



February 2010 e-newsletter

Our newsletter provides members and friends with regular, concise updates on the key issues and stories related to the Brain Research Centre. If you wish to submit an item for inclusion in the newsletter or have any comments, please email communications@brain.ubc.ca.

Contents

1. [New research and innovation possible due to CIHR funding](#)
2. [Weight training improves cognitive function in seniors](#)
3. [Discovery of new mechanism of brain cell injury in Huntington's offers new approaches to treatment](#)
4. [Marijuana ineffective as Alzheimer's treatment](#)
5. [Trans-Canada neurodevelopment research network created](#)
6. [Introducing Oscar Benavente, Research Director of the Stroke and Cerebrovascular Health Program](#)
7. [Opportunity for collaboration in neuro-regeneration](#)
8. [Neuroscience Graduate Student Association accepting new members](#)
9. [Medical illustrator services available](#)
10. [Upcoming events](#)
11. [Member update](#)
12. [Awards](#)
13. [Awards funding](#)
14. [Distinctions](#)
15. [Media coverage](#)
16. [Newsletter credits](#)

New research and innovation possible due to CIHR funding



Brain research has been given a boost thanks to the latest round of CIHR funding, making possible new research projects and innovation in mental health, addictions, and multiple sclerosis, among many areas.

William Honer, Alasdair Barr, Michael Krausz, and colleagues received **\$1.5 million** to investigate shared mechanisms for co-morbid disorders (co-existing health conditions). Since mechanisms of inflammation may be involved with a host of co-morbid disorders affecting behaviour, the researchers will be looking at inflammatory mechanisms in both aging and young adults with an aim to understand how to limit the prevalence of co-morbid mental illness, addiction, and infectious disease.

Helen Tremlett and colleagues also received **\$1.5 million** to investigate the epidemiology and impact of co-morbidity on multiple sclerosis in Canada. A joint initiative of four academic centres in BC, Alberta, Manitoba, and Nova Scotia, her team will use the results of their studies to help inform individualized disease

management, understand the pathophysiology of multiple sclerosis, and to improve health care relating to this disease.

Tim Murphy received **\$1 million** to investigate the structure and function of the motor system. By understanding the motor system's circuitry on a basic level, new insight into the treatment of sensory and motor diseases may be possible.

More information on additional projects funded by the latest CIHR grant competitions is available in the [Awards funding section of this newsletter](#).

[Back to top](#)

Weight training improves cognitive function in seniors



Dr. Teresa Liu-Ambrose

Weight-bearing exercises may help minimize cognitive decline and impaired mobility in seniors, according to a new study conducted by **Teresa Liu-Ambrose**.

The study, published January 25 in the *Archives of Internal Medicine*, is one of the first randomized controlled trials of progressively intensive resistance training in senior women. Dr. Liu-Ambrose, also a researcher at the Centre for Hip Health, found that 12 months of once-weekly or twice-weekly resistance training improved executive cognitive function in senior women aged 65 to 75 years old. Executive cognitive functions are cognitive abilities necessary for independent living.

Previous studies have shown that aerobic exercise training, such as walking or swimming, enhances brain and cognitive function. However, seniors with limited mobility are unable to benefit from this type of exercise.

Until now, the benefits of resistance training, which is an attractive alternative type of exercise for seniors with limited mobility, on cognitive function has received little investigation. Dr. Liu-Ambrose is one of few researchers in Canada investigating the role of targeted resistance training in promoting mobility and cognitive function in seniors.

Cognitive decline among seniors is a pressing health care issue and it is a key risk factor for falls. Approximately 30 per cent of BC seniors experience a fall each year and fall-related hip fractures account for more than 4,000 injuries each year at a cost of \$75 million to the health care system.

Results from this study are available for immediate adoption by senior women seeking to improve their health as the doses of resistance training used meet the recommended criteria provided by the 2008 Physical Activity Guidelines for seniors.

Support for this research was provided by a Michael Smith Foundation for Health Research Establishment Grant, the Vancouver Foundation, and the BC Medical Services Foundation.

[Back to top](#)

Discovery of new mechanism of brain cell injury in Huntington's offers new approaches to treatment

Scientists at the Brain Research Centre and Centre for Molecular Medicine and Therapeutics have uncovered a key cellular mechanism that alters brain cell function in Huntington's disease, and identified a possible treatment for the disease.

The results of the study were published in the January 28 edition of the journal *Neuron*.

Huntington's disease is an inherited degenerative brain disease that causes cognitive and motor impairment, and eventually death. One in 10,000 Canadians suffers from Huntington's disease.

Austen Milnerwood, Lynn Raymond, Tim Murphy, Michael Hayden, and colleagues found that, in mouse models, the genetic mutation that causes Huntington's disease results in an excessive number of NMDA receptors—special receptors found at the surface of brain cells—to accumulate and be active outside synapses, which are the connections between brain cells. In healthy conditions, there should be few NMDA receptors outside the synapse.

The researchers also found that the over-activation of the NMDA receptors outside the synapse—called extrasynaptic NMDA receptors—leads to a reduction in brain cell survival signals and disruption in brain function. Further, they showed an increase in the number of extrasynaptic NMDA receptors, shifting the balance between these opposing cellular mechanisms in animal models of early stages of Huntington's disease.

While further work still needs to be done to determine how the genetic mutation causes the excessive number and activity of NMDA receptors to localize outside the synapses, the researchers did find a way to mitigate damage and slow disease progression at early stages of the disease—using Memantine, a drug currently used to treat Alzheimer's disease.

Memantine in low doses works by preferentially blocking the activity of NMDA receptors outside the synapse. It was previously shown to reverse deficits and damage in late stages of animal models of Huntington's disease, but they found it could improve learning and cell survival signalling even at early stages of the disease.

A small human clinical trial of Memantine for Huntington's disease has also recently shown positive effects. Larger, international clinical trials are now being planned. However, Memantine's beneficial effects appear to be dose-specific. Before it can be prescribed to treat Huntington's disease, researchers need to know how to determine appropriate dosing and whether it interferes with other essential cellular and brain functions.

This study was funded by the Canadian Institutes of Health Research, Cure Huntington Disease Initiative, Michael Smith Foundation for Health Research, Heart & Stroke Foundation of BC & Yukon, Huntington's Disease Society of America, and the Huntington Society of Canada.

[Back to top](#)

Marijuana ineffective as an Alzheimer's treatment

The benefits of marijuana in tempering or reversing the effects of Alzheimer's disease have been challenged in a new study by **Weihong Song**. The findings, published online December 31, 2009 ahead of print in the journal *Current Alzheimer Research*, could lower expectations about the benefits of medical marijuana in combating various cognitive diseases and help redirect future research to more promising therapeutics.

Previous studies using animal models showed that HU210, a synthetic form of the compounds found in marijuana, reduced the toxicity of plaques and promoted the growth of new neurons. Those studies used rats carrying amyloid protein, the toxin that forms plaques in the brains of Alzheimer's victims.

The new study was the first to test those findings using mice carrying human genetic mutations that cause Alzheimer's disease – widely considered to be a more accurate model for the disease in humans.

Over a period of several weeks, some of the Alzheimer's-afflicted mice were given varying doses of HU210 – also known as cannabinoids – which is 100 to 800 times more potent than the marijuana compounds. Their memory was then tested.

The mice treated with HU210 did no better than untreated mice, with those given low doses of HU210 performing the worst. The researchers also found that HU210-treated mice had just as much plaque formation and the same density of neurons as the control group. The group given higher doses actually had fewer brain cells.

The research was supported by the Canadian Institutes of Health Research, the Jack Brown and Family Alzheimer's Research Foundation, the Michael Smith Foundation for Health Research, and a donation from the David Townsend Family.

[Back to top](#)

Trans-Canada neurodevelopment research network created



Dr. Dan Goldowitz

On December 1, 2009, the Federal Government announced the creation of a new Network of Centres of Excellence called NeuroDevNet. Under the leadership of **Dan Goldowitz**, and with a host of developmental neurobiologists from CFRI, CMMT, Brain Research Centre, UBC, and across Canada, NeuroDevNet will provide \$20 million over five years to support research and education on the developing brain. It is the first trans-Canada initiative dedicated to studying children's brain development from both basic brain research and clinical perspectives.

The researchers—whose expertise range from child development to brain imaging, genetics, and developmental biology— will explore how the brain develops, how to detect abnormalities, and how to repair damage, focussing initially on autism spectrum disorder, fetal alcohol spectrum disorder, and cerebral palsy. The network will also train the next generation of researchers and raise public awareness of childhood neurological disorders. For more information, visit www.neurodevnet.ca.

[Back to top](#)

Introducing Oscar Benavente, Research Director of the Stroke and Cerebrovascular Health Program



Dr. Oscar Benavente

The Brain Research Centre is pleased to welcome **Oscar Benavente** as a new member. Dr. Benavente joined UBC and Vancouver Coastal Health in September 2009 as Research Director of the Stroke and Cerebrovascular Health Program and Professor of neurology.

Dr. Benavente joins us from the University of Texas Health Center at San Antonio. He brings with him a large clinical trial (funded by NIH) aimed at identifying new measures to prevent small subcortical strokes, a type of stroke that occurs when a blood vessel bringing blood deep into the brain becomes blocked. The budget for this trial is approximately \$63 million. The goal of this study, entitled *Secondary Prevention of Small Subcortical Strokes (SPS3)* is to identify an optimal combination of blood pressure control and anti-clotting therapy that will prevent both recurrent strokes and cognitive decline.

Dr. Benavente received his medical degree from the University of Cordoba, Argentina. He completed residency and fellowship training at the University of Western Ontario and University of Ottawa, as well as the University of Texas Health Science Center in San Antonio, where he was the Director of the Stroke Program. He has published more than 40 papers and has participated in numerous clinical trials for prevention and treatment of acute stroke.

[Back to top](#)

Opportunity for collaboration in neuro-regeneration

With the expertise of many Brain Research Centre members in the areas of cell biology, molecular genetics, the basic science of neurological diseases, and clinic trials, there is much opportunity for collaboration and partnership. **Kevin Gregory-Evans**, a new member and [introduced in this newsletter](#), is looking to establish collaborations and research partnerships with others in the area of neuro-regeneration. If you are interested in this opportunity, please contact him directly at kge30@interchange.ubc.ca or 604.875.5275.

[Back to top](#)

Neuroscience Graduate Student Association accepting new members



The newly-formed Neuroscience Graduate Student Association (NRSC-GSA) hosted its fall social on November 23, 2009. The event, which was attended by more than 80 neuroscience students and faculty, served to introduce the association and to facilitate interactions between trainees and faculty members from research sites across campus.

For more information on the association, please email nrsc.gsa@gmail.com.

[Back to top](#)

Medical illustrator services available

M. Gail Rudakewich Biomedical Animation provides high-end 3D animation and illustration to medical science professionals and researchers from hospitals, academic institutions, and the life sciences industry. Ms. Rudakewich has eight years of freelance experience creating graphics for a broad range of medical and scientific topics, along with a Master of Science degree in Biomedical Communications from the University of Toronto and a diploma in Computer Animation from Sheridan College. A strong science background coupled with artistic and creative skills, results in didactic, aesthetically appealing visuals which accurately communicate complex scientific information. For more information, visit <http://synapse-visuals.com/gail.htm>.

[Back to top](#)

Upcoming events

The 3rd **Biennial Brain Development & Learning Conference** will be held **July 16-20, 2010** in Vancouver. For more information, visit www.interprofessional.ubc.ca/bdl.html.

The **Canadian Neuroscience Meeting** will be held **May 15-18, 2010** in Ottawa. For more information, visit www.can-acn2010.org.

The 1st **Canadian Stroke Congress** will be held **June 7-8, 2010** in Quebec City. For more information, visit www.strokecongress.ca.

[Back to top](#)

Member update

Recent additions include:



S. Jayne Garland, Department of Physical Therapy – Dr. Garland investigates the neural control of force production and movement, particularly under conditions of muscle fatigue, as well as the recovery of motor control following stroke, with emphasis on postural control. She uses sophisticated motor unit analysis to investigate fundamental motor control principles, force platform technology to measure postural sway, and isokinetic equipment to measure force production. Dr. Garland is Head of the Department of Physical Therapy.



Cheryl Gregory-Evans, Department of Ophthalmology & Visual Sciences – Dr. Gregory-Evans investigates the molecular control mechanisms in epithelial fusion in the developing central nervous system. Her model system is optic fissure closure in the eye in animal models such as the zebrafish.



Kevin Gregory-Evans, Department of Ophthalmology & Visual Sciences – Dr. Gregory-Evans is a UK-trained clinician scientist in ophthalmology. His undergraduate medical training was at St. Bartholomew's Medical School, London. His postgraduate medical training in ophthalmology was at Moorfields Eye Hospital, London, UK and the Casey Eye Institute, Portland, Oregon, USA. He completed an MD (Res) in molecular genetics at University College London and a PhD in cell biology at Imperial College London. His research interests include the diagnosis and treatment of genetic diseases of the retina—specifically retinitis pigmentosa and age-related macular degeneration. Currently he is working on cell-based treatment regimens for macular degeneration using embryonic and mesenchymal stem cells to deliver therapeutic molecules to the retina and tissue regeneration.



Phillippe Margaron, Department of Ophthalmology & Visual Sciences – Dr. Margaron is an Adjunct Professor in the Department of Ophthalmology & Visual Sciences, as well as Vice-President, Research and Development, at Charlesson LLC, an Oklahoma-based emerging biotech actively engaged in the development of therapeutics for treating debilitating ophthalmic diseases. He also holds a position of Adjunct Professor in the Department of Ophthalmology and Visual Sciences at UBC. He has authored more than 20 peer-reviewed articles in scientific journals and proceedings and is an inventor on 10 worldwide patent families on novel photodynamic and ophthalmic technologies and applications.



Takako Niikura, Faculty of Health Sciences, SFU – Dr. Niikura investigates the molecular mechanisms of the age-related neurodegenerative disorders, particularly Alzheimer's disease (AD) and Amyotrophic lateral sclerosis (ALS). She is working on a neuroprotective factor, Humanin, as a therapeutic candidate for AD. In addition, she uses superoxide dismutase 1 and ALS2, genes responsible for familial ALS, as models in the study of the molecular mechanisms of motoneuronal death underlying ALS.

[Back to top](#)

Awards

- **Tim Murphy** and **Stanley Floresco** each received a UBC Killam Research Prize, which is in honour of outstanding research and scholarly contributions.
- **Michael Hayden** received the Jacob Biely Prize, which is UBC's premier award for research.
- **Rafeef Abugharbieh, Kiran Soma, and Z. Jane Wang** each received a UBC Killam Research Fellowship, which supports scholars engaged in research projects of broad significance.
- **Adele Diamond** was elected a Fellow of the Society of Experimental Psychologists.
- **Brian Kwon** was selected for the American Academy of Orthopaedic Surgeons 2010 Kappa Delta Young Investigator Award for his paper "Cerebrospinal Fluid Pressure Monitoring and Biochemical Analysis in Acute Spinal Cord Injury - A Translational Approach." He was also named one of Vancouver's Top 40 under 40 by *Business in Vancouver*.
- **Stan Floresco** received the 2010 American Psychological Association Distinguished Scientific Award for Early Career Contribution to Psychology in the area of animal learning and behaviour.
- **Stephanie Borgland** received an Undergraduate Research Opportunities Mentorship Award, which is given to four faculty or staff members per year in honour of demonstrated excellence in the support of undergraduate students in research.
- **Terrance Snutch** received the 2010 Sarrazin Award, the highest acknowledgement from the Canadian Physiological Society. This award is given in honour of Dr. Michel Sarrazin (1659 – 1734), who is known as the first Canadian physiologist.
- **Julie Robillard (Brian MacVicar & Judy Illes)** won the Let's Talk Science activity contest, a friendly competition for graduate students to create a science-related learning activity for school age children.

[Back to top](#)

Awards funding

- **Results of the September 2009 CIHR Operating Grant Competition**
 - **Jason Barton** – "Functional and structural correlations in prosopagnosia" (\$701,012 over five years; This grant will support a collaborative project by the International Prosopagnosia Study Group.)
 - **Stephanie Borgland** – "Effect insulin in ventral tegmental area dopamine neurons" (\$724,997 over five years)
 - **Shoukat Dedhar** – "Targeting carbonic anhydrase IX and hypoxia for the diagnosis and treatment of aggressive breast cancers" (\$926,186 over five years)
 - **Stanley Floresco** – "Alterations in amygdala-prefrontal cortex circuitry by repeated psychostimulants: Electrophysiological and behavioural analyses" (\$528,461 over five years)
 - **Liisa Galea** – "Gonadal hormone effects on adult hippocampal neurogenesis in the male and female rodent" (\$664,690 over five years)
 - **Daniel Goldowitz** – "Cellular targets of kainate-induced neuron death in the hippocampus" (\$598,389 over five years)
 - **Wilfred Jefferies** – "Characterization of functional L-type calcium channels in lymphocytes" (\$337,447 over three years)
 - **Ujendra Kumar** – "Structure-function and regulation of somatostatin receptors" (\$295,623 over three years)
 - **Hakima Moukhles** – "Regulation of the functional distribution of aquaporin 4 in the brain" (\$562,020 over five years)
 - **Christian Naus** – "Connexin regulation and glioma growth control" (\$693,965 over five years)
 - **Lynn Raymond** – "Neuronal type-specific regulation of NMDA receptor signalling and toxicity" (\$715,831 over five years)
 - **Michael Silverman** – "Disruption of axonal transport by soluble A-beta oligomers" (\$482,608 over four years)
 - **Lakshmi Yatham** – "Brain imaging studies of oxidative stress cascade in bipolar disorder" (\$278,880 over three years)
- **Tony Traboulee, Dessa Sadovnick, David Li, and colleagues** received a China-Canada Joint Health Research Grant from CIHR to work with researchers in China to investigate environmental and genetic factors in multiple sclerosis.
- **Weihong Song** received a CIHR Catalyst Grant for a project entitled "Regulation of UCHL1 in neurodegeneration."
- **Christian Naus** and colleagues received a CIHR Emerging Team Grant to investigate vascular cognitive

impairment in animal models of comorbidity.

- **Wilfred Jefferies** received a CIHR HIV/AIDS Bridge Funding grant for a project entitled “Dissecting the molecular mechanism of HIV Nef immunosubversion.”
- **Neil Cashman** received a CIHR Meetings, Planning & Dissemination Grant to host PrP Canada 2010, Canada’s prion research conference.
- **Thibault Mayor** received a CIHR Meetings, Planning & Dissemination Grant to host the first conference on proteomics of protein degradation and ubiquitin pathways.
- **Helen Tremlett**, together with **Michael Hayden**, **Tony Traboulsee**, and others received a grant from the BC Clinical Genomics Network to investigate genotype specific approaches to therapy in multiple sclerosis.
- **Judy Illes**, together with **Elana Brief**, received a grant from the Michael Smith Foundation for Health Research for a project entitled “Alzheimer Disease in Remote First Nations Communities: Nurturing Knowledge, Understanding Education, and Care.”
- **Todd Woodward**, together with **Paul Metzak**, received a grant from the Down Syndrome Research Foundation for a project entitled “Neural networks involved in optimization of generalized cognitive performance.”
- **Cornelia Laule**, a physicist in the MRI Research Centre (**Alex Mackay**), received the Women Against MS endMS Research Training Network Transitional Career Development Award. Dr. Laule is developing magnetic resonance techniques to study the pathology of MS. This award will provide her with \$500,000 to fund the last two years of her MS-focused fellowship and the first three years of her first MS-focused faculty position in a Canadian institution.
- **Heidi Boyda (Alasdair Barr)** received the 2010 Dr. Lionel E. McLeod Health Scholarship from Alberta Innovates – Health Solutions (formerly the Alberta Heritage Foundation for Medical Research). There are only three scholarship recipients each year.
- **Melissa Ellamil (Kalina Christoff)** received a Mind & Life Institute Francisco J. Varela Research Grant for a project entitled "Investigating the neural basis of spontaneous thought with real-time fMRI and contemplative mental training."

[Back to top](#)

Distinctions

- **Stephan Schwarz** and colleagues at the UBC Huggill Anesthesia Research Centre received an award from the journal *Anesthesiology* for being one of that journal’s 12 best papers of 2009. The paper was: Ries CR, Pillai R, Chung CCW, Wang JTC, MacLeod BA, Schwarz SKW: QX-314 produces long-lasting local anesthesia modulated by TRPV1 receptors in mice. *Anesthesiology*. 2009, 111: 122–126.
- **Christian Naus** has published several papers recently, including *Journal of Neuropathology & Experimental Neurology* (January 2010), *Nature Cancer Reviews* (2010), and *Journal of Cellular Biochemistry* (2010).
- **Judy Illes** became a member of the IBRO US-Canada Regional Committee, National Academy of Sciences in January 2010.
- **Peter Reiner** participated in “On The Edge Of Chaos - Contemporary Neuroscience, Creative Patterns & Material Practice: The Rise of Neuro-Meme” at Emily Carr University in January 2010.
- **Elana Brief**, a Research Associate with **Judy Illes** in the National Core for Neuroethics, moderated an event called “Taking it to the streets” in October 2009. This event connected members of the public with those involved in community based research in order to stimulate conversation about the meaning of such research, its value in mental health and addictions research, and how community members might become involved in research initiatives.
- **Terrance Snutch** was one of the torch bearers for the Olympic Torch Relay through Surrey on February 8, 2010.

[Back to top](#)

Media coverage

November 2009

- **Bradley Vines (Allan Young)** – It’s beginning to sound a lot like Christmas (*The Vancouver Sun*)
- **Jill Zwicker (Lara Boyd)**, Department of Physical Therapy – Clumsy kids’ brains work differently (*CBC News*)
- **Judy Illes**, Division of Neurology, Department of Medicine & National Core for Neuroethics – Brain science creates a need for neuroethics (*Georgia Straight*)

- **Judy Illes**, Division of Neurology, Department of Medicine & National Core for Neuroethics – Tracking Trends and Performance in Basic Research (*sciencewatch.com*)

December 2009

- **Tony Traboulsee**, Division of Neurology, Department of Medicine – Italian MS research brings hopeful patients to private Vancouver clinic (*The Vancouver Sun*)
- **Tony Traboulsee**, Division of Neurology, Department of Medicine – UBC targets new way of looking at MS (*The Globe and Mail*), also covered by CTV and CBC Radio
- **Judy Illes**, Division of Neurology, Department of Medicine & National Core for Neuroethics – Buyer Beware (*ctv.ca*)
- **Ronald Barr**, Department of Medicine – Baby believed shaken, in critical condition (*The Vancouver Sun*)
- **Brain Research Centre** – The Science of the Brain (*The Vancouver Sun*)

January 2010

- **Lynn Beattie**, Division of Neurology, Department of Medicine – B.C. faces 'rising tide' of dementia (*The Province*)
- **Fabio Rossi**, Department of Medical Genetics – "Jekyll and Hyde" cell may hold key to muscular dystrophy, fibrosis treatment: UBC research (*UBC Public Affairs*)
- **Duncan Anderson**, Department of Ophthalmology – Missing out on 3-D magic; People with impaired binocular vision from crossed or lazy eyes can't appreciate RealD (*The Globe & Mail*)
- **Janice Eng**, Department of Physical Therapy – Strength training aids stroke-weakened hands, arms (*Reuters*)
- **Tony Traboulsee**, Division of Neurology, Department of Medicine – Cure vs. Hype; Is new MS research the real thing, or a media-driven frenzy? (*The National Post*)
- **Teresa Liu-Ambrose**, Department of Physical Therapy – Elderly 'should train with weights to help improve concentration' (*Telegraph*)
- **Brian Christie**, Department of Medical Sciences (UVic); **Sterling Clarren**, Department of Pediatrics; **Joanne Weinberg**, Department of Cellular & Physiological Sciences – Motor-skill activities hold promise of rewiring children's damaged brains (*The Globe & Mail*)
- **Michael Hayden**, Department of Medical Genetics & CMMT; **Tim Murphy**, Department of Psychiatry; **Lynn Raymond**, Department of Psychiatry – NMDA Receptors Play Good Cop, Bad Cop in Huntington's Model (*Alzheimer's Research Forum*)

February 2010

- **Tim Oberlander**, Department of Pediatrics – Prenatal exposure to alcohol dulls pain response in newborns (*The Vancouver Sun*)
- **Catharine Winstanley**, Department of Psychology – Why do losers keep gambling? Brain to blame (*MSNBC*)
- **Weihong Song**, Department of Psychiatry – BC study finds pot doesn't help Alzheimer's patients (*The Vancouver Sun*); Smoking not good for the brain - study (*News.com.au*); Marijuana Ineffective as an Alzheimer's Treatment (*ScienceDaily*); also appeared in *McKnight's Long Term Care News, Softpedia, Senior Spectrum, and All Headline News*
- **Bruce Forster**, Department of Radiology – A feature on radiology and imaging technology in the Vancouver 2010 Olympic Games (*CTV*)
- **Laird Birmingham**, Department of Psychiatry – Anorexics desperate for help, parents say (*The Vancouver Sun*)

[Back to top](#)

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**Brain
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**Vancouver
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Healthier lives through discovery

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The Brain Research Centre is a partnership between the Vancouver Coastal Health Research Institute and the Faculty of Medicine at UBC.

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[Back to top](#)