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The PRBIS Brainscan

A Powell River Brain Injury Society publication

News around the office:

Melissa Tookey was recently hired as society librarian. An ecstatic Melissa had this to say, "Yay." Her hard work is already visible; the library shelves are clean and organized. Melissa is currently working on a cataloguing of every book, magazine, and booklet. There are more matters of organization that she will implement in the future but for now we all commend Melissa for her hard work. (more on page 2)

Josh Friesen was appointed society communications-guy. He had nothing to say because no one asked for his thoughts on the matter. The newsletter you are reading was put together by his skilled desktop publishing hand. Look for new things in the coming weeks and months. Congrats to Josh. (more on page 2)

Merry Christmas Roger Whitaker and Jena Lohrbach

At 8:53am on December 25, 2010 Bonnie Grace Holly Whitaker was born. The happy couple left the hospital with a healthy seven pound seven ounce girl.





The Jewelry Counter

By; Melissa Tookey

Hello! I am Melissa and this is the Jewelry Counter.

I have to downsize my bead collection quite a bit so I will be going through them and picking out the stuff that I no longer want or need. If you are interested in making something please come and see me and I will hook you up with some nice shiny beads. I haven't been up to much beading as of late. I lost the groove for a while, but I am back and have some awesome new ideas.

CALENDAR OF EVENTS

**Thursdays
10-11am
workout at
Rec Center**



Government of Canada helps people with disabilities in Powell River develop job skills

Powell River, British Columbia, January 28, 2011-People with disabilities will get work experience through the Government of Canada's support for an employment project. Mr. John Weston, Member of Parliament for West Vancouver-Sunshine Coast-Sea to Sky Country, made the announcement today on behalf of the Honorable Diane Finlay, Minister of Human Resources and Skills Development.

"In today's environment, it is more important than ever that all Canadians have the skills they need to participate and succeed in the job market," said Mr. Weston, "By supporting this project, our government is helping Canadians with disabilities maximize their potential independence."

With assistance from the federal Opportunities Fund for Persons with Disabilities, the Powell River Brain Injury Society will provide two people with disabilities with job placements designed to suit their abilities. One participant will work as a newsletter editor, and the other as a library assistant. The participants will gain hands-on experience to help them prepare for lasting employment.

The Powell River Brain Injury Society will receive \$16, 002 under the Work Experience component of the Opportunities Fund.

(as quoted in Human Resources and Skills Development Canada news release)



Canada World Youth

Powell River Brain Injury Society is participating in the Canada World Youth exchange; Ana Maria of Villavicencio, Columbia and Cahn Lam Duc of Hoa Binh, Vietnam join the group very Monday, Wednesday, and Friday every week. They are both great young people to have around the office.

 (culled from Jan. 29, 2011 The Vancouver Sun)

The brain and behaviour: How nurturing influences our minds

Epigenetics could help scientists understand why stress drives some to suicide or illness

by **Hannah Hoag**

The brain arrives shortly after lunch. It rests on the lab bench, in a styrofoam box plastered with "Urgent Delivery" and "Fragile" stickers, while two research assistants prepare the dissection laboratory. One has tuned a small radio to a classical station. The sounds of bassoons and strings waft into the room. The opus is an allegro-upbeat and quick. The technicians glide around the room with practiced co-ordination. They are cloaked in knee-length blue plastic aprons, sleeves tucked into latex gloves. They tape absorbent mats to the bench tops and lay out scalpels and forceps.

Josee Prud'homme adjusts her face mask and eye shield, and nods to her colleague, Maamar Bouchouka. Bouchouka lifts the red biohazard bag from the box and slices it open with a scalpel.

"We're starting. It's 13:21," he says.

He pats the brain down with paper cloths and sets it on a white cutting board. It slouches a bit. The tissue has started to break down. The brain is pink and a little shiny. Dark red blood vessels snake through the deep wrinkles and folds of the cerebral cortex, like rivers through weathered canyons.

It's the brain of someone who took his life over the weekend, and was donated to the Quebec Brain Bank shortly thereafter.

"It's very emotional, each time we receive a brain at the bank. We don't get used to death," says Prud'homme. For 90 minutes, Bouchouka and Prud'homme will remove and freeze the brain's key structures. They'll separate the two hemispheres, preserving one in a rectangular clear plastic container filled with a formaldehyde solution, and cut the other into one-centimeter-thick slices, flash-frozen for storage at -80 C.

Now named -252, this brain has become a critical resource for scientists interested in the biological and environmental underpinnings of mental illness.

For scientists interested in the origins of disease, mental illnesses have been difficult to untangle. Researchers have rummaged through the genome looking for common genetic disruptions to explain the cause of these overwhelming conditions.

Some scientists assume they'll find the genetic roots of mental illnesses with more sophisticated technologies and approaches, and more powerful computers, says Arturas Petronis, a senior scientist in the Krembil Family Epigenetics Laboratory at the Centre for Addiction and Mental Health, and the Tapscott Chair in Schizophrenia Studies at the University of Toronto.

But genetics cannot explain all cases. Identical twins have nearly identical DNA, but if one twin develops schizophrenia, the other has only a 50-percent chance of the same outcome.

"There's another line of thinking that says, "There's probably something wrong with the paradigm," Petronis says.

"Maybe we've been barking up the wrong tree."

A growing cadre of scientists is finding that life experience can be chemically "painted" onto DNA, creating a genetic on/off switch. This type of genetic regulation is called epigenetics, "epi" meaning above.

Scientists have been studying epigenetics for years, but its application to the study of behaviour is relatively recent," says Barry Lester, a professor of psychiatry and pediatrics at Brown University's Center for the Study of children at Risk in Rhode Island.

The chemical traces of potent past experiences—such as famine or abuse—can change the way the brain works and may be a source of addictions, depression and other mental illnesses. In 2004, McGill University researchers Michael Meaney and Moshe Szyf showed in a widely cited study that a mother rat's nurturing could influence whether her pups were frazzled or relaxed as adults.

Meaney, a neurobiologist and clinical psychologist who splits his time between the Douglas Mental Health University Institute at McGill and the Singapore Institute for Clinical Sciences, has studied animal models of maternal care using the Long-Evans rat, which sports a dark hood of fur over its head and shoulders.

Mother rats will nurse, lick and groom their offspring during their first 21 days of life. Some are more attentive than others, which can change how the rats turn out.

"We spent eight hours a day watching these rats lick and groom their pups," Meaney says. "It's the ideal activity for long Canadian winters; it keeps your graduate students and post-docs off the streets."

Meaney's team found they could divide the young rats into two groups: the well-licked developed into calm, even-tempered creatures; the others were bundles of nerves that performed poorly on stress-tests.

To figure out why, the team measured the expression of a protein called the glucocorticoid receptor in the hippocampus, one of the brain structures involved in storing long-term memories, anxiety and depression, and placing events in place and time.

The hippocampi of the nurtured pups were awash with glucocorticoid receptors.

When the stress hormone cortisol activates the receptor, it dampens the stress response. More receptors mean a more modest response to stress.

Could maternal care change gene expression? Meaney turned to Szyf, a molecular biologist and cancer researcher who had long been interested in epigenetics, specifically in a process called DNA methylation. Painting methyl groups (a carbon atom and three hydrogens) onto specific parts of DNA silences nearby genes.

The group looked at the methylation patterns in the hippocampus and found the nurtured rats had lightly painted glucocorticoid receptor genes, whereas the others were slathered with the epigenetic mark.

Because the cell's protein-making machinery could more easily read the unadorned gene, it pumped out glucocorticoid receptors, muting the stress response.

What Meaney and Szyf had uncovered was most unorthodox. They had evidence that life experiences alter DNA, not by changing its sequence but by painting it and changing nearby gene expression.

"Rats are good animal models for studying human neurobiology, but eventually one must study the real thing.

Gustavo Turecki, a psychiatrist, neuroscientist and the director of the McGill Group for Suicide Studies, approached Meaney after hearing him speak at a meeting.

"I said, 'Michael, we have to do this in humans. We have everything we need,'" says Turecki, who is also the director of the Réseau Québécois de recherche sur le suicide and co-director of the Quebec Suicide Brain Bank (a division of the Quebec Brain Bank). The two worked a floor apart but had never collaborated on a research project.

Turecki had seen many patients who had experienced early traumatic events—neglect and abuse—that seemed to have triggered the onset of mental illness.

Patrick McGowan, a post-doctoral fellow in Meaney's lab, turned to the Quebec Suicide Brain Bank to translate the research from rats to humans. He withdrew 36 brain samples: 12 from men who had been abused as children and later had died by suicide, 12 from men who had no history of abuse but committed suicide, and for the control group, 12 samples of healthy brains from men who died of other causes.

The epigenetic marks on the glucocorticoid receptor gene in the human hippocampus closely matched what they had seen in the rodents. The glucocorticoid receptor gene on those who had been abused was rich with methyl groups. The results couldn't explain everything about abuse and suicide, but they offered proof of concept. "What we did was pretty cool," Meaney says. "It might take us somewhere that lets us understand why the genome operates differently in one individual versus another, and why environmental events might explain that."

In psychiatry, adaptation and vulnerability are linked. Meaney says. Someone who grows up in a "toxic environment," such as an abusive one, and adapts in the short term is vulnerable to developing a mental illness in the long term.

Methylation allows the genome to adapt—it's a molecular coping strategy. "For abused children, it sends the message that the world is harsh," Szyf says. "If you're raised in a highly adverse environment, being super-anxious and super-stressed is probably protective."

Many groups are now studying epigenetics, the brain and behaviour. At a meeting in Boston in October, scientists showed how epigenetics affects learning, memory, drug addiction, schizophrenia and other psychiatric disorders.

"There was a time when this idea—that an environmental signal could alter methylation of a gene—wasn't accepted,"

Meaney says. Yet by showing methylation changes at specific spots in the genome in response to fear conditioning, drug use or other scenarios, these groups are supporting this hypothesis.

Eric Nestler, a psychiatrist at Mount Sinai School of Medicine in New York City, has spent 25 years studying why stress and drug use lead some to develop depression and addiction, but not others.

Nestler has pinpointed epigenetic changes in the brain's reward centre—the nucleus accumbens—following recurrent drug use. His studies in rats show that chronic cocaine use strengthens the connections between brain cells, heightening the rush when the drug is taken again. It also launches a cascade of events, alternating methylation patterns and gene expression, and ultimately increasing the animal's stress response and depression.

Several animal studies, including those done by Nestler and Szyf, have found that some chemicals can alter the epigenetic marks, suggesting that, at least in theory, treatments that target these brush strokes could be developed.

Epigenetics—far better than genetics or environment alone—can help explain why the intensity of some diseases fluctuates, says Petronis of the University of Toronto. "Think about bipolar disorder, multiple sclerosis or psoriasis. There are periods when the affected individuals are perfectly normal, and then three months later they're very sick," he says. Because methylation is reversible, a gene's on/off switch can be altered over time.

"I trained as a geneticist. When I realized that there was this whole new world that we had basically been ignoring, I changed my religion. I started believing in epigenetics," Petronis says.

In a 2008 pilot project on the epigenetics of major psychiatric disease, Petronis identified epigenetic marks on the brains of people with schizophrenia.

Meaney, meanwhile, is deep into another study to understand the gene-environment collaboration.

The Maternal Adversity, Vulnerability and Neurodevelopment (MAVAN) project is tracking 500 women and their children to learn why some children stay healthy though they have impoverished and stressful childhoods.

Generally, kids who are cuddled less and have a weaker emotional bond with their mothers have a greater risk of developing learning difficulties or behaviour problems, and are more sensitive to stressful events. Seven years ago, Meaney's team began recruiting pregnant women living in Montreal and Hamilton, some of whom suffered from depression or lived in poverty.

Part of the project uses puzzles to test the kids' confidence and self-assurance.

Some are easy: others are rigged and impossible to complete.

After each test, the child is asked how well he thought he did, how well he thinks he'll do on the next puzzle, and how he feels about doing the next puzzle. Confidence tends to drop following failure. But whether it plummets or dips depends on two factors: genetics and maternal care.

A child with the short version of the gene that makes the serotonin transporter, a protein linked to emotion, is at greater risk for depression. But the short gene can't predict which children will be most upset by their performance. This also depends on the child's attachment to his mother. Those with the shorter gene generally avoid the emotional crash if they received nurturing care.

"It's only through the two-genes and environment-that you can understand it," Meaney says. "There are two points to this: one is the interdependence of gene and environment, and the other is that your genes don't make you sick. They make us more or less susceptible to environmental influences. It's a much more sophisticated way of thinking of what genes do."

Meaney's office is down the hall from the brain bank, where it's been a busy day. While working on S-252, the team received a telephone call. Another brain might soon be on its way. The donor is still alive. But Danielle Cecyre, the brain bank's coordinator, has been told that death is imminent.

In this case, the man decided nearly a decade ago to donate his brain at death. All the forms are signed and the copies are in the right places.

"The people who donate are people with hope. They hope that what we do here at the brain bank will change things," says Cecyre.

Hockey news by Jerry Francis

NHL

The Vancouver Canucks have come up with another win, shutting out the Phoenix Coyotes 6-0 on February 2 in Phoenix.

The Canucks remain tops in the league with the win (33-10-9).

Roberto Luongo logs another shut-out.

Rookie Cody Hogeson netted his first ever NHL goal.

Ryan Kessler continues his great play, as he reached the goal goal plateau. Thirteenth in overall points.

Daniel Sedin, #22, is only one point behind is one point behind for most points in the league.

Will Vancouver have any trades up their sleeve as the trading deadline nears?

POWELL RIVER KINGS HOCKEY

The Kings are also doing great this season. They are also on top of the standings.

TheKings have six prospects for the draft.

Go Kings Go!



Message from the Executive Director:

Welcome to the new edition of the newsletter. We are very pleased to bring this to you via our newest employee, Josh Friesen, working under the generous funding of Service Canada and the Opportunities Fund for Persons with Disabilities.

Josh and his counterpart Melissa Tookey will be working for 52 weeks gaining job experience and learning new skill sets that we expect will transfer to other arenas and opportunities in the future.

Josh and Melissa are not only our newest employees, they are also our clients and we are very excited to have found this opportunity for them to top up the provincial PWD pension to the maximum allowable while gaining valuable skills in the work place.

The Powell River Brain Injury Society is very busy and 2011 has started out very successful for us. We have three employees working through provincial and federal funding. Our website has been completely re-vamped and we are extremely happy with the way it turned out.

We have two exchange students from the Canada World Youth program, one from Vietnam and one from Quebec via Columbia. Look for their articles in this edition.

We are busy planning our third annual Brain Injury 101 – The Marathon to Awareness and this year especially excited to be taking this event International. Check out the website and see the map of the Pacific Coastal Highway all the way down to Chile. We expect that we will have representation for each country on the route.

Once again we would like to thank our generous funding agencies: Vancouver Coastal Health Authority, Community Brain Injury Supports, Powell River and District United Way and Gaming Policy and Enforcement Community Gaming Grants.

We have several fundraising events in the planning stages for 2011 and we are trying very hard to raise funds so we can make a presentation from the Art Group to the International Congress on Acquired Brain Injury in March 2012 in Edinburgh, Scotland.

We will be having a presence once again at the 2nd Safety Symposium, organized by one of our former board members, Roger Whittaker. Congratulations go out to Roger and Jena on the birth of their first child, a baby girl born on Christmas Day 2010. Welcome to Bonnie Grace Holley Whittaker.

We will also be having a question and answer session at this year Film Festival as introduce the documentary called Marwencol, about brain injury and self-help. If you can make sure you get to this poignant film.

We have an exciting and rejuvenated board of directors, a dedicated and productive staff team and some wonderful volunteers and clients, family members and caregivers.

Our fitness program has started up again and this is a popular and well-attended program. Come out for fun and fitness on Thursday mornings at the Complex at 10:00. It is free...just do it!

So. Once again, welcome to the new edition of the newsletter and I look forward to keeping and staying informed.

Respectively,

Debbie Dee, Executive



Greetings from the Board of Directors of the Powell River Brain Injury Society. It is with great pleasure that we welcome yet another milestone in the growth of PRBIS. Very many years ago, our fledgling board dreamed of a society that would be the catalyst of many support services and assistance for people with brain injuries. Under the guidance of our Founding Director, Penny Mebs and the other Directors, we grew and expanded our society. Under the tireless efforts of our Executive Director, Debbie Dee, we developed a great meeting centre, with many programs and services. With this newsletter, we open yet another communication door to connect people to opportunities. Keeping everyone informed is big job. We encourage everyone to get involved with this newsletter and help each other. People helping people is what has fueled this great society into the family it has become. We thank you for your support.

**Doug Logan,
President PRBIS.**



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We're on the Web!

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<http://www.braininjurysociety.ca/>

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