picks up bits and pieces of all kinds of debris, including minerals, silt, vegetation, fertilizers and agricultural run-off.



Even in relatively pristine areas, water in its natural state will likely require some type of treatment before it's safe to drink. At the least, it should be tested to identify any chemical or microbiological problems. That's why emergency boil-water orders aren't uncommon in Canada. They're often issued for small communities that don't have extensive water-treatment facilities.

Local health regions issue the orders, in consultation with Saskatchewan Environment, when a threat to public health from contaminated water exists. At the time of writing, there were 240 emergency boil-water orders in Saskatchewan.

In Canada, about 90 people die every year from drinking contaminated water. Many more suffer from health problems due to contamination. This is unacceptable, according to Dr. Cheryl Waldner, an epidemiologist who is a joint faculty member at the University of Saskatchewan School of Public Health and the Western College of Veterinary Medicine. "Safe, clean water is vital for public health and

should be available to all people across Saskatchewan," she says, "whether they live in a big city, small town, an acreage or farm, or the most remote parts of the province."

Dr. Waldner co-leads the Safe Water Health Research Team (SWHRT) at the University of Saskatchewan with Dr. Lalita Bharadwaj, a toxicologist from the University of Saskatchewan's School of Public Health. The goal of the team is to help develop sustainable water management strategies that promote the health of Indigenous, rural and remote populations, regionally and globally.

"We take water for granted and we shouldn't," says Dr. Bharadwaj. "For many of us, that kitchen faucet must be viewed with suspicion as a possible source of disease."

"Much of the published research on water and health has been conducted in urban environments," says Dr. Waldner. "There are a lot of people in this province who don't have the luxury of turning on the tap for a safe, clean drink of water. Many families that rely on private wells or

Dr. Lalita Bharadwaj (left)

Toxicologist and Associate Professor from the University of Saskatchewan's School of Public Health

Dr. Cheryl Waldner (right)

Epidemiologist and Professor at the University of Saskatchewan School of Public Health and the Western College of Veterinary Medicine

WATER THAT COMES DIRECTLY FROM NATURE, EITHER FROM UNDERGROUND SOURCES SUCH AS AQUIFERS, OR FROM SURFACE WATERS SUCH AS LAKES AND RIVERS, IS RARELY PURE.



cisterns have to treat or buy water for drinking and cooking, sometimes even for washing.”

Through their research, the pair hopes to raise awareness about the importance of regular water testing to ensure the safety of water from private water sources such as wells and cisterns. “There are many families in this province with private water supplies whose water isn’t tested unless they collect and submit their own samples,” says Waldner. “It’s important to test on a regular schedule as water safety can change over time.”

Provincial water regulations do not apply to First Nation communities on reserves. The responsibility for drinking water is shared by departments within the federal government, along with the Chief and Council of the First Nation who also oversee operations, training, maintenance and monitoring. As a result, uncertainties, inconsistencies and failed systems are frequent.

SWHRT works with the communities to gather baseline information on important issues related to drinking water access and safety.

“As a collaborative team, we identify the barriers to achieving effective regulation of First Nations water,” says Dr. Bharadwaj. “We also explore how the challenges identified impact the well-being of First Nations and their communities.”

The team recently conducted a survey of nearly a quarter of the rural municipalities in Saskatchewan that looked at the perceptions, concerns and practices around

drinking water. The information provided by participants is being used to guide the next steps in understanding the link between water quality and health in Saskatchewan. “It’s not about identifying that there is a problem,” says Dr. Waldner, who spent 10 years working as an environmental consultant. “We’ve actually brought the people together who have the tools and the skills to work on the solutions.”

One of the secrets of the team’s success is their emphasis on the importance of participatory research, directly involving the community in the work from the beginning of the project. Community members are involved in gathering information through helping with surveys, interviews and focus groups. That information is reviewed by a diverse group of experts in microbiology, epidemiology, environmental toxicology, public health, veterinary medicine, environmental assessment and resource management, as well as community partners.

The approach fosters more public interest in the project and ensures the research is relevant to the needs of the community. “A huge goal from our perspective is working with the communities to build local water management capacity and develop strategies to inform governments and regulators of the issues,” says Dr. Bharadwaj. “A lot of the issues are local in nature, and working with the communities lends itself to empowerment and provides voice and ownership over the issue.

The SWHRT team hopes that it won’t be long before people can raise a glass anywhere in the province with confidence that the water is not only cool and clear, but pure too. 

A scene from the play of life

The first character in our play is Brian. He's a 24-year-old male who was shot in a hunting accident. He was airlifted from the accident site to the nearest hospital in Saskatoon, but even during the agonizing helicopter ride, his parents could tell that it would take him years to recover, if ever.

The second character is Mary, a kindly 72-year-old grandmother of four who has suffered from osteoarthritis for several years. At first, her joints were stiff and sore for only 15 or 20 minutes after rising every morning. As time passed, the pain and discomfort lasted longer and got worse. Today, every movement takes incredible effort.

William is our third character. At 57 years old, he's suffered a stroke in his brain stem as a result of a blood clot. Had the blood flow been restored sooner, his chances for





recovery would have been much better. Instead, he now has locked-in syndrome, a condition where he can move only his eyes.

While Brian suffered a sudden trauma, Mary is feeling the effects of aging and William is coping with the sudden rupture of blood vessels in his brain. What could these three people possibly have in common?

They are among the millions of people who would benefit from the biomaterial scaffolds that are being developed by Dr. Daniel Chen and the Tissue Engineering Research Group at the University of Saskatchewan.

The conventional treatment approach for Brian involves surgically realigning his nerve endings. For Mary, doctors recommend replacing her afflicted joints with prosthetic implants of steel or other artificial materials. And for William, treatment protocols include something called endovascular treatment by selective cloning. While all these treatments have met with varying levels of success, it's very rare for a patient to completely regain function.

Instead of pursuing the traditional approaches, Dr. Chen and his team are working to develop implantable scaffolds to improve the repair of both nerves and joint cartilage. Think of the scaffolds as little bridges. They serve to guide healing cells, helping them find their way across

damaged areas of nerves and joint cartilage. At the same time as they are promoting axon growth across the injury site, they are actually degrading gradually themselves.

These biodegradable scaffolds show promise for peripheral nerve repair, cartilage repair and stroke treatment. "We believe significant advances in these techniques can be made by engineering biodegradable scaffolds with carefully controlled microstructure and microscopic arrangements of bioactive agents," says Dr. Chen. "To this end, our group will develop novel methods to advance the theoretical and practical basis of producing biodegradable scaffolds for the various applications." The advanced scaffolds will be tested first for their ability to promote tissue regeneration in culture dishes, then in animal models.

The team is building on research done in the first phase of the project, where they discovered that it was feasible to manipulate living cells using a bio-manufacturing system. In phase two, they are working to manufacture scaffolds with living cells and growth factors built right in. The scaffolds will help new tissue regenerate while gradually degrading themselves and disappearing once their job is done.

"Our goal is to develop living cell scaffolds for use in nerve and cartilage tissue engineering," says Dr.

Chen. "If we achieve success in the animal models, we will be able to use these scaffolds for the repair of human nerves."

The team also hopes to develop a synchrotron-based medical imaging technique that could be used to monitor the success of scaffolds in promoting nerve and joint cartilage repair in humans.

The near-term goal is to help those living with peripheral nerve injuries and to help heal the cartilage damage associated with osteoarthritis. Over the longer term, Dr. Chen believes biomaterial scaffolds offer a means to improve the repair of spinal cord injuries. The knowledge and technologies generated through this research may thus find other applications in bone repair and repair of spinal cord injuries, offering new hope to those living with paralysis.

Since Brian, Mary and William are fictional characters in our unwritten play of life, they will never actually experience the relief that the scaffolds can provide. It is reassuring to know, however, that the millions of people like our characters, who suffer from the debilitating effects of peripheral nerve or spinal cord injuries, the constant pain of osteoarthritis, or the ravages of stroke, may now look forward to a more effective, revolutionary treatment. 

DR. CHEN AND HIS TEAM ARE WORKING TO DEVELOP IMPLANTABLE SCAFFOLDS TO IMPROVE THE REPAIR OF BOTH NERVES AND JOINT CARTILAGE.



Dr. Daniel Chen

Mechanical Engineer and Professor in the Department of Mechanical Engineering and Division of Biomedical Engineering at the University of Saskatchewan (pictured seated centre with tie) and the Tissue Engineering Research Group



Dr. Terra Arnason

Endocrinologist and Associate Professor in Medicine at the University of Saskatchewan

How our metabolism impacts our health

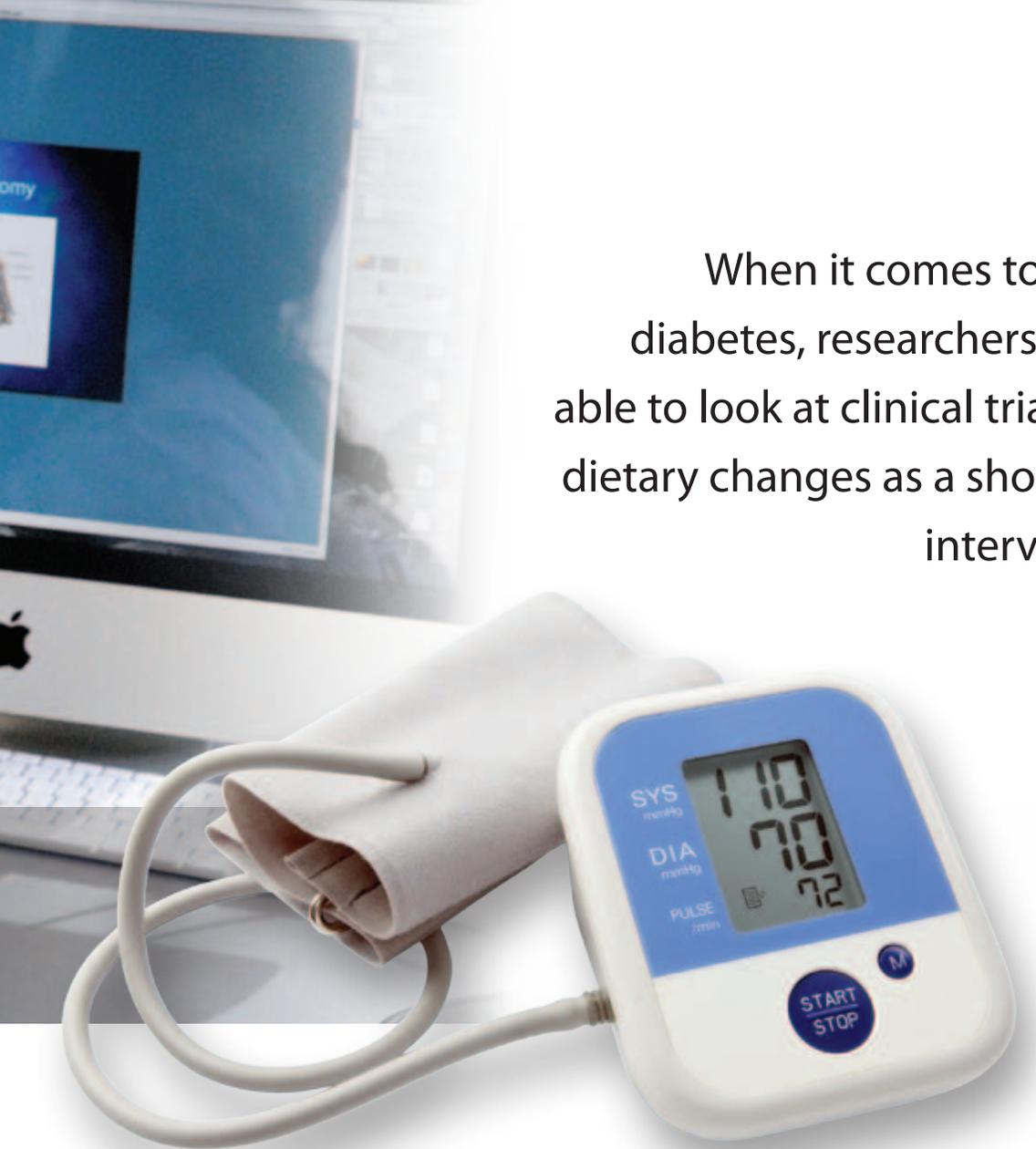
In an age when diabetes and obesity appear to be epidemic, endocrinologists are at a premium. Dr. Terra Arnason's addition to the University of Saskatchewan in 2007 not only added an important specialist to the health needs of Saskatchewan patients, it added a researcher with an interest and commitment to some very challenging health problems.

The recipient of an establishment grant and an equipment grant shortly after arriving, Arnason focused her research efforts on how an inefficient metabolism can contribute to development of metabolic syndrome, a disorder that increases a person's risk of type 2 diabetes and obesity.

Metabolic syndrome isn't widely understood. That may stem from the fact that it is a combination of medical disorders that may include obesity, elevated triglycerides, low HDL cholesterol, high blood pressure, and high blood sugar. Organizations as diverse as the World Health

Organization, Canadian Diabetes Association, and the American Heart Association all use slightly different combinations of definitions of these factors and their contribution to defining "metabolic syndrome". What everyone does agree on, however, is that, in combination, these factors increase the risk of developing cardiovascular diseases and diabetes.

Metabolic syndrome appears to be caused in part by improper regulation of an enzyme called AMP-activated protein kinase, or AMPK. Activating this enzyme with prescription drugs or exercise corrects many of the problems associated with the disorder. Arnason's research looked at studying the role of a small protein called ubiquitin in regulating yeast AMPK because yeast and human AMPK behave similarly. She believes that a better understanding of how the enzyme is regulated and how this control is lost in metabolic syndrome may suggest ways to manipulate the process to improve metabolism in people.



When it comes to type 2 diabetes, researchers will be able to look at clinical trials with dietary changes as a short-term intervention.

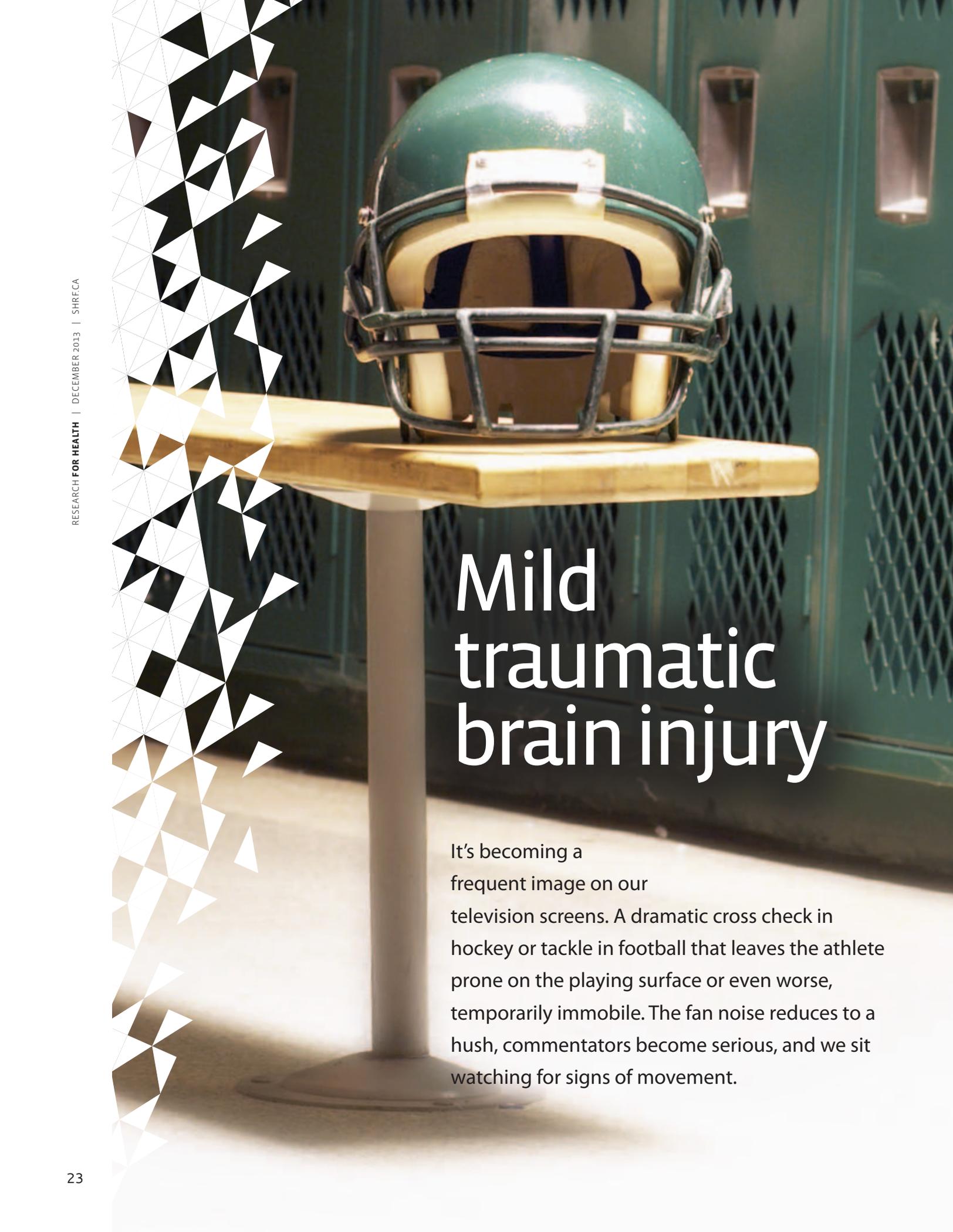
“Yes, ubiquitin is involved,” states Arnason. “We had really interesting findings and by mimicking feasting and fasting in yeast, we were able to turn AMPK on or off, and look specifically at how ubiquitin affects the efficiency of that switch. By using yeast as a model system, we in essence remove the endocrine system out of the equation, thereby reducing the complexity of the problem, which allowed us to focus on the actual activity of ubiquitin.”

As Arnason points out, the challenge is now to extend what they learned to human patients. Early research using human liver cells is now underway and “appears to demonstrate that the ubiquitin enzyme acts the same way in humans.”

What does this all mean?

When it comes to type 2 diabetes, researchers may be able to look at clinical trials with dietary changes as a short-term intervention. Putting people on a very strict diet in two week blocks of feasting and fasting may allow some patients to avoid insulin injections altogether.

Arnason believes our metabolism may hold the key for future diabetes regulation. As the impact on the health system appears to be increasing from diabetes and obesity, improving our insight into the management of these diseases would be welcome news to many patients and care givers. 



Mild traumatic brain injury

It's becoming a frequent image on our television screens. A dramatic cross check in hockey or tackle in football that leaves the athlete prone on the playing surface or even worse, temporarily immobile. The fan noise reduces to a hush, commentators become serious, and we sit watching for signs of movement.

Whether it's little league football, professional hockey, amateur cycling, or children tobogganing, concussions have grabbed media attention.

A concussion is a common injury, but since they cannot be seen on X-rays or CT scans, they have been difficult to fully investigate and understand. Fortunately, there have been many important advances in our knowledge of concussions, including how to identify, manage, and recover from a concussion.

Although concussions can go by the name "mild traumatic brain injuries" and often resolve uneventfully, all concussions have the potential for serious and long-lasting symptoms and so must be treated carefully and in consultation with a physician.

We're lucky in Saskatchewan to have had research underway for a number of years into the impact of concussions and mild traumatic brain injuries. For Patrick Neary, who received a SHRF Establishment Grant in 2007, it's been a focus area of research. Some people who suffer a concussion (also known as a mild traumatic brain injury, or mTBI) experience lingering problems, including depression and anxiety, severe fatigue, and even post-traumatic disorder. They often need to take time off from work and require considerable support from the health care system. Neary continues to study what happens in the brain of athletes who have been concussed especially since these individuals are particularly motivated to return to action in their chosen sport. He is also funded by the Canadian Institutes of Health Research to investigate the pathophysiological affects of mild traumatic brain injury from sport-induced concussions.



Dr. J. Patrick Neary
Exercise Physiologist and
Professor in Kinesiology
and Health Studies at the
University of Regina, and
Executive Director of the
Dr. Paul Schwann Applied
Health and Research Centre

SOME PEOPLE WHO SUFFER A CONCUSSION EXPERIENCE LINGERING PROBLEMS, INCLUDING DEPRESSION AND ANXIETY, SEVERE FATIGUE, AND EVEN POST TRAUMATIC DISORDER.

As part of his research with athletes, Dr. Neary developed two small exercises to help him identify signs of a concussion. First he asks athletes to hold their breath for 20 seconds, then to breathe normally for 40 seconds, and to repeat the exercise five times. In healthy individuals, this results in significant increase in blood flow to the brain, but doesn't do the same in concussed athletes.

Like the first exercise, in the second, he asks the athlete to hyperventilate for 20 seconds. This usually decreases blood flow to the brain, but in a more dramatic fashion in someone who is concussed.

These exercises aren't for use at the rink or soccer pitch though – they are research tools only. In addition to exercise techniques, Dr. Neary has also been using special

diagnostic research equipment to explore how the brain responds both physiologically (as measured by blood flow, heart rate, blood pressure, and how much oxygen the brain uses) and psychologically, during mild to moderate exercise after mTBI.

Dr. Neary has been putting his knowledge and interest in mild traumatic brain injury to good use. He has worked with the Canadian Olympic men's ice hockey team and professional hockey teams, including the Edmonton Oilers and the Los Angeles Kings.

To date, his research has resulted in information which may assist in the development of better treatment guidelines for, and reduced health care costs incurred by, people with mild traumatic brain injury. With more focus on concussions in sports, there continues to be considerable interest in this area of research. [↗](#)



When it comes to stroke, seconds count

Go to any family or public event in Saskatchewan and ask one simple question: "Has anyone you know had a stroke?" Odds are the answer will be yes. Everyone knows someone who has or is suffering from this condition.

Dr. Michael Kelly

Neurosurgeon with the Saskatoon Health Region, Associate Professor of Surgery, Medicine at the University of Saskatchewan, and Saskatchewan Clinical Stroke Research Chair



There are a lot of sobering statistics to back this up. According to the Heart and Stroke Foundation of Canada, each year, 50,000 Canadians of all ages suffer a stroke and 14,000 die as a result, making stroke the number three killer in Canada. Stroke is also the leading cause of long-term disability, with 330,000 people in Canada living with its effects. Eighty per cent of strokes are ischemic which means blood flow to the brain is interrupted due to a blood clot. About 20 per cent of strokes are hemorrhagic or caused by uncontrolled bleeding in the brain. For every minute delay in treating a stroke, the average patient loses 1.9 million brain cells and 13.8 billion synapses. Each hour in which treatment does not occur, the brain loses as many neurons as it does in almost 3.6 years of normal aging.

When it comes to stroke, seconds count.

This is the world of Dr. Michael Kelly.

His credentials are impressive: Associate Professor of Neurosurgery, Medical Imaging, and Anatomy and Cell Biology at the University of Saskatchewan; Clinical Stroke Research Chair; and Founder and Director of the Saskatchewan Cerebrovascular Centre also at the University of Saskatchewan. Stanford educated, Dr. Kelly has strong Saskatchewan roots.

Born in Saskatchewan, Dr. Kelly was raised on a grain farm outside Gray, 40 kilometres south of Regina. In interviews, Dr. Kelly has stated his upbringing in rural Saskatchewan really inspired two critical aspects of his work:

teamwork, and the fact that Saskatchewan people are deeply rooted to their home province. Both have directed Kelly's actions ever since.

To succeed at farming you have to be self-motivated and committed to learning how to get things done yourself. As a neurosurgery resident at the University of Saskatchewan, Dr. Kelly wondered why patients with ruptured brain aneurysms and other life-threatening vascular brain problems were sent to Alberta or Ontario for emergency care.

PATIENTS IN NEED OF EMERGENCY BRAIN SURGERY IN SASKATCHEWAN CAN NOW STAY IN SASKATCHEWAN

"A ruptured brain aneurysm is scary enough. When you're told that your relative is going to be flown out of the province and you've got to drive there to be with them, it's difficult," says Kelly. "Then I thought that's what I could do with additional training."

When Dr. Kelly returned in 2008 he founded the Saskatchewan Cerebrovascular Centre. Despite predictions that he wouldn't succeed, he forged ahead to unite a multidisciplinary team of nurse coordinators, neurologists, neuroradiologists and neurosurgeons to treat critically ill patients in the province.

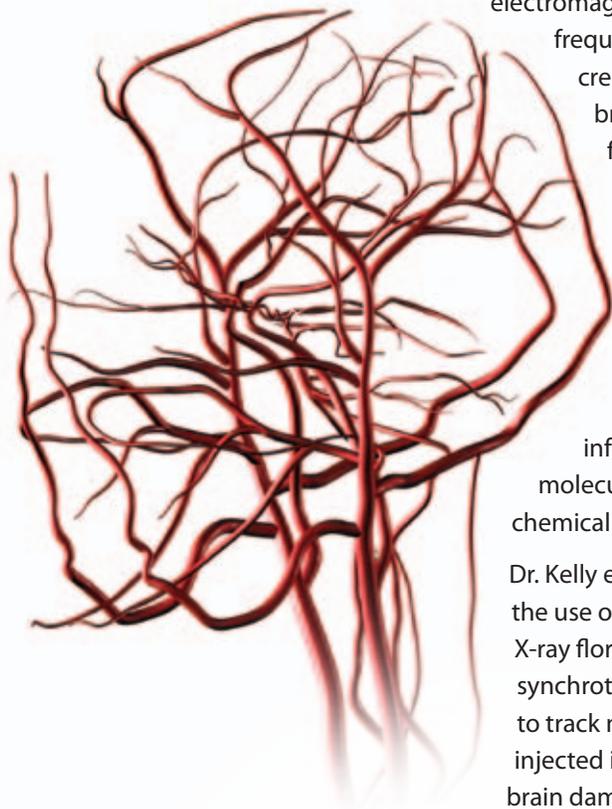
Thanks to his efforts, patients in need of emergency brain surgery in Saskatchewan can now stay in Saskatchewan.

Since the Centre's inception, he has discovered that the program has other benefits. "We're not only operating on patients who would have been sent out of province on an emergency basis, but we're able to diagnose people who previously wouldn't be caught or treated."

In 2012, he was awarded the Saskatchewan Research Chair in Clinical Stroke Research to pursue his work as a neurosurgeon, stroke prevention advocate, and stroke researcher. The research chair integrates clinical care, basic science and clinical research, allowing Dr. Kelly to pursue his work in the operating room and at the Canadian Light Source synchrotron to advance understanding of strokes and improve prevention and treatment. The chair provides \$1 million over five years, jointly funded by SHRF and the Heart and Stroke Foundation. The University of Saskatchewan is providing an additional \$200,000 for equipment and personnel costs, as well as providing protected research time and salary. The Saskatoon Health Region is also contributing through additional access to equipment, facilities and personnel.

As Chair, Dr. Kelly has four goals: to maintain a world-class clinical program in cerebrovascular and endovascular neurosurgery; to help the centre to become a leading centre for clinical trials in stroke research; to improve stroke awareness; and to develop a robust basic science program to advance the understanding, prevention and treatment of stroke.

His basic research focuses on advanced biomedical imaging at



EACH HOUR IN WHICH TREATMENT DOES NOT OCCUR, THE BRAIN LOSES AS MANY NEURONS AS IT DOES IN ALMOST 3.6 YEARS OF NORMAL AGING.

the Canadian Light Source (CLS), Canada's national synchrotron research facility. A synchrotron accelerates electrons, by using electromagnets and radio frequency waves, to create a source of brilliant, highly focused light. With this tool, scientists use different wavelengths of light, such as infrared, ultraviolet or X-rays, to collect information about molecular structures and chemical properties.

Dr. Kelly experiments with the use of rapid scanning X-ray fluorescence (RSXF) synchrotron technology to track neural stem cells injected into the brain to treat brain damage.

At Stanford, he studied the use of RSXF in patients with Parkinson's disease. While there, he encountered a fellow scientist in search of ways to find out where neural stem cells migrate in the brain after transplantation. By tracking the cells, Dr. Kelly hopes to find ways to help improve their effectiveness in treating stroke and other brain injuries.

Dr. Kelly's current research, funded by a SHRF Establishment Grant in 2013, will image an array of elements and chemical groups using synchrotron, X-ray and ultraviolet light to understand stroke better and to test how new therapies affect the complex chemistry of the brain.

The development of innovative therapies, which are necessary to reduce the tremendous burden that stroke has on society will come through a better understanding of the chemistry and cellular mechanisms of stroke. When a patient has a stroke some of the involved brain does not immediately die. This so-called "penumbra region" potentially can be salvaged by preventing swelling and inflammation after stroke by instituting an effective treatment. Such treatments are not yet available and one of the goals of understanding how the brain responds to stroke is to identify therapeutic targets.

Synchrotron imaging enables us to understand stroke better at the elemental and chemical levels and test how new therapies affect this chemistry. In his research Dr. Kelly will image an array of elements (like calcium and iron) as well as chemical groups (like proteins, lipids, etc.). The study will use a minimally invasive mouse model of cerebral stroke for these experiments. Dr. Kelly, with his unique synchrotron training and cerebrovascular neurosurgery expertise, is uniquely positioned to conduct this research and translate his findings into clinical trials to address cardiovascular health.

So what does the future hold? In addition to the clinical and research activities that are now going on, raising awareness of stroke, new treatments, and new awareness of the early warning signs of stroke, Dr. Kelly's research commitment will help raise the profile of stroke throughout society - its symptoms, treatments, and long-term care. 

Valued Impact

How do you measure the value of health research?

Ask any number of people in a room whether they think health research is a valuable investment and they will probably say yes. It makes sense to conduct research into what makes us healthier. Research into cures or even into new treatments and drugs can take years. How do you then measure the investment you make every year into health research when the results don't often immediately show up?

It's a question that SHRF has been trying to address.

Working with other health research funding agencies and the Canadian Academy of Health Sciences (CAHS), SHRF has helped develop a framework that measures returns on investment in health research. The result is a model where the impacts of health research can be tracked using indicators in five interconnected categories (see illustration):

- **Capacity Building.** This represents the people, additional research activity funding and infrastructure of health research;

- **Advancing Knowledge.** This is the research quality, activity, and outreach that occurs;
- **Informing Decision-Making .** What are the pathways that lead from research to health outcomes?;
- **Health Impacts.** This category includes health status, the determinants of health, and changes to the health system; and
- **Broad Impacts and Social Impact.** What are the activities, commercialization, health benefits, and social benefits that have accrued thanks to the research conducted?

So, in a nutshell, this framework works through how capacity in research produces knowledge that can influence decision-making to result in improvements to our health care, health, and economic and social well-being. Then of course, all this information provides feedback into future research projects.

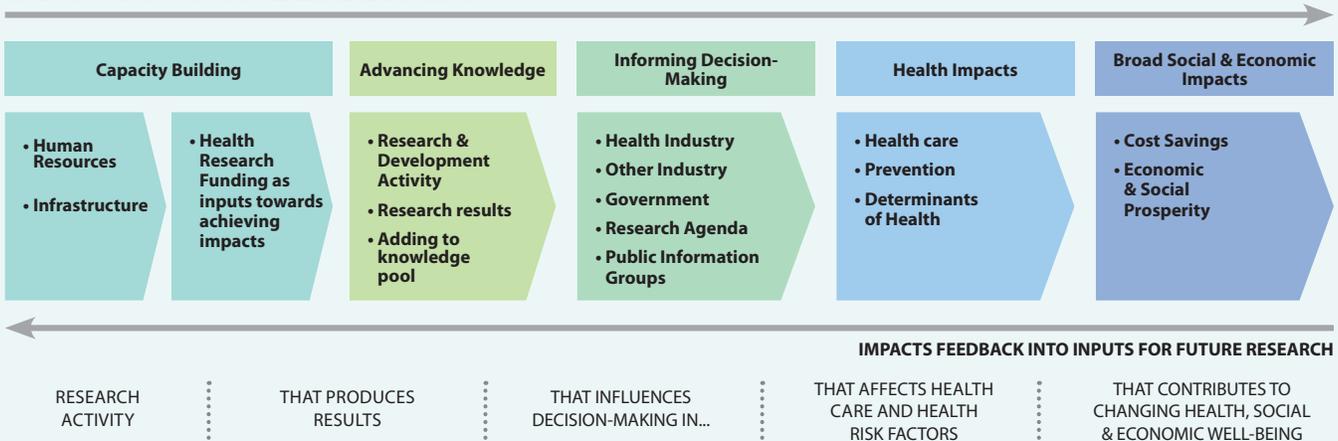
This model is a valuable method to encourage thinking around health research return on investment, but innovation remains a slow, patient process. Creating a body of knowledge resulting from health research, and then allowing the skill of innovators to turn that knowledge into usable products and services takes time.

SHRF collects information on a number of indicators in an attempt to use this model to demonstrate the benefits of investing in health research. We work on measuring the strengths and capacity of our research environment, the productivity, outreach, and outcomes of the excellent research we fund, and how the health research enterprise is making a difference on the health and well-being, and economic and social prosperity of Saskatchewan people.

Impact isn't just about numbers. The value of health research is measured true by our healthier lives. 🏡

Canadian Academy of Health Science Framework

INITIATION AND DIFFUSION OF HEALTH RESEARCH IMPACTS



Adapted from the Canadian Academy of Health Sciences *Making an Impact: A Preferred Framework and Indicators to Measure Returns on Investment in Health Research* (2009) and the National Alliance of Health Research Organizations (2013) Econometrics Project completed by Science Matrix.

When the stress of health care takes its toll

“Health care has changed over the last 20 years,” says Dr. Sonia Udod. “We are in an era of larger patient loads, sicker patients, budget strain, and facilities that are stretched thin. Today’s nurse manager doesn’t have the responsibility of just managing a nursing unit anymore, but now has an organization and administrative responsibility.”

A Registered Nurse herself, Dr. Udod is investigating the areas of stress and the coping mechanisms of nurse managers in acute care facilities in Saskatchewan and Alberta.

"It's research that has not been done in this area, even though it's a situation that the system is aware of," says the University of Saskatchewan College of Nursing Assistant Professor and recent SHRF Establishment Grant recipient.

So what does a typical nurse manager's day look like?

According to interviews with a number of nurse managers in Saskatoon, the fast-paced, multitasking role of a nurse manager doesn't always translate to a "typical" day. It can include the day-to-day nursing practice on patient care units but also supervisory responsibilities of a staff that may include registered nurses, licensed practical nurses, patient care assistants, and unit clerks. The nurse manager deals with concerns from patients and their families and represents the patient care unit or the nursing discipline on various committees.

A "typical" day quickly gets eaten up with tasks like coordinating schedules; conducting performance evaluations, interviewing and hiring; overseeing the unit budget; communicating and educating staff on policies and practice; and participating with policy, procedure, and practice developments.

"Today's nurse manager must have the ability to communicate

effectively in many different settings," adds Udod. "Leadership skills are essential as well as the ability to analyze a problem and make appropriate decisions."

The pressure of the role compounds. As a nurse manager becomes utilized more for leadership and administrative requirements, they are often less frequently on the nursing unit.

When the nurse manager is taken away from the unit, less experienced nurses and new nurses are left with a huge workload. Quickly, a nurse manager, who primarily has come into the job with clinical and patient care experience, is now in a role that requires significant management skills.

In this complex health care environment the need for work-life balance requires unique approaches to create and maintain healthy work environments for nurse managers and their staff. That's where Dr. Udod's research question is focused: What are the nurse manager stressors and coping strategies in acute care facilities to help create healthy work environments for managers?

"Investigating nurse managers' stress and how they cope will help develop a better understanding of managers' mental and physical health," she explains. "A manager's health affects managerial performance and also influences their willingness to stay in their position. Understanding the stress that a nurse manager is under is very important for designing support systems that lead to positive

**A NURSE MANAGER,
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Dr. Sonia Udod

Registered Nurse and
Assistant Professor of
Nursing, University of
Saskatchewan

**HEALTH CARE DELIVERY
IS A PARTNERSHIP –
ABOUT ALL THE PARTS
WORKING TOGETHER.**

staff experiences in the workplace, and for positive patient outcomes - both of which are high priorities for Saskatchewan's health care system."

Dr. Udod's study aims to improve the overall satisfaction of nurse managers and increase retention by sharing successful coping strategies. She expects to tackle that goal through a series of knowledge translation efforts at the end of her research project. Once she identifies indicators of how successful managers cope, a number of workshops will be delivered in each of the health care regions where the research is taking place – Saskatoon, North Battleford, and in Edmonton, Alberta. Since her research will touch on acute facilities in both large centres and rural ones, she expects to provide study participants, their managers, and their facilities with some valuable feedback.

"The results will be shared widely," says Dr. Udod. "Health care delivery is a partnership – about all the parts working together. Research has already shown that a stronger line of support from the leadership of organizations equals better patient care, so we hope to help provide some insight."

Dr. Udod has had many opportunities to speak with nurse managers first hand but prior to developing her research request, one conversation remains poignant.

"I remember talking with one nurse manager in an acute facility and asked her what it was like being a nurse manager on her unit," describes Udod. "She began to cry." After a pause, she adds, "That's a strong reason to undertake this research." 

Communication in western and traditional Chinese medicine

Richard Smith (patient name changed upon request) had been struggling with chronic pain for years and wasn't finding any relief from his family general practitioner. "I went to see a Chinese medical practitioner kind of as a last resort," he explains. "What did I have to lose? I had chronic pain in my hand due to psoriatic arthritis and in a shoulder from an injury. Nothing seemed to work."

Over a period of a few months, through acupuncture and herbal treatments, and with consultation with his family doctor, Smith's pain decreased and the swelling and inflammation was considerably reduced.

"What I really noticed was the amount of questions and time the Chinese medicine doctor took with me," says Smith. "And I took that back to my own doctor, who also started asking more questions and taking more time with me. I really felt that the experience of having the two doctors kind of working together was finally what helped me feel better."

The mix of traditional Chinese medicine with western medicine is becoming more frequent. But the interesting part of this example was that Smith wasn't Chinese, yet still sought out a blend of treatment.

From a health research perspective it raises an interesting question: non-Chinese inclusion of traditional medicine is on an individual basis, but how do the large population of



IN CHINA, THE TWO SYSTEMS OF HEALTH HAVE OFFICIALLY CO-EXISTED FOR DECADES.



Chinese immigrants, who have relied upon traditional Chinese medicine, adapt and deal with the more predominant western medicine tradition in Saskatchewan?

For Dr. Yixi Lu from the College of Nursing at the University of Saskatchewan, that's at the root of her current SHRF funded Postdoctoral Fellowship working with Dr. Louise Racine.

"How does Chinese traditional medicine and/or western medicine affect illness management and communication with health care providers for Chinese immigrants in Saskatchewan?" says Lu. "In China, the two systems of health have officially co-existed for decades. Combinations of both systems have been developed in a number of public health services and Chinese patients and doctors understand that these two systems can work together for a patient's health."

As Lu explains, Chinese immigrants have become one of the largest foreign-born visible minorities in Canada. In Saskatchewan, the Chinese population from mainland China has increased significantly. "So it is important for Saskatchewan health care providers to be informed about these immigrants' unique health care experiences and practices," says Lu.

Chinese immigrants' health experiences include the use of Chinese traditional medicine. "There are, however, social and cultural barriers that heavily influence their communication with their physicians," Lu adds. "Although these issues have been studied before, how the choice of Chinese traditional medicine and/or western

medicine interacts with their illness management and communication with health care providers has not been explored."

Lu's study aims to develop a theoretical framework to explain the decision-making processes mainland Chinese immigrants use to select traditional and/or western medicine therapies for illness management. She will be undertaking in-depth interviews with patients and practitioners in order to develop a model around the negotiated decision-making process among Chinese patients, Chinese traditional medicine practitioners and western medicine practitioners, and its impact on the patients' perceived health outcomes.

Traditional Chinese medicine is really a broad range of medicine practices sharing common concepts developed on a tradition of more than 2,000 years. They include various forms of herbal medicine, acupuncture, massage, exercise, and diet therapy.

"In traditional Chinese medicine, Chinese patients expect to talk more to their doctors and expect their doctors to ask lots of questions, especially about symptoms," explains Lu. But the answers to these questions are often not what a western doctor would expect.

Chinese patients – especially older patients – describe their symptoms as "hot" or "cold" and an imbalance between the two is said to increase susceptibility to sickness or to directly cause disease itself. Such an imbalance is not necessarily related to a subjective feeling of being hot (like sweating) or cold (like shivering). To a traditional Chinese doctor these explanations guide the line of questioning about symptoms



and connect to disease and health status, but in western medicine, their subtle meanings can get lost. And yet hot versus cold (or yin vs. yang) are the two most important oppositions in traditional Chinese medicine and critical to prescribing medicine, lifestyle changes, diet, therapies, and/or exercises.

According to Lu, how Chinese immigrants perceive health services here and how they manage to balance traditional with western medicine is a critical success factor in their health and that of the health system.

"I hope my study will contribute knowledge to a discussion of the negotiation of the professional boundaries between western

medicine and traditional Chinese medicine," explains Lu. "And I hope to provide knowledge that helps sensitize western health providers to traditional medicine and related alternative healing practices."

Lu's findings will have implications in the management of chronic diseases and cancer among a minority cultural group, and will help health care professionals design relevant health promotion programs and culturally responsive care.

Effective medicine is about effective communication. Whether it is traditional or western medicine, the implementation of new or better ways to communicate and understand a patients' health state creates a stronger health system. 

Dr. Yixi Lu (left)

**Postdoctoral Research Fellow
in the College of Nursing,
University of Saskatchewan with
her supervisor Dr. Louise Racine**

People and Places



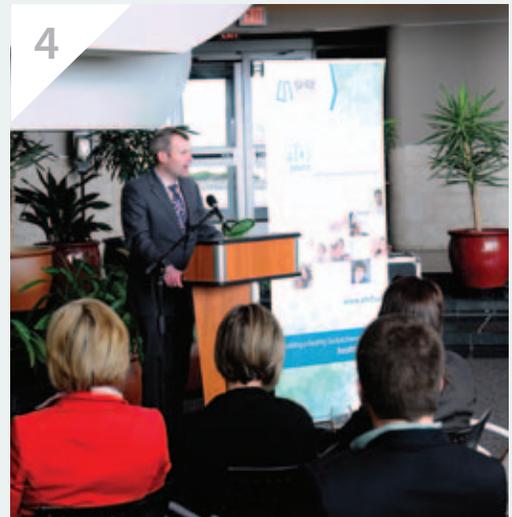
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1. Dr. Adam Baxter-Jones, Acting Dean of Graduate Studies at the University of Saskatchewan, and his family celebrate being awarded the 2012 SHRF Achievement Award.

2. Every year at Santé! Awards Evening, the research community gathers to celebrate the successes of Saskatchewan's health research enterprise

3. In October of 2013, over 100 researchers, students and community partners shared their knowledge and experiences at the first ever SHRF facilitated Community Engagement Workshop in Saskatoon.

4. In June, the Hon. Dustin Duncan, Saskatchewan Minister of Health, brought congratulatory comments when SHRF released its *Measuring the Value of Saskatchewan's Health Research* report in Regina.

5. The Indigenous Peoples' Health Research Centre's Phase III SHRF Health Research Group Grant led by Jo-Ann Episkewew, is announced at the University of Regina in April, 2013

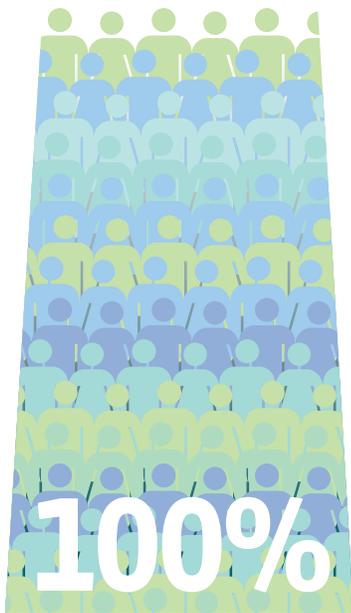


5

Health Research **by the numbers**

\$50m

invested 2003–2013⁽⁴⁾



percentage of SHRF establishment grant holders from 2007–08 still in Saskatchewan five years later⁽²⁾

3

number of Research Chairs currently funded⁽³⁾



600

grants awarded 2003–2013⁽⁴⁾

\$4.5m

invested in synchrotron research at Canada's Light Source 2004–13⁽³⁾

the amount of dollars SHRF-funded researchers have received from other funding agencies between 2005–06 and 2010–11⁽¹⁾

\$ 103.8m

Sources:

1. Health Research Capacity in Saskatchewan: A Descriptive Report, 2nd Edition (2012), SHRF 2. SHRF Five-year Follow-up Study (2012) 3. SHRF website 4. SHRF 2012-13 Annual Report (2013)

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