



BULLETIN

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**HUMAN MINDS
ARE LIKE
PARACHUTES—
WORK BETTER
WHEN OPEN**

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MESSAGE FROM THE DIRECTOR

Welcome to the first edition of the Bulletin, BBI's newsletter. The aim of the newsletter is to bring issues of interest of the BBI's achievements to our researchers, partners and supporters.

BBI's integrated research program was established to study the complex two-way interactions between the brain and the nervous system and bodily disease processes. The scope of the research program demands collaborative efforts bringing together individuals from diverse disciplines to address questions at the edge of our scientific understanding. A major effort has been made to recruit new scientists and over the past three years we have successfully recruited seven. Their backgrounds are diverse but they all share a common interest in the aims and goals of the BBI.

Some of our researchers and their support teams have moved into the new Tower building at St. Joseph's where they have been

provided with new laboratory facilities, have access to conference rooms, library and auditorium and to state-of-the-art technology in the Imaging Research Centre, home to a 3T fMRI and PET-CT. These new facilities provide a collaborative environment for BBI's researchers to work together and foster relationships with other researchers at St. Joseph's and McMaster University and into the international community.

The newsletter will be issued in the Spring, Fall and Winter. Our research profile in this edition will be on Dr. Claudio Soares. We will highlight some on-going research collaborations, new awards received by our researchers and introduce you to some of our students. We are looking for your input and hope that you will bring us your latest research developments and share them with all of us who want to know more about the BBI.

John Bienenstock

RESEARCH PROFILE



Dr. Claudio Soares—Director of the Women's Health Concerns Clinic and Member of the Brain-Body Institute

Claudio Soares is an Associate Professor of Psychiatry and Behavioural Neurosciences at McMaster University and the Director of the Women's Health Concerns Clinic at St. Joseph's Healthcare. Dr. Soares is a psychiatrist who earned his medical degree and later his PhD in Psychoneuroendocrinology from the University of Sao Paulo Medical School in Brazil. His post-doctoral fellowship in Perinatal and Reproductive Psychiatry was completed in 2001 at the Massachusetts General Hospital (MGH), Harvard Medical School. Dr. Soares served as Director for Research at the MGH

Perinatal Psychiatry Program until 2004 where he still holds an active academic appointment as an Assistant Professor at Harvard Medical School. In 2005 he was appointed Associate Professor of Psychiatry and Behavioural Neurosciences at McMaster University and a member of the Brain-Body Institute.

He is the recipient of numerous honours and awards including the North American Society for Psychosocial Obstetrics and Gynecology (NAPSOG) Award, and 2 National Alliance for Research on Schizophrenia and Depression (NARSAD) awards. He has written extensively in the area of

women's mental health and recently he was nominated the Associate Editor for the *Journal Watch Women's Health*, from the publishers of the *New England Journal of Medicine*.

Dr Soares' research career has focused on the design and conduct of various research projects related to female reproductive mood and anxiety disturbances. His research interests are primarily devoted to the evaluation of new treatments for female-specific psychiatric disorders, including premenstrual dysphoric disorder, and hormonal and non-hormonal interventions for treating depression and other complaints during the menopausal

transition.

His most recent areas of interest include the assessment and treatment of reproductive related trauma and post-traumatic stress disorders (PTSD) in women, and risk factors for psychiatric morbidity among female immigrants. This project is in collaboration with members of the Brain-Body Institute and with links to the Faculty of Social Sciences at McMaster University. Another project he is working on in collaboration with BBI members involves the diagnosis and treatment of premenstrual asthma and the impact of sex hormones.

RESEARCH COLLABORATIONS

The complexity of the scope of the BBI research program demands a collaborative effort and requires researchers from diverse disciplinary backgrounds. BBI's collaborations are locally based and international. Below are highlights of a few ongoing research collaborations.

John Bienenstock has held a Science Foundation of Ireland Visiting Scientist award for the last couple of years to work with the Alimentary Pharmabiotic Centre in Cork University. The Director of this institute is **Dr. Fergus Shanahan** who is well known in gastroenterology and mucosal immunology and is an Associate Member of the BBI. This group has significant strength in molecular microbiology and scientific depth in the field of intestinal ecology, physiology, etc., and is located contiguous with the National Centre for Food Safety. In Dr. Bienenstock's lab **Hanneke van der Kleij** is completing a study there of the effects of vagotomy in various models of inflammation such as the SCID model of colitis. **Dr. Lothar Steidler**, who was the first to bioengineer the Lactococcus to synthesize local IL-10 in the intestine and showed that this could inhibit the colitis of IL-10 transgenic knock-out animals, is also a collaborator. He now has engineered the Lactococcus to produce nerve growth factor and Dr.

Bienenstock is now studying this in other models of inflammation. **Paul Forsythe** has also spent time in Cork and there is a continuing collaboration on the role of intestinal micro-organisms on the lung including models of asthma. As a consequence to this collaboration Dr. Bienenstock has available a furnished house in Kinsale on the coast for anyone who wishes to conduct some collaborative research activity or visit.

Glenda MacQueen and co-investigators **Geoff Hall**, **Jane Foster**, **Kathryn Macdonald** and **Valerie Taylor** received funding from AstraZeneca to study the structural, functional, chemical, behavioural, clinical and genetic variables in patients with mood disorders prior to first treatment and following treatment with medications from key treatment classes. Use of a never treated patient group represents an ideal opportunity to evaluate patients without the confounding factor of medication (past or present) and then to examine the effect of medication using converging techniques. The researchers believe that the knowledge from this study has the potential to advance our basic understanding of the neurobiological abnormalities underlying mood disorders. Furthermore this study may provide us with key information regarding the factors (genetic basis as revealed through imaging) that predict

response to medications from key classes including antidepressants, lithium, and the atypical antipsychotic medications. Such information may have direct applicability of treatment for patients with mood disorders.

Michael Noseworthy has developed a collaboration with **Dr. Dinesh Kumbhare** in Rehabilitation Medicine who is an Associate Member of the BBI. Together they are developing new MRI approaches to assessing muscle and connective tissue damage. These tissues are classically anisotropic in terms of water diffusivity. Using this concept, optimization of diffusion tensor imaging (DTI) was done and applied to show fiber orientation in 3D space. This new approach reveals damaged fibers with clarity never before observed.

A further collaboration with members of the Firestone Institute, including **Prof. Myrna Dolovich**, will see the future development of lung MR imaging using hyperpolarized ^3He and ^{129}Xe gases.

Meir Steiner and his research team are studying postpartum depression (PPD) in new mothers and how it can be prevented. Central to their investigation is whether sleep deprivation, a state familiar and common among new mothers, is a cause for PPD. They want to know the effects of reducing that deprivation during the first week after

birth. The program was piloted and implemented at St. Joseph's Healthcare. Currently they are doing a randomized, controlled trial with three other hospitals in Ontario. This is a two year trial and the hope is that in the future, the positive results of this program will become policy everywhere.

Dr. Steiner is involved in another important study looking at whether a mother's stress, anxiety, or depression during pregnancy affects the baby. This latter study entitled the MAVEN

Study—Maternal Adversity, Vulnerability and Neurodevelopment is a multi-centered investigation taking place in Montreal, Toronto and Hamilton. WHCC (Women's Healthcare Concerns Clinic) is leading the clinical arm of the study with the motto: "Healthy Pregnancy for Great Life Beginnings". The study includes clinical, psychological, endocrinological and genetic assessments as well as preventive and therapeutic interventions with long-term follow up of both moms and their babies.

Science has already proven the potential ill-effects on the foetus of alcohol and/or drug abuse as well as smoking during pregnancy. This study is specific to stress. This is difficult to measure and it is difficult to know what to do about it. The study hopes to provide a better understanding on how much damage stress might potentially cause if it is not dealt with during pregnancy.

Dr. Steiner is the Founding Director of the Women's Healthcare Concerns Clinic (WHCC) and a member of the Brain-Body Institute.

STUDENT PROFILES

Each edition will feature the work of one of our students.

Valerie Taylor holds both a B. Med Sc and an MD. She completed her FRCPC training in psychiatry at McMaster University in 2004. Dr. Taylor is currently completing a 2-year research fellowship in Mood Disorders with the Faculty of Psychiatry and Behavioural Neurosciences and a PhD in Medical Science. Her primary research focus is

on the association between obesity and physical illness, especially metabolic syndrome, in patients with mood disorders. She is also examining the role of the immune system in patients with co-morbid mood disorders and physical illness. Dr. Taylor does clinical research work at the Obesity Clinic at the General Hospital and has established a Somatic Health Mood Disorders Program at St. Joseph's Healthcare to address issues pertaining to the medical management of physical co-morbidities in patients with

mood disorders.

Dr. Taylor is the first recipient of the Etherden-Sluzas Fellowship from St. Joseph's Healthcare, the Ontario Council of Graduate Studies, and a Regional Medical Association grant. She has also received funding from OMHF and Lilly Neuroscience and has just been awarded a grant from the Hamilton Community Health and Education Fund. The latter two grants are for the Somatic Health Program which she has created.

NEW AWARDS

John Bienenstock has been awarded a grant from the Defense Advanced Research Program Agency (DARPA) for US \$350,000 (one year) to study "Thinking with the gut: enhancing cognitive performance with probiotics". Co-Investigators include **Paul Forsythe**, **Boris Sakic** and **Jane Foster**.

Glenda MacQueen has received an award from AstraZeneca for \$1 million over five years for a project on the "Structural, functional and biochemical changes in selected brain regions of patients with mood disorders prior to and

following treatment with selected classes of medication". **Jane Foster** and **Geoffrey Hall** are co-investigators on the project.

Boris Sakic has received funding from the CIHR in the amount of \$291,345 over three years to study "Brain-reactive autoantibodies: origin, structure, and effects on behaviour".

Michael Noseworthy has received funding from NSERC in the amount of \$105,000 for 5 years to study "Microvascular evaluation using

correlative magnetic resonance imaging, analytical electron microscopy, and non-linear dynamics".

Jane Foster has received an award from the OMHF for \$150,000 for 2 years to study "Genetics of hippocampal structure and function in depressed patients". **Glenda MacQueen** is a co-investigator on this project.

Dr. Foster has also received an award from NSERC in the amount of \$165,000 for 5 years to study "Class I MHC and neuroplasticity—a novel role for a classical immune molecule".

IN THE NEWS

At this year's North American Society of Psychosocial Obstetrics and Gynecology

meeting, the Junior Investigator's known as The Steiner Young Investigator's Symposium was renamed. It will now be Investigator's Symposium. This honor

was bestowed upon **Dr. Meir Steiner**, for his years of research and mentorship in the field of women's mental health, as well as for his many years of leadership and support of the Society.

In December 2005 **Dr. Michael Noseworthy** presented to a senior group at Novartis Pharmaceuticals in Basel, Switzerland on "Advanced MRI applications for detection and quantitation of difficult tissues: micro-structural and functional changes in

muscle injury/repair, spinal cord, and lung tissues". In January 2006 he

presented at the University Health Network in Toronto on "Medical imaging solutions for research and clinical use". In February 2006 he presented to AstraZeneca in Lund, Sweden on "MR imaging of the lung".

In March 2006 **Dr. Jane Foster** presented at FSORC Basic Science Seminars on "Immune-brain interactions—keeping neurons alive and

In April 2006 **Dr. Boris Sakic** presented at FSORC Basic Science Seminars on "Brain degeneration and proposed pathogenic mechanisms in systemic autoimmune disease".

UPCOMING EVENTS



Mood Disorders Program Academic Half Day

Thursday, July 13, 2006
12:00 -4:30 pm
St. Joseph's Healthcare, T2203

STRESS, FROM BASIC SCIENCE TO CLINICAL APPLICATION

Dr. Harvey is Research Programme Leader, Drug Research and Development Focus Area, at North-West University, South Africa and also Co-Director (pre-clinical research) at the MRC Unit on Anxiety and Stress Disorders. In recent years, his research activities have seen increasing collaboration with internationally recognized scholars in neuroscience.

From his post-graduate years to the present day, Dr. Harvey has been actively involved in research into the neurobiology and pharmacology of neuropsychiatric illness, most notably depression, schizophrenia, post-traumatic stress disorder, obsessive compulsive disorder and tardive dyskinesia. His current focus is the study of cell signalling and mechanisms of cellular resilience in these illnesses, and the action of psychotropic drugs using in vitro and in vivo animals models.

For additional information or to RSVP contact: Cathy Preete, 905-522-1155 ext 5409 or cpreete@stjosham.on.ca

Key Speaker: Brian H. Harvey—PhD

PUBLICATIONS

Mabbott DJ, **Noseworthy MD**, Goettsche G, Mao YK, Wang YF, Laughlin S, Rockel C, Bouffet E, Tougas G, **Bienenstock J**. Inhibitory effects of Lactobacillus reuteri on atypical antipsychotic drug-induced Diffusion tensor measures of white matter following cranial radiation in visceral pain induced by colorectal childhood: Relations with intellectual distension in Sprague Dawley rats. *Gut* 40, 2006. function. *Neuro-Oncology* 2006 (in Press).

Zaraiskaya T, Kumbhare D, **Noseworthy MD**. Diffusion tensor imaging and fibre tractography of injured human skeletal muscles. *J Magn Reson Imag* 2006.

Kamiya T, Wang L, Forsythe P, Sondhi S, Castellano JM, Chong VZ, Rogoza RM, Sloblenick KJ, Dyck BA, Gabriele J, Thomas N, Ki K, Pristupa ZB, Singh AN, MacCrimmon D, Voruganti P, **Foster J**, Mishra RK. cDNA array reveals increased expression of glucose-dependent insulinotropic polypeptide following

Anderson KK, Ballok DA, Prasad N, Szechtman H, **Sakic B**. Impaired response to amphetamine and neuronal degeneration in the nucleus accumbens of autoimmune MRL-1lpr mice. *Behav Brain Res* 166(1): 32-8, 2006.