



# November 2009 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](mailto:communications@brain.ubc.ca).

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## Another Research Day success



Back row L-R: Brian Cairns, Jeff Mogil, Jon Stoessl, Chris Ahern. Front row L-R: Terry Snutch, Allan Basbaum, Sian Spacey

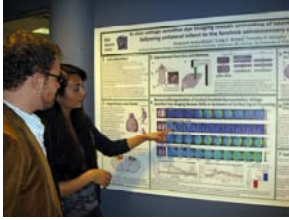
On Saturday, October 3, 2009 the Brain Research Centre hosted another Research Day, which was met with much success. Hosted by **Terry Snutch** and **Brian Cairns**, the event featured presentations on a variety of topics relating to pain. Local and invited speakers included:

- Allan Basbaum, UCSF: “The neurobiology of pain and its control”
- Jeff Mogil, McGill University: “What’s wrong with animal models of pain?”
- **Chris Ahern**, Department of Anesthesiology, Pharmacology & Therapeutics and Department of Cellular & Physiological Sciences, UBC: “Making the case for voltage-gated sodium channels as therapeutic targets in the management of painful syndromes”
- **Terry Snutch**, Michael Smith Laboratories: “New developments in targeting voltage-gated ion channels for neuropathic pain intervention”
- **Sian Spacey**, Division of Neurology, UBC & Vancouver Coastal Health: “Pathogenic mechanisms in migraine”
- **Jon Stoessl**, Division of Neurology, UBC & Vancouver Coastal Health: “Parkinson’s, pain, placebos, and dopamine”
- **Peter Soja**, Faculty of Pharmaceutical Sciences, UBC: “Prethalamic sensory inflow during sleep vs. anesthesia: Implications for pain research”

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## Neuroscience Extravaganza nets second largest participation record



Trainees discussing their research.

Once again participation records were set at the Neuroscience Extravaganza, which was held on Thursday, October 29, 2009. The annual neuroscience trainee poster competition attracted 76 submissions this year, which were equally distributed between the two categories of Cellular & Molecular and Systems & Behaviour. The winners were:

### Cellular & Molecular

- **Gwenaël Labouebe (Stephanie Borgland):** “Insulin-induced LTD of AMPAR-mediated synaptic transmission in dopamine neurons of the Ventral Tegmental Area”
- **Austen Milnerwood (Lynn Raymond):** “Altered synaptic vs extrasynaptic NMDAR activity and trafficking at cortico-striatal synapses in Huntington disease mice”
- **Sherri Tran (Tim Murphy):** “Locally induced cortical hypothermia promotes recovery of dendritic structure following ischemic insult as revealed by two photon imaging”

### Systems & Behaviour

- **Carine Dias (Tony Phillips):** “Inhibition of the regulated AMPA receptor endocytosis facilitates the extinction but fails to affect induction, expression or reinstatement of morphine-induced conditioned place preference”
- **Meghan Linsdell (Lara Boyd):** “Effects of primary somatosensory continuous theta burst and repetitive transcranial magnetic stimulation on contralateral somatosensory cortex”
- **Kristina Uban (Liisa Galea & Joanne Weinberg):** “Region specific effects of stress on corticotropin-releasing hormone mRNA levels following prenatal alcohol exposure”

Special thanks are extended to the judges—Alasdair Barr, Stephanie Borgland, Judy Illes, and Cheryl Wellington—for their contributions, as well as to the Graduate Program in Neuroscience and the MSFHR/CIHR Strategic Training Program in Neurobiology and Behaviour.

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## New UNBC research lab seeking collaborators

Under the supervision of **William Tippett**, a new UNBC research lab—called the Brain Research Unit—is now operational. Dr. Tippett is seeking collaborators with an interest in developing mobility and cognitive training programs in individuals with Alzheimer’s disease or individuals that have experienced a stroke. For more information, please visit <http://brainresearch.unbc.ca>.

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## New understanding about mechanism for cell death after stroke leads to possible therapy

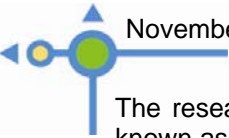


Scientists at the Brain Research Centre have uncovered new information about the mechanism by which brain cells die following a stroke, as well as a possible way to mitigate that damage. The results of the study were recently published online in *Nature Medicine*.

Following a stroke, many brain cells continue to die even after blood flow has been restored. Researchers have long known this is due to a complicated cascade of cellular messages that lead to the “self-destruction” and death of brain cells.

The team of Brain Research Centre scientists discovered that, in animal models, the over-activation of NMDA receptors—special receptors on the surface of brain cells—activates another protein, called SREBP-1, which subsequently causes cell death. SREBP-1 is found naturally in cells throughout the body and is involved with cholesterol and other fat production.

NMDA receptors control the movement of calcium in and out of brain cells, which is necessary for normal brain function. However, following a stroke, levels of glutamate—the most abundant chemical messenger in the brain—rise rapidly in cells, leading to over-activation of NMDA receptors, an excess of calcium entering cells, and the onset of cell death.



The researchers found that under normal conditions, SREBP-1 is largely kept in an inactive form by a protein known as Insig-1. After a stroke, over-activation of NMDA receptors leads to a rapid degradation of Insig-1, which increases the level of active form of SREBP-1.

“How over-activation of NMDA receptors caused cell death after a stroke has been a mystery,” says **Yu Tian Wang**, co-lead on the study and the Heart and Stroke Foundation of BC & Yukon Chair in Stroke Research. “We found that SREBP-1 was one of the missing key players in that process.”

While the detailed mechanisms by which activation of SREBP-1 leads to brain cell death remain to be established, the researchers discovered a way to inhibit SREBP-1 and thereby significantly reduce cell death.

“We developed a drug that can stabilize Insig-1, which in turn inhibits the activity of SREBP-1,” says **Max Cynader**, co-lead on the study and a Canada Research Chair in Brain Development. “By doing so, we were able to prevent cell death.”

The researchers also found that the drug works post-stroke in animal models. “When we administered it post-stroke, there was less brain cell damage 30 days later than compared to controls,” says Dr. Wang. “This is important because previous studies focused on blocking the NMDA receptors in order to prevent cell death, but this approach didn’t work because it affected normal cell function and had a relatively short therapeutic window. The drug we studied works downstream of NMDA receptors and appears to have less detrimental side effects with a much improved therapeutic window.”

Further investigations will help researchers understand how SREBP-1 causes cell death and to further determine efficacy of the drug. As well, because of the protein’s connection to cholesterol synthesis and other cellular functions, further investigations may reveal if it has a role in other neurological disorders, such as ALS, and whether the drug might be effective for those conditions as well.

This study was funded by the Heart & Stroke Foundation of BC & Yukon, the Canadian Institutes of Health Research, and the Cure Huntington’s Disease Initiative Foundation. Stroke is the third leading cause of death in Canada, and the leading cause of long-term adult disability.

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## Study on MS relapses reveals new information about disease progression and impacts

**Helen Tremlett** published a paper in the November 4 issue of *Neurology*, the medical journal of the American Academy of Neurology, which examined how MS relapses affect people during different time periods of the disease. She found that people with MS who have relapses within the first five years of onset appear to have more severe disability in the short term compared to people who do not have an early relapse.

Research shows that 85% of people with MS begin by having the relapsing-remitting form of the disease and the majority of these people later develop secondary progressive MS. Because relapse-related symptoms often improve within a few weeks, it’s been unclear how much disability comes from relapses, and how much from progression.

For the study, Dr. Tremlett and colleagues reviewed the medical records of 2,477 people with MS who experienced relapses in BC. They looked at whether the participants had disability severe enough to require the use of a cane for walking and whether this was related to relapses occurring within five years, five to 10 years, or more than 10 years after onset of symptoms. The participants were followed for an average of 20 years. During that time, the group experienced 11,722 relapses.

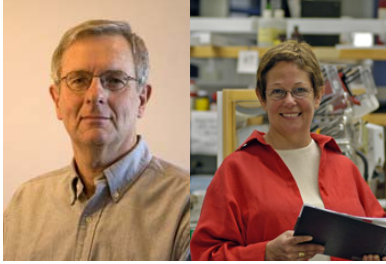
Dr. Tremlett found that people who had a relapse within five years of disease onset were at a 48% higher hazard of needing a cane to walk within five years of disease onset than those who did not have an early relapse. Importantly, the impact of the early relapse lessened over time. Those with early relapse who did not need a cane after five years were at only a 10% higher hazard of needing one 10 years after disease onset compared to those without early relapses.

The impact of relapses that occurred later also waned over time and became insignificant after long-term follow up. Relapses in people under 25 had a longer impact on disability compared to those over 35 years. The study was supported by the U.S. National MS Society.

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## Two members elected Fellows of the Royal Society of Canada



Alan Mackworth and Adele Diamond

**Alan Mackworth** and **Adele Diamond** were elected Fellows of the Royal Society of Canada. Election to the Society is the highest honour that can be attained by scholars, artists, and scientists in Canada.

Dr. Mackworth is a leading figure in the field of artificial intelligence and robotics. He introduced the first soccer-playing robots and is globally recognized as the founding father of the famous robot soccer challenge RoboCup. Earlier this year he received the 2009 Award for Research Excellence from the Association for Constraint Programming.

Dr. Diamond's contributions have significantly improved understanding and medical treatment of phenylketonuria, autism, and ADHD. Her unique combination of expertise in cognitive psychology and neuroscience led to the creation of an entirely new subfield of psychology called developmental cognitive neuroscience. Earlier this year, she was the recipient of a YWCA Women of Distinction Award in the Science and Technology category.

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## Janice Eng receives a lifetime achievement award



Janice Eng speaks with a stroke research study participant. Photo credit: Tiffany Akins

**Janice Eng** was awarded the 2009 Jonas Salk Award from the March of Dimes Canada.

Earlier this year Dr. Eng developed a rehabilitation program that can dramatically improve recovery of arm function in stroke patients. She is now developing a similar patient managed program for leg rehabilitation following stroke.

The Jonas Salk Award is a lifetime achievement award presented annually to a Canadian scientist, physician, or researcher who has made a new and outstanding contribution in science or medicine to prevent, alleviate, or eliminate a physical disability. The award is jointly presented by Sanofi Pasteur and March of Dimes Canada.

Dr. Eng was also elected a Fellow of the Canadian Academy of Health Sciences this year.

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## Trainees receive Brain Star awards

Two Brain Research Centre trainees have received CIHR Brain Star awards. These awards recognize the excellence of research done by Canadian neuroscience trainees. Twenty-four awards are available each year.

**Kevin Eade**, a doctoral student with **Doug Allen**, received a CIHR Brain Star Award for his paper entitled "Neuronal Phenotype in the Mature Nervous System is Maintained by Persistent Retrograde Bone Morphogenetic Protein signalling," which was published in *The Journal of Neuroscience* in March 2009.

**Ana Mingorance-Le Meur**, a former postdoctoral fellow with **Tim O'Connor**, also received an article for their article "Neurite consolidation involves constant repression of protrusive activity," which was published in the *EMBO Journal* in February 2009. Ana has been a Senior Scientist at UCB Pharma in Belgium since April 2009.

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## Upcoming events

Come hear Dr. Grant Gillet, a neurosurgeon and Professor of Medical Ethics from the University of Otago Medical School, Dunedin Hospital, and Otago Bioethics Centre in New Zealand, give a series of lectures **November 24 and November 26 – 28, 2009**. Visit [www.greencollege.ubc.ca](http://www.greencollege.ubc.ca) for information on times and locations.

Don't forget to check out all our other regularly-scheduled events, including **Pizza Seminars**, **Neuroscience Research Colloquia**, **PI Seminars/Synaptic Journal Club**, **MS Seminars**, and more by visiting


[www.brain.ubc.ca](http://www.brain.ubc.ca)
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## Member update

A recent addition includes:



**Ann Martin-Matthews**, Department of Sociology, UBC – Dr. Martin-Matthews is the Scientific Director of the CIHR Institute of Aging, as well as a Professor in the Department of Sociology. From 1990-1996, Dr. Martin-Matthews was one of four co-principal investigators on the Canadian Aging Research Network. At UBC, she has held academic administrative positions as Director of the School of Family and Nutritional Sciences (1998-1999), Associate Dean Research and Graduate Studies in the Faculty of Arts (1999-2001), and Dean pro tem of the Faculty of Arts (2001-2002). Her publications include two books—*Widowhood in Later Life* (1991) and *Aging at the Intersection of Work and Home Life: Blurring the Boundaries* (2008)—as well as more than 125 peer-reviewed articles and chapters on aging, formal and informal support, and health. Her current research is on home care and human health resource issues.

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## Awards

- **Stephanie Borgland** received The Garden Centre Group Co-op New Investigator Award from the Parkinson Society Canada.
- **The following members were elected Fellows of the Canadian Academy of Health Sciences this year:**
  - Alison Buchan
  - Janice Eng
  - Jon Stoessl
  - Trevor Young
- **H. Lee Lau (Catharine Rankin)** received the Best Graduate Student Poster Prize at the Pacific Northwest Chapter Meeting of the Society for Neuroscience on October 3 in Bellingham, WA.

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## Awards funding

- **Wendy Comeau (Joanne Weinberg)** received a Neuroscience CIHR Training Grant.
- **Recipients of Michael Smith Foundation for Health Research Studentships:**
  - Biomedical, Junior Graduate**
    - Thomas Harrison (Tim Murphy) – “Light-based mapping of cortical reorganization after stroke in channelrhodopsin-2 mice”
    - Kaspar Podgorski (Kurt Haas & Nicholas Swindale) – “In vivo imaging of brain circuit plasticity during receptive field refinement”
    - Shaun Sanders (Michael Hayden) – “The role of palmitoylation in the pathogenesis of Huntington’s Disease”
    - Jessica Simpson (Brian Christie) – “Evaluation of neurogenesis and synaptic plasticity in the YAC128 transgenic mouse model of Huntington’s disease”
  - Biomedical, Senior Graduate**
    - Paul Adams (Terry Snutch) – “Congenital migraine mutations alter the calcium-dependent regulation of P/Q type calcium channels and affect synaptic plasticity”
    - Cindy Barha (Liisa Galea) – “The effects of different forms of estrogen replacement on hippocampal neurogenesis and cognition in young and older female rats”
    - David McVea (Tim Murphy) – “Testing the role of muscle spindles in cortical development and plasticity”
  - Biomedical, Postdoctoral Fellow**
    - Allen Chan (Yu Tian Wang & Tim Murphy) – “Role of ionotropic glutamate receptors in ischemic injury and dendritic spine dynamics”

- Jesse Gillis (Paul Pavlidis) – “Influence of aging on candidate neuropsychiatric disease genes measured using differential coexpression”
- Sarah Heimovics (Kiran Soma) – “Seasonal plasticity in brain estrogen signalling mechanisms regulating aggression”

#### Clinical, Junior Graduate

- Melissa Ellamil (Kalina Christoff) – “Real-time fMRI training of functional connectivity and adaptive self-awareness”
- Julia Kam (Todd Handy) – “Mind wandering in individuals with schizotypal personality traits”

#### Clinical, Senior Graduate

- Lindsay Nagamatsu (Todd Handy & Teresa Liu-Ambrose) – “Visual-spatial attention and falls risk in seniors: Do fallers show impairments in reflexive orienting?”

#### Clinical, Postdoctoral Fellow

- Ana Andreazza (Trevor Young) – “Identifying biomarkers associated with the diagnosis and illness progression of mood disorders”
- Sam Doesburg (Ruth Grunau & Urs Ribary) – “Magnetoencephalographic (MEG) investigation of cortical processing in children born very preterm”
- Olave Krigolson (Todd Handy & Teresa Liu-Ambrose) – “Do neurocognitive deficits in the evaluation of motor output contribute to falls risk in older adults?”
- Sean Meehan (Lara Boyd) – “Sensory contributions to motor deficits after stroke: What is the role of the unaffected cortex in motor recovery?”

#### Health Services, Senior Graduate

- Alicia Semaka (Michael Hayden) – “Development of clinical standards of care for Huntington's disease intermediate allele predictive test results”

#### Population Health, Postdoctoral Fellow

- Dr. Martin Guhn (Clyde Hertzman) – “Investigating the effects of social cultural demographic and socio-economic factors on developmental health and education trajectories of children in British Columbia”

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## Distinctions

- **Jill Zwicker (Lara Boyd)** was highlighted in UBC Reports for her research into the neural correlates of developmental coordination disorder.
- **Weihong Song** was appointed Handling Editor of the *Journal of Neurochemistry* and a member of the Editorial Board of the *Journal of Molecular Neuroscience*.
- **Adele Diamond** was featured in an American Public Media program on ““Learning, Doing, Being: A New Science of Education.” The program aired on US public radio stations nationwide November 19 – 24, 2009.
- **Peter Reiner** recently published an article on meditation in *Scientific American MIND*.
- **Judy Illes** gave several presentations in North America recently on neuroethics in sport; the implications of neurotechnology for mental states, social policy, and clinical practice; and other topics. She also has a paper in press with *Nature Reviews Neuroscience* entitled “Improving the communication of neuroscience.” She was also featured in a September 2009 article in the *Ubyyssey* on the ethics of neuroscience in sport.

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## Media coverage

### September 2009

- **Adele Diamond**, Department of Psychiatry – The make-believe solution (*The New York Times*)
- **Laird Birmingham**, Department of Psychiatry – Fasting is a form of worship (*The Vancouver Sun*)

### October 2009

- **Wolfram Tetzlaff**, Department of Zoology – Special diet speeds spinal cord healing (*United Press International*)

### November 2009

- **Adele Diamond**, Department of Psychiatry – The link between exercise and more brainpower (*The Globe and Mail*)

- **W. Thomas Boyce**, Human Early Learning Partnership – The science of success (*The Atlantic*)
- **Helen Tremlett**, Division of Neurology, Department of Medicine -- Pregnancy study 'reassuring' for women with MS (*CBC News*)

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## Newsletter credits

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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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