

NEUROLOGY

Dr. Jon Stoessl
Professor & Acting Head

Faculty Members

Professor	Barton, Dr. Jason	VA
Professor	Benavente, Dr. Oscar	VA
Professor	Cashman, Dr. Neil	VA
Professor	Doudet, Dr. Doris	VA
Professor (on leave)	Feldman, Dr. Howard	VA
Professor	Illes, Dr. Judy	UBCH
Professor	Oger, Dr. Joel	VA
Professor	Pelech, Dr. Steven	VA
Professor (on leave)	Rieckmann, Dr. Peter	VA
Professor & Acting Head	Stoessl, Dr. Jon	VA
Professor	Tsui, Dr. Joseph	VA
Professor	Wang, Dr. Yu Tian	VA
Associate Professor	De la Fuente-Fernandez, Dr. Raul	VA
Associate Professor	Kastrukoff, Dr. Lorne	VA
Associate Professor	McKeown, Dr. Martin	VA
Assistant Professor	Jacova, Dr. Claudia	UBCH
Assistant Professor	Petterson, Dr. Jacqueline	Prince George
Assistant Professor	Traboulsee, Dr. Anthony	VA
Assistant Professor	Tremlett, Dr. Helen	VA
Clinical Professor	Robinson, Dr. Gordon	VA
Clinical Professor	Teal, Dr. Philip	VA
Clinical Associate Professor	Beckman, Dr. Jeff	VA
Clinical Associate Professor	Hooge, Dr. John	SPH
Clinical Associate Professor	Javidan, Dr. Manouchehr	VA
Clinical Associate Professor	Jones, Dr. Michael	VA
Clinical Associate Professor	Keyes, Dr. Robert	SPH
Clinical Associate Professor	Krieger, Dr. Charles	VA
Clinical Associate Professor	Spacey, Dr. Sian	VA
Clinical Assistant Professor	Bozek, Dr. Christopher	Burnaby
Clinical Assistant Professor	Briemberg, Dr. Hannah	VA
Clinical Assistant Professor	Chapman, Dr. Kristine	SPH
Clinical Assistant Professor	Clarke, Dr. Stephen	SPH
Clinical Assistant Professor	Costantino, Dr. Anthony	Abbotsford
Clinical Assistant Professor	Devonshire, Dr. Virginia	VA
Clinical Assistant Professor	Foti, Dr. Dean	VA
Clinical Assistant Professor	Gibson, Dr. Gillian	VA
Clinical Assistant Professor	Hayden, Dr. Sherri	UBC
Clinical Assistant Professor	Hsiung, Dr. Ging-Yuek Robin	UBCH
Clinical Assistant Professor	Johnston, Dr. Dean	SPH
Clinical Assistant Professor	Katz, Dr. David	VA
Clinical Assistant Professor	Martzke, Dr. Jeffrey	VA

Clinical Assistant Professor	Mezei, Dr. Michelle	VA
Clinical Assistant Professor	Murphy, Dr. Colleen	VA
Clinical Assistant Professor	Prout, Dr. Alister	SPH
Clinical Assistant Professor	Thiessen, Dr. Brian	VA
Clinical Assistant Professor	Woolfenden, Dr. Andrew	VA
Clinical Instructor	Bogod, Dr. Nicholas	VA
Clinical Instructor	Hallam, Dr. Bradley	VA
Clinical Instructor	Silverberg, Dr Noah	GFS
Clinical Instructor	Tai, Dr. Charles	SPH
Clinical Instructor	Townsend, Dr. Tiffany	VA
Clinical Instructor	Varelas, Dr. Michael	VA
Clinical Instructor	Yip, Dr. Samuel	VA
Associate Member	Anderson, Dr. Duncan	VA
Associate Member	Boulton, Dr. Peter	Abbotsford
Associate Member	Collier, Dr. Todd	Kamloops
Associate Member	Daly, Dr. Lyle	Prince George
Associate Member	Diggle, Dr. John	SMH
Associate Member	Forwell, Dr. Susan	VA
Associate Member	Graeb, Dr. Douglas	VA
Associate Member	Ho, Dr. Kennely	RCH
Associate Member	Hurwitz, Dr. Trevor	VA
Associate Member	Leavitt, Dr. Blair	VA
Associate Member	Li, Dr. David	VA
Associate Member	Mackenzie, Dr. Ian	VA
Associate Member	Medvedev, Dr. George	RCH
Associate Member	Moore, Dr. Wayne	VA
Associate Member	Oyler, Dr. Jeffrey	Kamloops
Associate Member	Raymond, Dr. Lynn	VA
Associate Member	Quandt, Dr Jacqueline	UBCH
Associate Member	Sadovnick, Dr. Adele	VA
Associate Member	Stowe, Dr. Robert	VA
Associate Member	Vorobeychik, Dr. Galina	Burnaby
Associate Member	Wilkinson, Dr. Rosemary	VA
Adjunct Professor	Bub, Dr. Daniel	U Victoria
Adjunct Professor	Ostermann, Dr. Joachim	UBC
Adjunct Professor	Ruth, Dr. Thomas	VA
Adjunct Professor	Sossi, Dr. Vesna	UBC
Professor (Emeritus)	Calne, Dr. Donald	VA
Professor (Emeritus)	Eisen, Andrew	VA
Professor (Emeritus)	Kim, Dr. Seung	VA
Professor (Emeritus)	Pate, Dr. Brian	VA
Professor (Emeritus)	Sweeney, Dr. Vincent	VA
Clinical Professor (Emeritus)	Anzarut, Dr. Andre	SPH
Clinical Professor (Emeritus)	Bratty, Dr. Paul	VA
Clinical Professor (Emeritus)	Hashimoto, Dr. Stanley	VA
Clinical Associate Professor (Emeritus)	Wong, Dr. Milton	SPH

DIVISIONAL OVERVIEW

The Division of Neurology has major teaching, research and clinical activities at Vancouver General Hospital, UBC Hospital, and St. Paul's Hospital. There are 53 Neurology faculty members whose primary appointment is in the Division, with another 21 appointed as associate members, 4 as adjunct professors and 9 as emeriti. The faculty members comprise basic and cognitive neuroscientists as well as clinicians.

The Division is nationally and internationally recognized for its clinical and research programs in multiple sclerosis, stroke and neurodegenerative disorders including the dementias, motor neuron disease and Parkinson's disease, as well as its program in neuroethics. It has been consistently extremely successful in obtaining peer reviewed grant funding from agencies in Canada and internationally. In 2009, Division members attracted nearly \$9M in peer-reviewed grants and more than \$2.4M in clinical trial funding. Divisional members make important contributions to both basic neuroscience and clinical neurological literature. This past year divisional members published more than 134 papers in peer-reviewed journals. Clinically, the Division provides province-wide tertiary and quaternary care for a variety of neurological disorders. The Division has clinical outreach to many communities around the province. Faculty members are actively involved in teaching and supervising all levels of students and trainees from undergraduate to post doctoral fellows. The Residency training program in Neurology is the largest in the country.

Dr. Oscar Benavente was recruited to the Division in September 2009 from the University of Texas in San Antonio, in order to head up the clinical research program in cerebrovascular disorders. He heads a large international multicentre NIH funded trial on Secondary Prevention of Small Subcortical Strokes. Dr. Jacqueline Petterson was recruited to the faculty at University of Northern British Columbia and has both clinical and research interests in stroke and cognitive impairment. Dr. Jacqueline Quandt was recruited to the Department of Pathology and is an Associate member of the Division of Neurology, where she works closely with the MS group.

During 2009, Neurology was very actively engaged in the planning for the Centre for Brain Health, in partnership with the Department of Psychiatry and the Brain Research Centre.

Teaching Programs

Undergraduate

The Division is involved in providing instruction to UBC medical students (250) during the Brain and Behavior section of Phase Two. Division members lecture within the didactic calendar on topics such as headache, dementia, multiple sclerosis, Parkinson's disease and neuromuscular disorders.

The Neurosciences Clinical Skills course gives students 18 hours of small-group instruction (6 - 8 students) in learning to perform a neurological examination. This consists of 32 student groups scheduled between January and May using on average 24 neurologists from the Division (includes VGH, UBCH and SPH staff).

Support materials have been developed and these are disseminated to distant sites as printed and video material. These sessions have been enhanced by the recruitment of volunteer patients who are used to demonstrate common deficits found on neurological examination.

During third year, all Vancouver-based students participate in a small-group (2 - 4 students) bedside session. They evaluate a patient with neurological disease following which a Division member provides direct instruction.

Students enrolled in the Vancouver program are provided with a two hour seminar reviewing the neurological examination and other topics in neurology. This is scheduled at VGH during the first week of their medical CTU

rotation and is simulcast to distant sites (SPH, Royal Columbian and Royal Jubilee Hospitals).

A 4-week elective/selective is offered in third or fourth year (guidelines attached) to any UBC medical student. On average 15 - 20 students participate at either SPH or VGH sites in a primarily inpatient rotation. At VGH students may be scheduled to Neurology as part of their medical CTU training. In addition, the Division accepts students from other Canadian and accredited foreign medical schools for elective study.

Faculty members who are associated with the Division provide clinical teaching in the Vancouver Island and Prince George programs.

Postgraduate

The Post Graduate Residency Training in Neurology is fully accredited with the Royal College of Physicians and Surgeons. It currently has 26 residents at various levels of training from PGY1 to PGY5. In the first two years of the program the residents rotate through various subspecialties such as Internal Medicine, ICU, and Emergency, in addition to participating in their first Neurology rotations. The years PGY3-5 are identified as core Neurology training years. Residents acquire their inpatient training at Vancouver General Hospital and St. Paul's Hospital. Many outpatient subspecialty clinics are provided at UBC Hospital. Over the course of their training the residents in Neurology are also actively involved in various research projects. In 2009 there were 2 resident poster presentations and 3 abstracts published at various international meetings and peer-reviewed journals and 6 peer-reviewed publications. Dr. Gerald Pfeffer was awarded a Resident Scholarship Award for the American Academy of Neurology Annual Meeting in 2009. Dr. Pfeffer was further awarded the Best Neurology Resident's Research presentation at BC Neuroscience Day in 2009, the Andre Barbeau Memorial Prize of the Canadian Neurological Society, and the Stefan Grzybowski Prize at the UBC Medicine Research Day in 2009. Dr. Pfeffer also received the Ludmila and Henry Zeldowicz Award to be shared with Dr. Ryan Punambolam in 2009.

There are 5 CaRMS positions for academic year 2009-2010.

Graduate, Doctoral, Postdoctoral Students and Fellows: The Division has an active program supporting students at all levels of neuroscience and neurology training. In 2009 there were 36 post-graduate trainees mentored by Divisional faculty:

Alzheimer's Disease and Related Disorders: Fellows: Dr. Ummamon Puanthong (Thailand), Dr. Itthipol Tawankanjanachot (Thailand), Dr. Shahul Kameed (Singapore), Dr. Aiman Sanosi (Saudi).

Parkinson's Disease and Movement Disorders (Pacific Parkinson's Research Center): Clinical fellows: Dr. Biju Gopalakrishnan (India), Dr. Renju Kuriakose (India), Dr. Silke Cresswell (Germany, UK), Dr. Jayasri Srinivasan (Australia). **Post-doctoral fellow:** Dr. Scott Mackey (Montreal Neurological Institute). **Visiting scientist:** Dr. Frank Jing Yu (China).

Multiple Sclerosis and MRI: Post-doctoral Clinical and Research fellow: Dr. Raed Al Roughani (Kuwait), Dr. Jameelah Saedi (Saudi), Dr. Ana Luiza Sayao, Dr. Reza Seyedsadjadi (UK), Dr. Jayasree Basivireddy (Germany), Dr. Ibtisam Al-Thubait (Saudi), Dr. Mona Alkhwajah (Saudi), Dr. Elaine Kingwell, Dr. Afsansh Shirani (Saudi), Alex Lange (Switzerland).

Neuromuscular Diseases: Dr. Areej Bushnaq (Saudi).

Neuro-ophthalmology: Clinical fellows: Dr. Amir Mani (Singapore); Dr. JoAnn Pon (New Zealand), Dr. Alex Lange (Switzerland) **Clinical research fellow:** Dr. Mathias Abegg (University of Bern, Switzerland) **Post-doctoral research fellows:** Dr. Giuseppe Iaria (Neuropsychology, University of Rome, Italy), Dr. Linda Lanyon (Computational neuroscience, University of Plymouth, UK), Ipek Oruc (Neuropsychology, New York University, NY), Dr. Michael Scheel (Psychiatry, University of Berlin, Germany) **Graduate students:** Kirsten Dalrymple, MSc

program psychology, UBC. Jaya Viswanathan, MSc program neuroscience, UBC.

Neuroethics: Post-doctoral Research fellows: Kate Tairyan, MD, MPH, Daniel Buchman, BA, MSW,

Stroke: Dr. Naser Alotaibi (Saudi), Dr. Jamelah Alghalbi (Saudi), Dr. Omar Ayoub (Saudi).

Vancouver General Hospital Neurology Service (Clinical Teaching Unit)

The in-patient service at VGH consists of a 14 bed unit located on T5 and 6 of the Pattison Pavilion. This is the only dedicated hospital neurology clinical teaching unit (CTU) in the province and has within its mandate the provision of tertiary care for complex neurological disorders. The inpatient program features a specialized seizure monitoring unit and Acute Stroke Unit. Life, Limb and Threatened Organ policies approved by the Vancouver Acute Medical Advisory Committee are in place for accepting acute stroke patients as well as other neurological disorders requiring a higher level of care.

A large percentage of all stroke patients presented to the emergency room at VGH are now admitted to the Neurology service for acute management during the first 5-7 days of their post stroke care. From there, the stroke pathway includes transfer to the Subacute Stroke Unit (now located on T6-A), other appropriate rehabilitation facilities, or home.

A joint initiative between the UBC Division and VA has been successful in instituting an alternate payment plan allowing specialized stroke neurologists to be actively involved in stroke care throughout the continuum. This service began in March 2009 and represents a major improvement in stroke care at VA. There are now 5 dedicated stroke neurologists supporting the program. Their activities include development of a tele-stroke program which allows expansion of acute stroke management to facilities beyond the geographic region of VA.

The VGH and UBC neurologists provide important consultation services within Vancouver Acute. Neurological diagnostic services at VGH include electroencephalography (EEG), intraoperative monitoring (IOM), and electromyography (EMG).

Ambulatory services provided include subspecialty clinics for: movement disorders, multiple sclerosis, headache, ALS, Alzheimer's and other dementias, stroke, neuromuscular disease, and neuro-oncology.

These clinics integrate a strong research environment for each of the programs, which in turn form the core of the academic mission of the Division. The clinics also provide important post-graduate educational activities for trainees within the Division.

Specialty Programs in the Division of Neurology

Alzheimer Disease and Related Disorders Program

Faculty

The past year has been an active and exciting one at the UBC Hospital Clinic for Alzheimer and Related Disorders. Dr. Robin Hsiung obtained a CIHR Clinical Genetics Investigatorship career award. Dr. Claudia Jacova successfully obtained funding from CIHR to develop a novel computer-based cognitive test for screening and triaging of patients with cognitive complaints. In addition, existing research projects have been advanced and several new projects developed, while Dr. Howard Feldman has taken a leave-of-absence for two years to pursue other career opportunities.

Clinical Activities

With our team of clinicians (Drs. Dean Foti and Robin Hsiung: Neurologists, Drs. Lynn Beattie and Philip Lee: Geriatricians, and Dr. Margo Genge: Geriatric Psychiatrist), we continue to evaluate over 1000 patients per year with a range of neurodegenerative and geriatric cognitive disorders. Our implementation of a multidisciplinary model of care, together with Neuropsychology (Dr. Sherri Hayden), Genetic Counseling (Emily Dwosh/Rachel Butler), and Social Work (Amy Freeman), has been highly successful and deeply appreciated by the community. Our continued goal is to provide excellence in clinical care today while researching methods for improved care tomorrow.

Research Activities

Clinical Trials remain an active component in our clinic, as such, Dr. Foti is initiating a phase 3 study on Dimebon (latrepirdine) in treatment of moderate to severe Alzheimer Disease (AD). Dr. Hsiung is conducting trials including treatment of prodromal AD using gamma secretase inhibitor, and treatment of mild to moderate AD with monoclonal antibodies targeted against the amyloid peptide. Other novel treatments being tested include intravenous immunoglobulin for AD, and oral amyloid aggregation inhibitors. Drs. Hsiung, Jacova, Lee, and Beattie are an integral part of the provincial Alzheimer Drug Therapeutic Initiative (ADTI) program. This provides coverage of cholinesterase inhibitors to AD patients while collecting data on the population experience with this class of medication, within a number of funded research projects. We are also a centre for the Alzheimer Disease Neuroimaging Initiative (ADNI), a multi-million project funded by the NIH to develop early biomarkers for AD.

Our research group continues to examine the clinical, genetic, and pathological biomarkers of Frontotemporal Lobar Degeneration (FTLD) with Ubiquitinated Inclusions – of which the major protein component is now known to be transactivation response (TAR) DNA-binding protein (TDP-43). Dr. Jacova is examining the role of neuroimaging (MRI, PET) in association with mutations of the progranulin gene in FTLD, and Dr. Hsiung has found that serum progranulin measurement can be used to screen for subjects with frontotemporal dementia carrying progranulin mutations. Dr. Ian Mackenzie, Neuropathologist, has made important advances in understanding the role of TDP-43 and a novel protein (FUS – fused in sarcoma) in the development of FTLD. This project is supported by CIHR and the Pacific Alzheimer Research Foundations.

A number of new exciting collaborations were established this year. Two collaborations have focused on creating a research program to develop non-pharmacological interventions for cognitive impairment and AD. Drs. Hsiung, Jacova, and Lee together with Dr. Liu-Ambrose from Department of Physical Therapy have successfully obtained a \$395,000 grant from the Heart & Stroke Foundation to examine the effect of aerobic exercise on vascular cognitive impairment. Drs. Hsiung and Jacova, together with Dr. Kevin Kirkland, Music Therapist, and Dr. Lara Boyd, Physical Therapy, have been successful in obtaining seed funds to examine musical memory with fMRI in Alzheimer Disease from BCNAR & VCHRI, and received a \$200,000 grant from the Alzheimer Society of Canada to carry out a randomized controlled trial of music therapy in moderate AD patients. In addition, Dr. Hsiung will be studying the difference in risk factors and clinical presentation of dementia in Asian vs. Caucasian patients with Dr. Roger Wong, Geriatric Medicine. Dr. Hsiung has also established a HIV-cognitive disorder clinic with the HIV team at St. Paul's Hospital to examine the clinical and biological characteristics of HIV patients who are stable medically on highly active antiretroviral treatment (HAART) but continue to develop progressive cognitive impairment.

Instrument development is another important research goal pursued by the group. The Clinical Meaningfulness in Alzheimer Disease Treatment (CLIMAT) scale has been developed to measure meaningful treatment response. The first development study has been completed successfully and Drs. Jacova, Lee and Beattie are now applying CLIMAT longitudinally in the ADTI. Drs. Jacova and Hsiung, with Dr. McGrenere from Computer Science, have obtained CIHR funding to develop an optimized human-computer interface for Cognitive Testing on Computer (C-TOC).

Teaching Activities

Our group is very active in providing teaching to trainees of multiple disciplines at the undergraduate student, graduate student, medical student, resident, and fellow levels. Dr. Itthipol Tawankanjanachot, Neurologist, and Dr. Umamon Puangthong, Geriatric Psychiatrist, from Thailand will be completing their fellowship training this year, while Dr. Shahul Hameed, Neurologist from Singapore, and Dr. Aiman Sanosi, Neurologist from Saudi Arabia, have begun their training with us this year. The group also supervises undergraduate students doing directed studies projects at the Department of Psychology and is prepared to take on graduate students in the Neuroscience program.

Neuroethics Program

Since August 2007, when Dr. Judy Illes was appointed Canada Research Chair in Neuroethics and Professor of Neurology in the Department of Medicine, and with the generous support of the Chairs program, CIHR/INMHA and other research sponsors, Dr. Illes established the National Core for Neuroethics at the University of British Columbia, the only national research resource in the world in the domain of neuroethics at that time. She and her Core team are devoted to addressing challenges at the juncture of neuroscience, ethics, culture, and human values, through high impact, high visibility, research, education, and outreach. Their work has been widely recognized in the local community, across Canada, in the press, on the international stage in peer-reviewed publications of prestigious journals such as the *Nature* series, and in nominations for scholarly and service awards. In the past year alone, Professor Illes participated in the Gairdner Lectures held at UBC, carried out a Canada-wide study on the future of Neuroethics for CIHR, contributed to the high-profile Intellectual Muscle Lectures focused on ethics in sports for the 2010 Olympic and Paralympic Games (<http://www.theglobeandmail.com/intellectual-muscle/the-talks/article1312702/>), and was finalist for the YWCA Women of Distinction Award in the science and technology category. During 2008-2009, Dr. Illes was also appointed Adjunct Faculty in the School of Population and Public Health at UBC, in the School of Journalism at UBC, and in the Department of Computer Science and Engineering, University of Washington, Seattle, Washington, USA.

Current clinical research initiatives in neuroethics at UBC are focused on investigations of the ethical, legal, and societal impact of innovations in neurotechnology such as brain imaging, brain stimulation, pharmacology and stem cells, neurodegenerative disease and dementia, mood, attention and anxiety disorders, addictions, and spinal cord injury.

Highlights of recent research are:

- Identification of the perceived benefits and risks of neuroimaging and neurogenetics for predicting and diagnosing disorders of mental health.
- Understanding the challenges, needs, and priorities for ethics of neuroscientists who use imaging in their research.
- Characterizing knowledge translation and exchange strategies, and their strengths and weaknesses in the professional community whose research is devoted to dementia (in collaboration with geriatrician Dr. Lynn Beattie, the UBC Alzheimers Clinic, and the Canadian Dementia Knowledge Translation Network).
- Working with Aboriginal people to integrate traditional beliefs and medical explanations of genetic predisposition to neurodegenerative diseases such as dementia (also in collaboration with Dr. Beattie).
- Examination of physician practice and prescription patterns for enhancers of the body and mind, such as Viagra and Ritalin (under the leadership of Dr. Peter Reiner in the Department of Psychiatry).
- Harnessing for the first time the voice of persons with spinal cord injury and their extended network of caregivers and providers regarding their views on stem cell therapy (SCT). This work also led to collaboration plans with UBC Neurology's Dr. Helen Tremlett and Dr. Ana Luiza Sayao to compare and

contrast the view of these individuals versus those affected by chronic demyelinating disorders such as multiple sclerosis.

Neuroethics is also a platform for an exciting initiative focused on neurodevelopmental disorders that has been funded under the umbrella of the Network of Centres of Excellence, NeuroDevNet (www.neurodevnet.ca). This award will enable entirely new research at the intersection of neuroethics and neurodevelopmental disorders – initially Cerebral Palsy (CP), Autism Spectrum Disorder (ASD), and/or Fetal Alcohol Spectrum Disorder (FASD) – to UBC.

The more than dozen faculty, post-doctoral fellows, staff, and students in the Core also work hand-in-hand with practicing neuroscientists, clinical researchers, policy makers, and related stakeholders in British Columbia to promote and ensure a close consideration of ethics in research education and the clinical translational process. To achieve this goal, the Core has completed a series of studies to describe the landscape of ethics training in neuroscience curricula, and has been working toward developing ethical tools and resources that can be readily embraced by practicing neuroscientists in both research and clinical arenas. The Core has already launched a robust program of clinical neuroethics training for residents in neurology, psychiatry, radiology, and neurosurgery that gives them the opportunity to conduct research projects which have both a neuro and ethics component, and as well, to engage in scholarly journal clubs and seminars about difficult cases they experience in their daily lives.

Numerous writing projects among Neurology faculty were also initiated, and some are already completed during the past academic year. Dr. Jon Stoessl and Dr. Silke Cresswell contributed an ethical issues chapter in the management of Parkinson's disease to the Oxford Handbook of Neuroethics (J. Illes and B.J. Sahakian, Eds.; forthcoming, 2010). Dr. Robin Hsiung contributed a chapter on ethical concerns and pitfalls in neurogenetic testing to the same volume. And Dr. Claudia Jacova and Dr. Illes co-authored with Dr. Iina Singh from the London School of Economics and Dr. Paul Ford from the Cleveland Clinic a chapter called "Being and Thinking" for *A Patient's Survival Guide*, Cambridge University Press (T. Kushner, Ed., forthcoming).

Dr. Illes' research and the activities of the Core are made possible by generous support from the Institute of Neurosciences, Mental Health and Addiction (INMHA) of the Canadian Institutes of Health Research (CIHR), the Canada Foundation for Innovation (CFI), the British Columbia Knowledge Development Foundation (BCKDF), the National Institutes of Health (NIH/NIMH), the Vancouver Coastal Health Research Institute (VCHRI), the Michael Smith Foundation for Health Research (MSFHR), the Stem Cell Network (SCN), the Foundation for Ethics and Technology, the North Growth Foundation, and the Dana Foundation.

Neuromuscular Diseases Program

Clinical activities

The program consists of specialized weekly clinics for the diagnosis and treatment of Myasthenia Gravis, Myopathies, Peripheral Nerve disease, and Amyotrophic Lateral sclerosis. The program is closely associated with the Adult Metabolic diseases clinic and the ALS Centre at GF Strong. The Vancouver Hospital neurophysiology labs are integrated into the neuromuscular diseases program. The neuromuscular physicians held a Myasthenia Gravis Education day in October 2009. The clinic was the site of the annual Canadian Neurophysiology examinations in June 2009 where Dr Kristine Chapman was an examiner. Finally, Dr Hannah Briemberg runs a muscle biopsy clinic weekly serving the province, and a private donor has enabled us to fund a nurse educator position for the program.

Teaching and Educational Activities

The NMDU is active in the training of neurology and rehabilitation residents in clinical neuromuscular disease and neurophysiology under the supervision of Dr. Michelle Mezei. The program holds weekly rounds for the presentation of neurophysiologic topics and clinical cases, and once monthly neuropathology rounds where muscle

and peripheral nerve biopsies are reviewed. As well, a comprehensive two-year neuromuscular fellowship has also been established.

Research Activities

Activities include the participation in a multinational NIH funded trial assessing the efficacy of thymectomy in the management of Myasthenia Gravis, and the recently completed trials of Etanercept in Dermatomyositis and Talampanel in ALS. Dr Mezei has ongoing clinical research projects in mitochondrial diseases. Dr Charles Krieger has been awarded grants for the study of bone marrow derived cells as gene delivery vehicles in ALS.

Amyotrophic Lateral Sclerosis Program

Clinical Activities

The ALS Centre at GF Strong is a trans-disciplinary entity providing care, teaching, and basic research in the Vancouver area to provide clinical services to affected patients and their families. The ALS Centre is staffed by three neurologist physician-scientists (Drs. Briemberg, Cashman and Krieger), a psychiatrist (Dr. Travlos), and a specialized nurse coordinator (Marife Fabros), as well as the highly trained ALS Team at GF Strong, providing social work, physio- and occupational therapy, speech language assessment and therapy, and dietary guidance. The ALS Society of BC (ALSBC) and the ALS Centre have consolidated an innovative partnership to provide a successful outreach clinic program for areas of the province difficult to reach for disabled patients. Outreach clinics in 2009 included Victoria, Prince George, and Nanaimo. In recognition of their excellent care program, the ALS Team was awarded the Marcel Bertrand Exceptional Support Services Program Award, presented by ALS Canada.

Research Activities

Three major scientific programs are being conducted at the ALS Centre. Dr. Briemberg leads clinical trials for the ALS Centre in collaboration with other team members and with the encouragement and financial assistance of ALSBC. Two clinical treatment trials are underway, and an additional trial was completed by the newly founded Canadian ALS Clinical Trials and Research Network (CALS). In future, it is possible that the scope of clinical trials may expand with assistance from ALSBC to include new medical devices and technologies for improving the quality of life with ALS. Dr. Krieger's CIHR-supported basic scientific program at Simon Fraser University is focused on the engraftment of stem cells in the affected CNS of mouse models of ALS, with collaboration from Fabio Rossi at the UBC Biomedical Research Centre. Dr. Cashman is a Canada Research Chair in Neurodegeneration and Protein Misfolding Diseases at the UBC Brain Research Centre. With support from CIHR, CFI, BCKDF, and private donations, Dr. Cashman is conducting basic research on immunotherapies and vaccines to protein misfolding diseases, especially ALS.

Neuro-Oncology Program

Faculty

The Neuro-Oncology Program is a multidisciplinary program including members of the Divisions of Neurology and Neurosurgery, and Departments of Radiation and Medical Oncology. Its goals are to provide comprehensive care for patients with CNS malignancies and establish both clinical and translational research programs in Neuro-Oncology.

Clinical Activities

The BCCA Neuro-Oncology Site group has developed a business model of brain tumour research and care, titled BrainCare BC. This model has been the driving force to develop a new multidisciplinary clinic involving

neurosurgery, medical oncology, neurology, radiation oncology, nursing, and counseling and rehabilitation services.

Research Activities

Using funding obtained from last year's BC Cancer Foundation Gala fund-raising event for brain tumour research, a Brain Tumour Clinical Trials Unit was established at the BCCA to support ongoing clinical trials.

The group had the pleasure of welcoming Dr. Stephen Yip, molecular neuropathologist, to the BCCA to assist in molecular research of gliomas as well as help develop the brain tumour tissue repository and molecular diagnostic program for brain tumours.

Collaboration evolved over the past year with the BC Genome Science Centre and Calgary Neuro-Oncology group to develop a Terry Fox Research Initiative for the genomic analysis and therapeutic target development in gliomas.

Neuro-Ophthalmology Program

Faculty

There are 5 staff neuro-ophthalmologists including Duncan P. Anderson, Maryam Aroichane, Jason J.S. Barton, Janette I. Lindley, Chris J. Lyons. There are 7 adjunct clinical staff: Ray Bell, Victoria; David Neima, New Westminster; David Nelson, Langley; Briar Sexton, Vancouver; Martin Sutton Brown, Victoria; N. Kevin Wade, Vancouver and David Wakelin, Duncan.

Clinical Activities

The UBC Neuro-ophthalmology Division provides clinical teaching and research services at Providence Health Care (St. Paul's Hospital site), VHHSC (Eye Care Centre) and UBC Hospital. Consulting services are also provided at GF Strong Rehab and BC Children's Hospital. St. Paul's site has 4-5 neuro-ophthalmology clinics per week staffed by D Anderson (3 clinics) and J Lindley (1-2 clinics). VGH Eye Care Centre has 6 clinics per week staffed by D Anderson (4 clinics) and J Barton (2 clinics). UBC has 2 clinics per week in the Multiple Sclerosis Clinic staffed by D Anderson, J Lindley, and K Wade. Neuro-ophthalmology patients are also seen in private offices of B Sexton and K Wade. BC Children's hospital has 2 pediatric neuro-ophthalmology clinics per week staffed by M Aroichane and C Lyons. Botulinum toxin injection clinics are provided by Janette Lindley and Kevin Wade. There are satellite MS/neuro-ophthalmology clinics, one every 2 months in Burnaby staffed by D Anderson, and one in Comox. The monthly clinic at the Royal Jubilee Hospital in Victoria staffed by R Bell (director), J Barton, and D Wakelin, was transferred to the service of M SuttonBrown in July.

Research Activities

There were 29 research presentations, 11 invited research lectures, 8 clinical/teaching lectures and 52 articles or chapters published or in press at the time of this report. The research of the Human Vision and Eye Movement Lab was highlighted in the Faculty of 1000 Biology twice. We received press coverage from newspapers (Vancouver Sun), radio and TV (CBC Radio Calgary, CTV News, The Denver Channel), and magazines (The Scientist, The New Scientist, The Walrus), and for our work on handwriting and word encoding (Toronto Star).

Teaching Activities

The educational outreach of the program included a variety of key activities. Dr. L. Lanyon was invited for 3 invited lectures for 2009. The educational website operated by the division continues to be well used, receiving 1,390,076 hits and 97,754 visits in the last 12 months.

Pacific Parkinson's Research Centre

Clinical Activities

The Movement Disorders Clinic provided close to 4,000 outpatient visits in 2009. The majority of these were for patients with Parkinson's disease or focal dystonia. The program continues to be heavily supported by nurse coordinators, who provide education and counseling to patients, families and other health care professionals, as well as a physiotherapist and social worker.

Research Activities

In 2009, Centre investigators continued to receive support through a CIHR Team grant in Parkinson's Disease (\$4.45M over 5 years, beginning 2006), a Research Unit award from the Michael Smith Foundation for Health Research (\$800K over 4 years, starting 2006) and a Centre grant from the Pacific Alzheimer Research Foundation on Overlap Syndromes resulting in Dementia valued at more than \$7M over 5 years (PI Stoessl). Centre investigators continue to work on a number of other CIHR funded projects, including the natural history & progression of Parkinson's Disease, depression in PD, mechanisms of impulse control disorders in PD and mechanisms of the placebo effect. Through the collaboration with Mayo Clinic Jacksonville, centre investigators participate in studies on the genetics of PD and other disorders resulting in parkinsonism. This included the identification of mutations in the dynactin gene in patients with a rapidly progressive disorder known as Perry Syndrome (named for former UBC Professor Dr. Thomas L. Perry Sr.). Dr. Ruth and his collaborators continue to work on labeling of large molecules for positron emission tomography. Dr. McKeown holds a multidisciplinary MSFHR Team award on Monitoring and Control of Abnormal Brain Dynamics and is a co-investigator on a \$12.8M CFI grant for expansion of the ICICS facilities in biomedical technologies (PI: N. Rajapakse, ICICS, Mechanical Engineering). Dr. Tsui has conducted studies in collaboration with the School of Population Health on occupational risk factors for PD and data collection was finished in 2009 with analysis underway. Centre investigators had 28 PubMed listings during 2009, including papers in Nature, Nature Genetics, Brain, Eur J Neurosci, Nature Clinical Practice Neurology, Neurology and Neuroscience.

Teaching Activities

The Movement Disorders Clinic provides ambulatory teaching to medical students and to residents in neurology, geriatrics and psychiatry. During 2009, there were 4 fellows who worked in the PPRC. Faculty members of the Pacific Parkinson's Research Centre participate in the Brain & Behaviour course and provide training to multiple students at the MSc. and PhD levels in the Graduate Neuroscience program, as well as students in Chemistry, Physics & Astronomy and Electrical & Computer Engineering. PPRC faculty also provide a series of lectures to the Neurology residents on basic science applications to basal ganglia disease. Dr. Doudet took over as co-director of the Motor Systems module of the Systems Neuroscience (Neuroscience 501) core course in the Graduate Neuroscience program. Faculty members within the Centre serve on numerous supervisory, comprehensive and examination committees.

Epilepsy Program

Faculty

Dr. Mano Javidan and Dr. Tiffany Townsend are Co-Directors of the Epilepsy Program. Dr. Mano Javidan is also currently the Director of the Neurophysiology Lab at Vancouver General Hospital, as well as former president of the Canadian Society of Clinical Neurophysiology (CSCN) and former member of the Executive Board, Canadian Neurological Society Federation (CNSF). He has served as examiner for the EEG Board examination of CSCN since 1999.

Clinical Activities

Epilepsy Clinic: This has been a very active year. Patients with a wide range of epileptic disorders, diagnosis of spells, first seizure, complex and refractory epilepsy, as well as candidates for epilepsy surgery or complex medical treatment were assessed. Dr. Townsend and Dr. Javidan worked in the clinic 4-5 days a week.

Seizure Investigation Unit (SIU): This unit is located on T5B at VGH. It is the only adult epilepsy surgery program in British Columbia. In 2009, a total of 55 patients were monitored in the 2 bed SIU with 17 epilepsy surgeries performed and 3 with invasive monitoring. The technology within the SIU continues to advance with improved usage and accuracy of the seizure detection software. Extensive education is provided to the neurology nursing staff and patients/families by Janice Henrikson, a skilled nurse practitioner.

Dr. Dana Wittenberg, neuropsychologist, joined the program in autumn of last year and has been working full time since.

Dr. Woodhurst, our neurosurgeon, retired and the department of neurosurgery is in the process of recruiting a new epilepsy neurosurgeon.

Research Activities

Dr. Javidan has been actively developing a program of clinical research spanning the rates of non-convulsive status epilepticus, the localization and prediction of seizures by computerized analyses, the characteristics of patients with temporal lobe epilepsy, surgery without interictal epileptic activity on EEG, and the weighted value of interictal and ictal EEG activity in the surgical outcome of patients with temporal lobe epilepsy.

The article “The Rate of Occurrence of Non-convulsive Status Epilepticus in a General Hospital” was published in the European Journal of Epilepsy “Seizure” in January 2009. The project of the assessment of outcome of patients with non-convulsive status epilepticus in hospital is now finalized. One of the neurology residents was involved in this study. This work has been accepted for presentation in the American Academy of Neurology Meeting in April 2010, and will also be submitted for publication.

The study of seizure detection by wavelet analysis “Automated Real-Time Epileptic Seizure Detection in Scalp EEG Recordings Using an Algorithm Based on Wavelet Packet Transform” has already been accepted for publication in one of the most prestigious Bio medical engineering Journals “IEEE Transactions on Biomedical Engineering”.

Teaching Activities

The Epilepsy Program plays a key role in the education of Neurology residents and fellows. Neurology residents spend at least three months of their residency on the EEG/ Epilepsy rotation where they interpret outpatient and inpatient EEGs, admit, and are directly involved with the care of the patients in SIU and those seen in the Epilepsy Clinic, all under direct supervision. Drs. Javidan and Townsend are both active in CME and also have served as experts on provincial and national committees.

Basic Neuroscience Research Program

The Division’s basic neuroscience research is primarily conducted within the Brain Research Center at the UBC Campus. Areas of research include a focus on neuroimmunology, neurovirology, and neurochemistry.

The long-standing research interest in Dr. Yu Tian Wang’s laboratory has been on understanding fundamental mechanisms controlling synaptic transmission among neurons in the brain and the dysfunction of these mechanisms

in the pathogenesis of brain disorders such as epilepsy, stroke, and learning deficits. Dr. Wang and collaborators have developed an NR2B-derived peptide as an anti-excitotoxicity based stroke therapy and it has recently completed phase 1 of the trial. The results showed that the predicted efficacy dose of the peptide was well-tolerated by human subjects. The second phase 2A began in autumn, 2008 and is expected to be completed within the next year or two. Most recently, Dr. Wang and colleagues also discovered that activation of transcription factor SREBP1 which regulates the expression of genes involved in maintaining lipid homeostasis, as a critical step leading brain damage following stroke. This new discovery has led to the development of a new post-stroke neuroprotectant (*Nature Med.* 15:1399-1406, 2009). Beyond the research on stroke the Wang lab also continued their investigations on the pathogenesis of epilepsy and molecular mechanisms underlying learning and memory.

The labs of Drs. Steven Pelech, Joel Oger, Lorne Kastrukoff, and Neil Cashman contribute to divisional research in basic neuroscience research.

Appointments and Promotions

Dr. Kristine Chapman was promoted to the rank of Clinical Assistant Professor from Clinical Instructor with effect from July 1, 2009.

Dr Jacqueline Petterson was appointed to the rank of Assistant Professor with effect January 1, 2009.

Dr Noah Siverberg was appointed to the rank of Clinical Instructor with effect March 1, 2009.

Dr. Oscar Benavente was appointed to the rank of Professor with effect from September 1, 2009.

Special Honours and Awards

Dr Helen Tremlett was awarded Stephen C. Reingold Award for Highest Merit-Ranked Project in Research.

The ALS Centre at GF Strong Rehabilitation Centre as received the ALS Society of Canada Marcel Bertrand Exceptional Support Services Group Program Award.

Dr. Jacqueline Pettersen awarded the UBC Roche Award for Excellence in Clinical Skills Teaching for the second year medical class, Northern Medical Program, 2009.

Dr. Jeff Beckman was awarded the UBC Department of Medicine Fay R. Dirks Award for Excellence in Teaching at VGH.

Dr. Jason Barton received the Faculty of Medicine Special Meritorious Recognition Distinguished Achievement Award for overall excellence.

Dr. Jon Stoessl was inducted as a Fellow of the Canadian Academy of Health Sciences.

Publications by Fellows/Students/Residents

1. **Briscoe N**, and Michelle Mezei. *Polyglandular Autoimmune Syndrome Type 3 in a patient with Ocular Myasthenia Gravis*. *Muscle and Nerve* 2009.40:6;1064-5
2. **Field TS**, Barton JJ. Wallenberg's lateral medullary syndrome. In: eTextbook of Eye Movements, Barton JJ, ed. 2009; <http://www.neuroophthalmology.ca/textbook/NOeyemovt.html> [currently being formatted for the website]

3. **Pfeffer G**, Prout AJ, Hooge JP, Maguire J. Biopsy-proven immune reconstitution syndrome associated with HIV and cerebral toxoplasmosis. *Neurology* 2009;73:321-322
4. **Pfeffer G**, Cote HCF, Montaner JS, Li CC, Jitratkosol M, Mezei MM. Ophthalmoplegia and ptosis: mitochondrial toxicity in HIV patients on therapy. *Neurology* 2009;73:71-72
5. **Puangthong U** & Hsiung, GYR. Critical appraisal of the long-term impact of memantine in treatment of moderate to severe Alzheimer's disease. *Neuropsychiatric Disease and Treatment* 2009;5:553-561.
6. **Sayao AL**, Heran MK, Chapman, K, Redekop G, Foti D. Intracranial hypotension causing reversible frontotemporal dementia and coma. *Can J Neurol Sci.* 2009 Mar;36(2):252-6.