Department of Psychiatry

University of Alberta
Edmonton, AB, Canada

Tuesday June 26th, 2012
Welcome to the 11th Annual Psychiatry Research Day at the University of Alberta!

Our department has an internationally recognized record of research going back to the early days of Dr. Bill Dewhurst’s chairmanship. A psychiatrist and neurochemist, Dr. Dewhurst recognized the importance of having basic science researchers included in clinical departments and of encouraging collaborative research between basic science and clinical researchers. As cofounder of the Neurochemical Research Unit, Dr. Dewhurst was a pioneer in the area of “trace amines” and suggested in the 1960s, after conducting a series of elegant studies which resulted in a number of seminal publications including a major paper in *Nature*, that these compounds had an important role to play in psychiatric disorders. Since those early days, the number of basic science and clinical researchers in our Department has grown significantly, and we now have active programs in many areas relevant to psychiatry including neurochemistry, neuropsychopharmacology, psychotherapy, neuroimaging, epidemiology, neuropsychiatry and translational neuroscience, with newer programs evolving in other areas. Many of these programs involve collaborative research with colleagues from other departments and institutions locally, nationally and internationally.

Over the years, the Department of Psychiatry has developed very strong MSc and PhD programs to complement our excellent residency program, with some of our residents enrolled in our MSc program currently. Our graduate students and postdoctoral fellows represent our department exceedingly well by winning many national, provincial, university and faculty scholarships and awards and by disseminating their diverse and innovative research at scientific conferences throughout the world. These junior colleagues play an important role in keeping our department on the international stage of psychiatric research.

For this, our 11th Research Day, the keynote speaker is Dr. Antoine Bechara. Dr. Bechara is a Professor of Psychiatry and Management in the Department of Psychiatry and Desautels Faculty of Management at McGill University and Douglas Institute in Montréal. Dr. Bechara, Canada Research Chair (Tier 1), investigates “decision neuroscience”, or how the brain makes decisions, integrating the study of brain physiology with behaviour, enhancing the understanding of human decision-making events with a focus on individuals with psychiatric disorders or addictions. This novel multidisciplinary area studies human decision-making using a variety of laboratory behavioral decision tasks, neuroscientific analyses, functional neuroimaging and psychophysiological techniques, as well as pharmacological manipulations. Dr. Bechara’s highly anticipated keynote presentation at Psychiatry Research Day is entitled, *“Decision-making and Addiction.”*

The remainder of our research day will feature talks by faculty, graduate students and departmental collaborators, as well as two poster session presentations by our research trainees and collaborators. The top presentations by research trainees will be acknowledged with awards, namely the Geoff Hopkinson Award, the Gordon King Award, and the Glen Baker Research Award. We thank Drs. Katherine Aitchison, Andy Greenshaw, Nikolai Malykhin, and Esther Fujiwara for agreeing to serve as judges for these awards. We also thank Drs. Katherine Aitchison and Hannah Pazderka for their valuable presentations. There will also be a presentation to the winners of a major departmental research prize, the Roger C. Bland award for overall
excellence in research; we thank Dr. Esther Fujiwara and Graduate Program Committee for evaluating the applications for this award. Dr. Esther Fujiwara will also present the prize for the best presentation by a graduate student over the past year in the Grand Rounds lecture series.

We are grateful to all our research trainees and their supervisors for their overall contribution to the vital research component of our department, and to Tara Checknita for providing excellent ongoing administrative support for our research program. Special thanks this year go to Ashley Radomski and Yasmeen Kameddine (our graduate student representatives), Dr. Esther Fujiwara (our graduate program director) and Ms. Checknita for their tireless efforts in organizing this Research Day. We also gratefully acknowledge financial support from several sources for this important venture, and these contributors are indicated in the book of abstracts.

Thank you for joining us in celebrating our research accomplishments for the past year.

Best wishes,

Jean-Michel LeMellédo, Professor
Acting Chair of the Department of Psychiatry
ACKNOWLEDGEMENTS

The Department of Psychiatry is grateful to the following for providing financial support*:

ASTRAZENECA CANADA INC.

BRISTOL-MYERS SQUIBB CANADA CO.

DEPARTMENT OF PSYCHIATRY, UNIVERSITY OF ALBERTA

ELI LILLY CANADA INC.

GEOFF HOPKINSON MEMORIAL FUND

GRADUATE STUDENTS’ ASSOCIATION

JANSSSEN-ORTHO INC.

LUNDBECK OF CANADA

W. G. DEWHURST MEMORIAL FUND

*Listed in alphabetical order
11th Annual Psychiatry Research Day Itinerary

8:45 AM – 9:00 AM  Opening Remarks

9:00 AM – 10:00 AM  Keynote Address

Dr. Antoine Bechara
Decision-making and Addiction

10:00 AM – 11:00 AM  Student Poster Session (1)

11:00 AM – 12:00 PM  Student Presentations

Yasmeen Krameddine
Interactive Training of Police Officers Regarding Various Psychiatric Illnesses: A Novel Role-Play Approach Leading to Improvements in Officer Behaviour

Victoria Suen
Effect of Expert Advice in the Stock Market: What Influence Does Advice Have?

Ashley Radomski
Decision Making with Explicit Rules in Patients with Multiple Sclerosis

12:00 PM – 1:00 PM  Break for Lunch

1:00 PM – 2:00 PM  Faculty Presentations

Dr. Hannah Pazderka
Impulsivity, Emotionality and Addictive Behavior: Exploring the "Hot" Side of Frontal Lobe Functioning in Children and Adolescents

Dr. Katherine Aitchison
Ecstasy: the "love drug" – or is it?

2:00 PM – 4:00 PM  Student Poster Session (2)

3:00 PM – 5:00 PM  Afternoon Refreshments

4:30 PM  Award Presentation
*W.G. Dewhurst Memorial Lecture*

9:00 AM – 10:00 AM

Dr. Antoine Bechara

Professor, Department of Psychiatry and Desautels Faculty of Management, McGill University

Dr. Antoine Bechara received his Ph.D. from the University of Toronto in 1991. By 1997, Dr. Bechara was a Professor of Neurology at the University of Iowa College of Medicine, and remained there until 2005. From 2005-2009, Dr. Bechara relocated to the University of Southern California, where he conducted research in the Department of Psychology and Brain and Creativity Institute. Since 2009, Dr. Bechara has served as a Professor of Psychiatry and Management in the Department of Psychiatry and Desautels Faculty of Management at McGill University and Douglas Institute in Montréal. Dr. Bechara has recently received a Canada Research Chair in Decision Neuroscience (Tier 1) and is probably the best known scientist in this intersection between neurology, psychiatry and economic sciences. Dr. Bechara's impressive scientific achievements are further supported by his 159 peer-reviewed publications, 19 book chapters and one patent. His work has been crucially important to our current understanding of the neural basis of judgment and decision-making, social behavior, and their disturbance in psychiatric and neurological conditions. For example, Dr. Bechara created the Iowa Gambling Task (originally published in 1994 in *Cognition*, >700 citations). This was the first standardized test to assess the decision-making deficit observed in many patients with frontal lobe syndrome, a deficit that was difficult to detect and quantify in these patients in clinical settings. This task is now widely used for clinical as well as investigative studies all over the world. Other high-impact work demonstrated the non-conscious nature of decision-making (1997, *Science*), implicated the frontal lobes in addictions (2001, *Neuropsychologia*), and the insula in the recovery from addictive behaviours (2007, *Science*). Besides many research awards (including an honorary doctorate at the University of Cordoba), he serves on the editorial board for several influential journals.

Decision-making and Addiction

I will review neuropsychological evidence implicating three key neural systems in complex decision-making: (1) An impulsive, amygdala- striatum-dependent, system for signaling immediate prospects and mediating automatic and habit behaviors, and (2) A reflective, prefrontal cortex-dependent, system for signaling future prospects and for exerting control over the impulsive system. I will review evidence for several mechanisms of impulse control in the reflective system, and the vulnerability of this system during development. Most importantly, the dynamics of these two neural systems can be altered significantly under the influence of homeostatic perturbations brought about by conditions such as deprivation, craving, or even stress, depression, and anxiety. One key neural structure that mediates these homeostatic signals is (3) the insula, where bottom-up (body) signals sensitiz the impulsive system, and even “hijack” the top-down cognitive resources needed for the normal function of the reflective system, such as when exercising willpower to resist the temptation to smoke or to use drugs in addicted individuals. I will review the evidence showing that lesions of the insula wipe out smoking addiction. Thus one learning objective of this presentation is gaining an understanding of the neural basis of decision-making and impulse control, based on work in patients with focal brain damage. A second objective is gaining an overview of how different sets of neuropsychological tests are linked to different mechanisms of decision-making and impulse control that are sub-served by different neural regions.
# STUDENT PRESENTATIONS

11:00 AM – 12:00 PM

<table>
<thead>
<tr>
<th>PRESENTER</th>
<th>PROGRAM</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yasmeen Kramedine</td>
<td>M.Sc.</td>
<td><em>Interactive Training of Police Officers Regarding Various</em></td>
<td>10</td>
</tr>
<tr>
<td>Dr. Peter Silverstone</td>
<td></td>
<td><em>Psychiatric Illnesses: A Novel Role-Play Approach Leading</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>to Improvements in Officer behaviour</em></td>
<td></td>
</tr>
<tr>
<td>Dr. Peter Silverstone</td>
<td></td>
<td><em>Does Advice Have?</em></td>
<td></td>
</tr>
<tr>
<td>Ashley Radomski</td>
<td>M.Sc.</td>
<td><em>Decision Making with Explicit Rules in Patients with</em></td>
<td>12</td>
</tr>
<tr>
<td>Dr. Esther Fujiwara</td>
<td></td>
<td><em>Multiple Sclerosis</em></td>
<td></td>
</tr>
</tbody>
</table>

# FACULTY PRESENTATIONS

1:00 PM – 2:00 PM

<table>
<thead>
<tr>
<th>PRESENTER</th>
<th>POSITION</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Hannah Pazderka</td>
<td>Director of Research</td>
<td><em>Impulsivity, Emotionality and Addictive Behavior: Exploring</em></td>
<td>13</td>
</tr>
<tr>
<td>Department of Psychiatry</td>
<td>CASA Child, Adolescent and Family Mental Health</td>
<td><em>the &quot;Hot&quot; Side of Frontal Lobe Functioning in Children and Adolescents</em></td>
<td></td>
</tr>
<tr>
<td>Dr. Katherine Aitchison</td>
<td>Alberta Centennial Addiction &amp; Mental Health Research Chair, Professor of Psychiatry</td>
<td><em>Ecstasy: the &quot;love drug&quot; - or is it?</em></td>
<td>14</td>
</tr>
<tr>
<td>Poster #</td>
<td>PRESENTER</td>
<td>PROGRAM</td>
<td>TITLE</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td>Dr. Saleem Al-Nuaimi</td>
<td>Resident M.Sc.</td>
<td>Progress and Understanding Future Sights in Schizophrenia</td>
</tr>
<tr>
<td></td>
<td>Dr. Glen Baker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Dr. Simona Folescu</td>
<td>Resident M.Sc.</td>
<td>An Audit of High Dose Antipsychotic Prescribing in Psychiatry</td>
</tr>
<tr>
<td></td>
<td>Dr. Serdar Dursun</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sara Gilliam</td>
<td>M.Sc.</td>
<td>Decision Making Alterations in People with HIV</td>
</tr>
<tr>
<td></td>
<td>Dr. Esther Fujiwara</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Marnie MacKay</td>
<td>M.Sc.</td>
<td>Effects of L-Argine-Induced Nitric Oxide Production in Schizophrenia: A Randomised, Double-blind, Placebo-controlled Study</td>
</tr>
<tr>
<td></td>
<td>Dr. Serdar Dursun</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Brenda Maire</td>
<td>M.Sc.</td>
<td>Group Cohesion in Substance Abuse Treatment</td>
</tr>
<tr>
<td></td>
<td>Dr. Anthony Joyce</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Dmitriy Matevychuk</td>
<td>M.Sc.</td>
<td>In Vitro Metabolism of Phenelzine to 2-Phenylethylidenehydrazine (PEH) and Comparison of In Vivo Effects of PEH Isomers on Rat Brain Levels of Amino Acids</td>
</tr>
<tr>
<td></td>
<td>Dr. Glen Baker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Marghalara Rashid</td>
<td>M.Sc.</td>
<td>Methods of Data Collection in Ethnography</td>
</tr>
<tr>
<td></td>
<td>Dr. Amanda Newton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Carlee Ruddy</td>
<td>M.Sc.</td>
<td>Concurrent Disorders: Youth in the Alberta Treatment Continuum</td>
</tr>
<tr>
<td></td>
<td>Dr. Anthony Joyce</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Yanlin Wang</td>
<td>Ph.D.</td>
<td>Roles of IGF-II Receptor in APP Processing and Aβ Metabolism</td>
</tr>
<tr>
<td></td>
<td>Dr. Satya Kar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Lauren Alston</td>
<td>M.Sc.</td>
<td>Eye-Tracking and Memory in Repressive Coping Style</td>
</tr>
<tr>
<td></td>
<td>Centre for Neuroscience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Degree</td>
<td>Title</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------</td>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>11</td>
<td>Branden Ayotte</td>
<td>Undergraduate</td>
<td>Psychological and Medical Prenatal Events with Dissociable Effects on Psychological Health in Late Adolescence</td>
</tr>
<tr>
<td></td>
<td>Department of Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Curtis Benson</td>
<td>M.Sc.</td>
<td>Motor and Non Motor Outcomes of the MAO Inhibitor Phenelzine in Mice with EAE</td>
</tr>
<tr>
<td></td>
<td>Centre for Neuroscience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Aleksandra Dimitrijevic</td>
<td>Undergraduate</td>
<td>The Applied Genomics Centre (TAGC).Applications: Multiplex Approaches to SNP Detection</td>
</tr>
<tr>
<td></td>
<td>Department of Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Stanislau Hrybouski</td>
<td>M.Sc.</td>
<td>Resting-State Functional Neural Networks in the Human Brain are Consistent Across Acquisition Protocols and Field Strength</td>
</tr>
<tr>
<td></td>
<td>Centre for Neuroscience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Yushan Huang</td>
<td>M.Sc.</td>
<td>Hippocampal Subfield Differences Between Subjects with Major Depressive Disorder as Seen on the 4.7T MRI</td>
</tr>
<tr>
<td></td>
<td>Centre for Neuroscience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Sam Joshva Baskar Jesudasan</td>
<td>Ph.D.</td>
<td>Characterization of Spinal Cord Microglia</td>
</tr>
<tr>
<td></td>
<td>Centre for Neuroscience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Leah Luoma</td>
<td>Ph.D.</td>
<td>Identifying Neuropsychological and Cognitive Endophenotypes of Schizophrenia-Associated Exonic Variants of NPAS3 and COMT</td>
</tr>
<tr>
<td></td>
<td>Department of Medical Genetics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Gomathith Ramakrishnan</td>
<td>M.Sc.</td>
<td>Mechanisms and Efficacy of Transient Aortic Occlusion for Treatment of Acute Ischemic Stroke</td>
</tr>
<tr>
<td></td>
<td>Center for Neuroscience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Bernice Sist</td>
<td>Ph.D.</td>
<td>Spatiotemporal Profile of Spinal Plasticity Following Photothrombotic Stroke of the Sensorimotor Cortex</td>
</tr>
<tr>
<td></td>
<td>Center for Neuroscience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Scott Travis</td>
<td>Ph.D.</td>
<td>Subfield Volumes in the Posterior Hippocampus and Cortisol Levels Predict Performance on Memory Tasks in Patients with Major Depressive Disorder</td>
</tr>
<tr>
<td></td>
<td>Center for Neuroscience</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DEPARTMENT OF PSYCHIATRY AWARDS
FOR RESEARCH TRAINEES

GENERAL DEPARTMENTAL AWARDS

Roger C. Bland Graduate Award in Psychiatric Research
This award is offered annually to a graduate student who has demonstrated excellence in psychiatric research. The award will consist of $1000 and a certificate bearing the recipient’s name.

Department of Psychiatry 688 Award
This award is offered annually to a graduate student for the best overall presentation in the graduate seminar series, as judged by peers. This award consists of $200 and a certificate bearing the recipient’s name.

RESEARCH DAY AWARDS FOR PRESENTATIONS BY RESEARCH TRAINEES

Gordon King Award
This award is named in honour of Dr. Gordon King, a child psychiatrist with a strong interest in psychopharmacology. Preference will be given to research trainee presentations in child psychiatry or psychopharmacology, but any area of research is eligible. The award will consist of $500 and a certificate bearing the recipient’s name.

Geoff Hopkinson Award
This award is named in memory of Dr. Geoff Hopkinson, a long-time member of the Department of Psychiatry. Dr. Hopkinson was particularly interested in the training of psychiatry residents and graduate students. Preference for the award will be given to research trainee projects on the neurobiology of psychiatric disorders, but any area of psychiatric research is eligible. The award will consist of $500 and a certificate bearing the recipient’s name.

Glen Baker Research Award
This award is named after Dr. Glen Baker, a former Chair of Psychiatry and a former Canada Research Chair who is currently a University of Alberta Distinguished University Professor. The award can be given for any area of psychiatric or neurologic research conducted by a research trainee and will consist of $500 and a certificate bearing the recipient’s name.

JUDGES

DR. KATHERINE AITCHISON
DR. ESTHER FUJIWARA
DR. ANDY GREENSHAW
DR. NIKOLAI MALYKHIN
INTERACTIVE TRAINING OF POLICE OFFICERS REGARDING VARIOUS PSYCHIATRIC ILLNESSES: A NOVEL ROLE-PLAY APPROACH LEADING TO IMPROVEMENTS IN OFFICER BEHAVIOUR

Yasmeen I. Krameddine¹, Peter H. Silverstone¹, David DeMarco ², Robert Hassel ²

¹Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, krameddi@ualberta.ca, peter.silverstone@ualberta.ca
²Edmonton Police Service, Edmonton, AB, Canada, David.DeMarco@edmontonpolice.ca, Bob.Hassel@edmontonpolice.ca

Police officers constantly interact with individuals exhibiting varying forms of mental illness. This interaction lacks understanding by both parties and may result in poor outcomes. The need to strengthen communication between police officers and mentally ill individuals is widely recognized, but is poorly researched. For these reasons a novel training program was created in close collaboration with the Edmonton Police Service focusing on how to best interact with individuals suffering from different psychiatric disorders. This training incorporates the use of professional actors carefully trained in 6 role-play scenarios, depicting various forms of mental illness. Over a 2-month period, 663 police officers participated in training. Goals of training aim to increase knowledge and empathetic understanding regarding issues encountered by mentally ill individuals, as well as awareness of officer verbal and non-verbal techniques of communication. Measurements of attitudes and behaviour at baseline and 6 months show no change in attitudes but significant improvements in behaviour of police officers. Behaviour changes include increases in empathy, communication and verbal de-escalation with the public. Other post-training analysis show an increase in officer efficiency through a decrease in time spent per mental health call leading to $80,000 in cost savings over 6 months. A reduction in the use of physical force was observed as well, however, this training was not the single reason for this decrease. Given findings of increased police efficiency and decrease in costs related to mental health calls, we advocate that this training should be broadly implemented.

NOTES:

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

10
EFFECT OF EXPERT ADVICE IN THE STOCK MARKET: WHAT INFLUENCE DOES ADVICE HAVE?

Victoria Suen¹, Matthew R.G. Brown¹, Randall K. Morck², Peter H. Silverstone³

¹Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, vsuen@ualberta.ca, mbrown2@ualberta.ca, peter.silverstone@ualberta.ca
²Department of Finance and Statistical Analysis, University of Alberta, Edmonton, AB, Canada, randall.morck@business.ualberta.ca

It has frequently been suggested that involvement in the stock market, as all other decisions made under uncertainty, is no different than gambling. Only recently has work been done to elucidate what brain areas are in use when risky financial decisions are being made and what impact outside pressures may have. We developed an investment task in which advice presented to the participants was controlled in order to examine the influence of advice in decision-making. Advice was manipulated to lead participants towards more “win” outcomes (good advice) at the beginning of the task then shift towards more “lose” outcomes (bad advice) as the task progressed. Results showed significant differences when participants believed the advice was being given by a financial expert with over 20 years of experience in the field rather than by a peer figure who was running the experiment. Specifically, when participants chose to disobey the financial expert, there was increased activation in the anterior cingulate cortex as compared to when they were obedient. However, in the peer group, there was no significant difference in activation between obedient and disobedient decisions. There was no significant difference in brain activation when participants were presented with good or bad advice. These findings shed light on the impact of authority figures in financial decision-making and the ability of individuals to decipher advice that will lead them towards financial gains rather than losses. These results have relevance for understanding fluctuations in the stock market and potentially further in gambling behavior.

NOTES:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

11
DECISION MAKING WITH EXPLICIT RULES IN PATIENTS WITH MULTIPLE SCLEROSIS

Ashley D. Radomski¹, Christopher Power², Kenneth G. Warren³, Ingrid Catz³, Scot E. Purdon⁴, Derek J. Emery⁵, Esther Fujiwara¹

¹Department of Psychiatry, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada, adr2@ualberta.ca/efujiwara@ualberta.ca
²Departments of Medicine and Medical Microbiology & Immunology, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada, chris.power@ualberta.ca
³Department of Medicine (Neurology), Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada, kenneth.warren@ualberta.ca/icatz@ualberta.ca
⁴Department of Psychiatry, Faculty of Medicine and Dentistry, University of Alberta and Alberta Hospital Edmonton, Edmonton, AB, Canada, scot.purdon@albertahealthservices.ca
⁵Departments of Biomedical Engineering and Radiology and Diagnostic Imaging, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada, demery@ualberta.ca

Cognitive deficits are seen in approximately 50% of patients with multiple sclerosis (MS). We examined whether decision making is impaired in MS patients using the Game of Dice Task (GDT). Previous studies have shown decision making deficits in MS patients, but never established relationships between those deficits and other neurocognitive/emotional problems. All prior MS studies used the Iowa Gambling Task (IGT) to assess decision making. In our task, the GDT, decision rules and probabilities for gains and losses are made explicit, unlike in the IGT; hence, GDT decisions are more reliant on executive functions. The GDT and a standard neuropsychological battery were administered to healthy controls (n=20) and MS patients with varying levels of neurological impairment: 1) “RR1”: 15 patients with relapsing-remitting (RR) MS and mild disability according to the Expanded Disability Status Scale (EDSS), 2) “RR2”: 9 RR-MS patients with moderate EDSS disability, 3) “SP”: 10 patients with secondary progressive MS. Patients’ brain atrophy was studied with linear measurements on axial MRI images. Decision making in the GDT was significantly impaired in RR2 and SP subgroups, compared to controls. Composite performance in four cognitive domains (Processing Speed, Memory, Executive Functions: Inhibition, Planning) revealed a relationship between GDT and executive functions, especially in RR2 subgroup. In MS patients, GDT performance was correlated with measures of global brain atrophy, even when controlling for disease duration. In summary, MS-related impairment in the GDT may indicate other cognitive/executive dysfunctions and reductions in brain volume associated with the disease.

NOTES:
IMPULSIVITY, EMOTIONALITY AND ADDICTIVE BEHAVIOR: EXPLORING THE “HOT” SIDE OF FRONTAL LOBE FUNCTIONING IN CHILDREN AND ADOLESCENTS

Hannah Pazderka¹,²
¹Department of Psychiatry, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada
²Child, Adolescent and Family Mental Health (CASA), Edmonton, AB, Canada,
hpazderka@casaservices.org

When discussing concepts related to Executive Functioning, many researchers relate the construct to the "cooler" more cognitive side of reasoning - planning and prioritization, working memory, and goal-directed persistence. While all of these are clearly frontal lobe functions, it is the behavior that results from their dysfunction that may be more pertinent to behavioral problems seen clinically. The research at CASA, a non-profit organization in Edmonton serving over 3000 children and adolescents per year, attempts to explore the less "controlled" side of frontal lobe function: risk taking, impulsivity, and emotional control of behavior. We review a number of ongoing research projects at CASA, examining the evidence for this "hotter" (i.e., emotionally-driven) type of functioning, present evidence for its prevalence, and discuss how the topic is being explored in different ways for different populations.

NOTES:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
ECSTASY: THE “LOVE DRUG” – OR IS IT?

1Department of Psychiatry, University of Alberta, Edmonton, Alberta, Canada, kaitchis@ualberta.ca
2MRC SGDP Centre, King’s College London, Institute of Psychiatry, London, UK
3Department of Pharmacology, University of Alberta, Edmonton, Alberta, Canada,
4Division of Psychological Medicine and Psychiatry, King’s College London, Institute of Psychiatry, London, UK
5Department of Pharmacology, University of Alberta, Edmonton, Alberta, Canada,
6Neuroendocrine Laboratory, School of Medicine, King’s College London, UK
7Neurochemical Research Unit, Department of Psychiatry, University of Alberta, Edmonton, Alberta, Canada
8Division of Pharmaceutical Science, School of Biomedical Science, King’s College London, UK9Department of Pharmacology, University of Alberta, Edmonton, Alberta, Canada10Department of Pharmacology, University of Alberta, Edmonton, Alberta, Canada

‘Ecstasy’ is a “street” name for 3,4-methylenedioxymethamphetamine (MDMA), a synthetic amphetamine analogue. The tablets vary in appearance and there is no consistency of content, in terms of amount of MDMA or purity of substance (Wolff et al., 1995). In 2006, “ecstasy” pills containing piperazines (e.g., benzylpiperazine or BZP) began to appear in Vancouver. We herein present clinical analyses of mechanisms underlying the toxic effects of “ecstasy” and behavioural pharmacological studies which show how the addition of BZP to MDMA tablets may exacerbate these.

The clinical effects of “ecstasy” include the release monoamines, and of hormones including antidiuretic hormone and cortisol. Inappropriate antidiuretic hormone release leads to hyponatremia and is a risk factor for cerebral oedema (Wolff et al., 2006). Excessive cortisol release is potentially neurotoxic (Parrott et al., 2008; Wolff et al., 2012). Some individuals may be particularly susceptible to these effects owing to genetic variants in the enzymes catechol-O-methyl-transferase (COMT) and cytochrome P450 2D6 (CYP2D6) that conduct the initial steps in the metabolism of MDMA (Wolff, Tsapakis et al., 2012; Aitchison, Tsapakis et al., 2012).

Behavioural pharmacology studies reveal potentiation of the release of monoamines by the addition of BZP to MDMA and an increase in locomotion (Hudson et al., 2011). The metabolism of BZP (Tsutsumi et al., 2006) is consistent with involvement of CYP2D6 and COMT. Moreover, BZP is an inhibitor of CYP2D6 (Antia et al., 2009).

We conclude that the addition of BZP to MDMA could exacerbate the toxic effects of MDMA, through pharmacokinetic and pharmacodynamic interactions.

NOTES:

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________
1. PROGRESS AND FUTURE SIGHTS IN UNDERSTANDING SCHIZOPHRENIA
Saleem K. Al-Nuaimi¹, Chris Power², Andrew Greenshaw¹, Glen Baker¹
¹Department of Psychiatry, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada, sa@ualberta.ca/andy.greenshaw@ualberta.ca/glen.baker@ualberta.ca
²Departments of Medicine (Neurology), Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada, chris.power@ualberta.ca

Schizophrenia is a chronic mental illness that affects about 1% of the population. This severely debilitating illness warrants serious investigation with the objective of attaining tangible clinical outcomes. These outcomes include the better management, treatment, and hopefully the prevention of schizophrenia in a personalized manner for patients. In order to achieve these goals, various research efforts have been directed at determining the etiology of schizophrenia. The extensive research done so far has significantly advanced our understanding of schizophrenia. However, we are yet to determine the underlying etiology of schizophrenia. It appears that the major challenge to determining the etiology of schizophrenia stems from the complex, heterogeneous nature of the illness itself. There is growing support in the literature for an alternative multi-level approach that does not focus on determining a single etiological agent. Instead, one is to focus on elucidating the various causal mechanisms and their pathways. The use of endophenotypes and epigenetics are two approaches that will help identify such causal pathways. Hopefully this will result in explaining complex, reinforcing mutual networks of disordered mechanisms as seen in psychiatric disorders as well as other complex medical conditions.

NOTES:

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
2. AN AUDIT OF HIGH DOSE ANTIPSYCHOTIC PRESCRIBING IN PSYCHIATRY
S. Folescu¹, S. M. Dursun ¹, ², G. B. Baker ¹, J. C. Lind ², J. W. Morrison ²
¹Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, folescu@ualberta.ca
²Centre for Psychiatric Assessment and Therapeutics, Alberta Hospital Edmonton, Edmonton, AB, Canada

Prescription of high dose antipsychotics remains a common practice, contrary to available evidence (Taylor, 2002). Studies have found that on average, high daily doses of antipsychotics are no more effective or are less effective than are moderate doses, and have indicated that higher doses are associated with a greater incidence of side effects which may be worse than with a moderate dosage range in the treatment of schizophrenia (e.g., Baldessarini et al., 1988; Woods, 2004).
Pharmacoepidemiological studies in the USA and Europe have revealed that prevalence rates of high-dose antipsychotic prescriptions (i.e., chlorpromazine equivalent daily doses exceeding 1000 mg) vary from 15.4% to 41 % and up to 81% in Japan (Sim, 2008).
Although mortality and morbidity are dose related, there remains no consensus for the definition of high antipsychotic dose, and there is wide variation within the range of recommended doses. In a recently published retrospective cohort study (Wayne et al., 2009) the adjusted incidence rates of sudden cardiac death among patients receiving high doses of antipsychotic medication(s) was higher than in patients receiving antipsychotic medication(s) within the recommended dosage range for both typical and atypical antipsychotic medications.
The objectives of the present study are as follows.
1. First, we will examine the safety of high dose antipsychotic use in treating patients with psychotic illnesses.
2. The second objective will be to examine different variables which are associated with treatment resistant schizophrenia in patients who received high-dose antipsychotics and which could be of predictive value for determining poor response to antipsychotics.

NOTES:
3. DECISION MAKING ALTERATIONS IN PEOPLE WITH HIV
Sara Gilliam¹, Christopher Power², Scot Purdon¹, Esther Fujiwara¹
¹Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, sara.gilliam@ualberta.ca; scot.purdon@albertahealthservices.ca; efujiwara@ualberta.ca
²Division of Neurology, University of Alberta, Edmonton, AB, Canada, chris.power@ualberta.ca

Human immunodeficiency virus (HIV) infection can lead to impaired neurocognitive functioning. Treatment advances have led to changes in the domains and severity of impairment. The new profile of HIV neurocognitive alteration is characterized by higher-order (e.g., executive) dysfunctions rather than subcortical-dementia. Decision making in HIV is one area of neurocognitive functioning which has received little attention.

We administered an HIV+ novel task to assess decision making, the Game of Dice Task (GDT), to HIV+ individuals (n=20) and healthy controls (n=21) as well as a standard neurocognitive battery. The GDT has explicit rules and co-varies more reliably with executive functions than other decision making measures (e.g. Iowa Gambling Task - IGT). The few existing studies of decision making in HIV exclusively used the IGT in more complicated populations (e.g., HIV patients with co-morbid substance abuse) and had mixed findings.

Decision making abilities were significantly impaired in the HIV+ group. Patients showed impaired feedback utilization to guide their decisions compared to healthy controls. General neurocognitive performance was consistent with previous studies of treated HIV+ individuals: patients were impaired in tests of executive functions, psychomotor skills, verbal fluency and information processing speed. The patients’ performance on the GDT was related to other measures of executive functioning as well as with immune response. Our findings ascertain decision making deficits in treated HIV patients without co-morbid substance use, co-varying with immune and executive dysfunctions. Such impairments may further complicate disease management (e.g., drug adherence) and quality of life.

NOTES:
4. EFFECTS OF L-ARGININE-INDUCED NITRIC OXIDE PRODUCTION IN SCHIZOPHRENIA: A RANDOMISED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY

Marnie B. MacKay¹,³, Glen B. Baker¹, John C. Lind³, Dianne W. Cox², Georgina Macintyre², Serdar M. Dursun¹,³

¹Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, marnie.mackay@ualberta.ca
²Department of Medical Genetics, University of Alberta, Edmonton, AB, Canada
³Centre for Psychiatric Assessment and Therapeutics (CPAT), Alberta Hospital Edmonton, Alberta Health Services, Edmonton, AB, Canada

Schizophrenia is a complex disorder that often requires combined treatments to control its symptoms. Despite the availability of several neuroleptic medications on the market, many patients remain symptomatic. The modulation of the nitric oxide pathway has gained considerable interest as a therapeutic strategy. In this study, our goal is to determine whether the addition of L-arginine to treatment as usual (TAU) in schizophrenia further improves and enhances the therapeutic efficacy (against positive, negative, and depressive symptoms) and effectiveness of antipsychotic treatment. In a blinded cross-over design, 13 subjects with a DSM IV TR diagnosis of schizophrenia were administered L-arginine or placebo for 21 days at a dosage of 6 g per day (3g twice a day), with a wash-out period of 5 days; then re-commenced on the alternative arm of the randomization. Pre- and post-treatment scores were obtained from the Positive and Negative Syndrome Scale (PANSS), Clinical Global Impressions Scale (CGI), and the Calgary Depression Scale for Schizophrenia (CDSS) to evaluate the positive, negative, cognitive, and depressive symptoms of schizophrenia. Significant reductions in the PANSS general psychopathology subscale (p=.046), but no differences in positive (p=.88) or negative (p=.67) PANSS subscales were found in patients while they were receiving L-arginine treatment relative to placebo. There were no clinical side-effects observed by the structured Udvarg for Kliniske Undersogelser (UKU) rating scale or the Abnormal Involuntary Movement Scale (AIMS). Improvement in anxiety and cognitive symptoms with L-arginine augmentation may indicate that nitric oxide production in the brain can influence treatment-resistant symptoms in schizophrenia with no additional side-effects. Nitric oxide donors may be a safe and effective augmenting strategy and a novel approach to the advancement of future pharmacological treatments in the illness. Additional exploratory investigations of neuroinflammatory biomarkers, viruses, and the NPAS3 gene, a potential susceptibility gene in schizophrenia, as well as various neuroactive steroid measurements are also being conducted to determine their possible role in psychosis.

NOTES:
5. GROUP COHESION IN SUBSTANCE ABUSE TREATMENT

Brenda Maire¹, Anthony Joyce²
¹ Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, maire@ualberta.ca
² Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, ajoyce@ualberta.ca

Group cohesion is described as an essential requirement for therapeutic group formation and maintenance. Group cohesion is the bond or feeling of alliance and unity that encompasses individuals’ relationships to the group therapist, to the other group members, and to the group as a whole. “Groups which do not hold together, which do not exert a force of attraction or affinity for its members, will not develop enough of a capacity for the psychological work that is required to make the group a therapeutic tool” (Ezquerro, 2010, p. 503).

For patients coping with substance abuse, group counselling is an integral and valuable treatment approach (APA, 2006). There is no difference between group and individual counselling within the substance abuse treatment domain. Yet despite the common use of group counselling, few studies have examined group cohesion with this population.

This study will examine group therapy at the Henwood Substance Abuse Treatment Centre to address this research gap. Clients will provide information on their substance use and experiences in group counselling along with demographic data and information on factors known to effect treatment outcome, including: motivation, perceived social support, mental health, and self efficacy. It is hypothesized that clients who rate their group’s cohesion high will demonstrate greater symptom improvement and will be more likely to complete treatment.

NOTES:
6. IN VITRO METABOLISM OF PHENELZINE TO 2-PHENYLETHYLIDENEHYDRAZINE (PEH) AND COMPARISON OF IN VIVO EFFECTS OF PEH ISOMERS ON RAT BRAIN LEVELS OF AMINO ACIDS
Dmitriy Matveychuk¹, Nasir Ullah², Carlos A. Velazquez-Martinez³, Gail Rauw¹, Emerson Nunes¹ and Glen B. Baker¹,²
¹ Neurochemical Research Unit, Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, dmitriym@ualberta.ca
² Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta, Edmonton, AB, Canada

Phenelzine is an antidepressant with anxiolytic and neuroprotective properties. It is a unique monoamine oxidase (MAO) inhibitor in that it is also a substrate for the MAO enzymes. Phenelzine is also an inhibitor of GABA-transaminase and alanine-transaminase, and was shown to elevate brain levels of GABA and alanine along with a reduction of glutamine levels. These effects of phenelzine on amino acids are thought to be the result of a metabolite, β-phenylethylidenehydrazine (PEH), produced as a consequence of MAO-mediated catabolism of phenelzine.

We confirmed the production of PEH from phenelzine by human MAO-B in vitro using liquid chromatography coupled with mass spectrometry. Since PEH can exist as geometric isomers, we also investigated the effects of two different isomer ratios, E/Z=80/20% and E/Z=9/91%, with regard to changes in rat brain levels of amino acids at 1,3,6 or 12 hours following injection. Amino acids were analyzed by high-performance liquid chromatography with fluorimetric detection. Both mixtures produced comparable changes in amino acid levels. GABA and alanine levels were increased at all time points, with the most prominent elevation at 3 hours. Glutamine levels declined between 1 and 6 hours. L-Serine levels were reduced slightly while arginine levels were increased with both mixtures at 3,6 and 12 hours.

These findings provide evidence for the MAO-mediated metabolism of phenelzine to PEH, and indicate that PEH has marked effects on brain levels of several amino acids. The two isomers of PEH were equivalent in their neurochemical properties under the conditions used in this study.

NOTES:
7. METHODS OF DATA COLLECTION IN ETHNOGRAPHY
Marghalara Rashid¹, Helly R. Goez², Jerome Y. Yager² Anthony S. Joyce¹, Amanda S. Newton²
¹Department of Psychiatry, University of Alberta, Edmonton, AB, Canada marghalara@ualberta.ca
²Department of Pediatrics, University of Alberta, Edmonton, AB, Canada mandi.newton@ualberta.ca

Through ethnographic research, a researcher can study how meaning is derived through the everyday, interpersonal interactions of study participants. In order to collect rigorous data, diverse approaches to data collection are used: interviews, participant observation, and field notes. Each of these approaches involves different techniques and ways of execution. Interviews: Interviews can be structured, semi-structured, and unstructured. The semi-structured format is frequently used because of the flexibility—it allows the researcher to interact with participants in a responsive manner. Questions in the semi-structured format should be presented in a non-leading and non-biased manner to ensure that the participants are describing their experiences and ideas are not introduced by the researcher. ‘Probes’ (e.g., tell me more about [ ]) are used during interviews to elicit detailed answers. Participant observation: Participant observation is significant for studying the everyday lives of participants. It involves researchers observing participants in their own environment (e.g., home, community, etc.), and can involve the researcher participating in everyday activities with participants. This results in collecting data from both an insider (emic) and outsider (etic) perspective. These perspectives are vital aspects of ethnographic research. Field notes: Field notes are the researcher’s documentation of thoughts, feelings, and conceptual concerns during the study period. These notes assist with data collection and analysis.

Interviews, participant observation, and field notes are vital aspects of data collection in ethnographic research. The use of multiple methods enhances the trustworthiness (e.g., accuracy) of the data collected and guides the researcher in making decisions during the study.

NOTES:


21
8. CONCURRENT DISORDERS: YOUTH IN THE ALBERTA TREATMENT CONTINUUM
Carlee Ruddy¹ and Anthony Joyce²
¹ Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, cruddy@ualberta.ca
² Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, ajoyce@ualberta.ca

The term concurrent disorder (CD) refers to a psychiatric illness occurring at the same time as a substance use disorder (SUD) or gambling disorder (Health Canada, 2002; Center for Addiction and Mental Health, 2009). Research demonstrates a high prevalence of concurrent mental health disorders and substance use disorders. Increasing evidence suggests that concurrent disorders have a strong developmental trajectory with onset occurring during adolescence, which makes improving our capacity for early detection and intervention all the more imperative (CCSA, 2009).

This study will explore how youth describe their experiences within the mental health and addiction treatment systems. Four to six youth will be recruited from the Children, Adolescent and Family Mental Health Services (CASA)’s residential program. A short concurrent disorder screen will be used to ensure that youth meet the inclusion criteria to participate. Once the youth are screened through, a 60 minute qualitative interview will be conducted with each of them. The interview will incorporate an interpretive phenomenological approach to extract richer data with the goal being to obtain a narrative of each youth’s story based on their experience of treatment services and previous, if any, substance use treatment experiences. These interviews will be digitally recorded to allow for the interpretive phenomenological analysis of the youth’s experiences.

NOTES:
9. ROLES OF IGF-II RECEPTOR IN APP PROCESSING AND Aβ METABOLISM
Yanlin Wang1,2 and Satyabrata Kar1,2,3
1Department of Psychiatry; University of Alberta, Edmonton, AB, Canada, yanlin.wang@ualberta.ca
2Centre for Prions and Protein Folding Disease, University of Alberta, Edmonton, AB, Canada, skar@ualberta.ca
3Department of Medicine, University of Alberta, Edmonton, AB, Canada

The insulin-like growth factor-II (IGF-II) receptor involves in the transport of newly synthesized lysosomal enzymes within the endosomal-lysosomal system which plays a critical role in the processing of amyloid precursor protein (APP) leading to the generation of β-amyloid (Aβ) peptide - a key player in the development of Alzheimer’s disease pathology. In this study, we used IGF-II receptor overexpressing and deficient fibroblast cell lines to study the influence of the receptor on APP processing and Aβ metabolism. PCR-arrays, western blotting, fluorometric kits and ELISA were used to detect the mRNA/protein levels of APP, its processing enzymes and Aβ peptides as well as the lysosomal enzyme activities. Pepstatin-A, an inhibitor for the lysosomal enzyme cathepsin D was used to verify its role in APP processing. We observed increased mRNA levels of APP and β- and γ-secretases and increased protein levels of APP holoprotein, β-C-terminal APP fragment and cathepsin D in IGF-II receptor overexpressing cells. Secreted N-terminal APP fragment, Aβ1-40 and Aβ1-42 were higher in the conditioned media of IGF-II receptor overexpressing cells. The increased expression and activity of β-secretases were also found in IGF-II receptor overexpressing cells. Cells overexpressing IGF-II receptors were more susceptible to staurosporine-induced cytotoxicity. Additionally, pepstatin-A inhibits the generation of β-C-terminal APP fragment without affecting the levels of APP and related β- and γ-secretases in IGF-II receptor overexpressing cells. These results suggest that overexpression of IGF-II receptors increase levels of APP and the expression and activity of β-secretases leading to increased Aβ generation with enhanced cathepsin D expression.
10. EYE-TRACKING AND MEMORY IN REPRESSIVE COPING STYLE
Lauren Alston\textsuperscript{1}, Andrea Shafer\textsuperscript{1}, Anthony Singhal\textsuperscript{1,3}, Esther Fujiwara\textsuperscript{1,2},
\textsuperscript{1} Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada, lalston@ualberta.ca, atshafer@ualberta.ca
\textsuperscript{2} Department of Psychiatry, University of Alberta, Edmonton, AB, Canada, efujiwara@ualberta.ca
\textsuperscript{3} Department of Psychology, University of Alberta, Edmonton, AB, Canada, asinghal@ualberta.ca

Individuals with a repressive coping style are characterized by a combination of high defensiveness and low anxiety in self-report questionnaires. Repressors (as opposed to non-repressors) have been described as showing an increased early attention towards potential threat combined with later attentional avoidance. Unclear is whether these patterns relate to later memory. We hypothesized that repressors would show vigilance-avoidance as evidenced with eye-tracking: Earlier first eye-gaze fixations of negative images and fewer/later overall fixations of negative images than non-repressors. Further, free recall of negative images was expected to be impaired in repressors, and especially so if non-threatening visual information competed with processing of negative images. Vigilance-avoidance was assessed with eye-tracking during viewing of standardized pictures with negative or neutral content that were either shown alone or alongside 1-3 color-patches. Memory for the pictures was assessed with free recall and recognition tests. Forty undergraduates from the University of Alberta were tested. Coping style (repressive, non-repressive) was assessed using standard questionnaires. Preliminary results showed that repressors fixated negative images less than non-repressors (in accordance with attentional avoidance) and they also recalled negative images less frequently, but these measures were unrelated. Recognition memory was unaffected by coping style. Repressors were less able to recall a negative picture presented alone as opposed to when it was presented along with color patches. Unlike our expectation, repressors were not using the distractors to help forget negative information. Instead, the presence of distractors might have reduced the impact of the negative image.
11. PSYCHOLOGICAL AND MEDICAL PRENATAL EVENTS WITH DISSOCIABLE EFFECTS ON PSYCHOLOGICAL HEALTH IN LATE ADOLESCENCE

Branden Ayotte, Ian Colman, Dan LaPrenier, Rheanna Robertson, Cam Wild, Jody Wolfe, Scot E Purdon

1 Neuropsychology, Alberta Hospital Edmonton & BSRU, University of Alberta, Edmonton, AB, Canada, scot.purdon@albertahealthservices.ca
2 Dept of Community Medicine and Epidemiology, University of Ottawa, Ottawa, ON, Canada, icolman@uottawa.ca
3 School of Public Health, University of Alberta, Edmonton, AB, Canada, cam.wild@ualberta.ca

Prenatal environment exhibits a strong effect on the development of the unborn child that may influence psychological status after birth. Maternal stressors that influence prenatal environment include both psychological and medical events. This study assessed the effects of prenatal events on the psychological status of students in late adolescence. Stressful events were quantified with a self-report questionnaire administered to eighty mothers of high school students. The students completed the Mood and Feelings Questionnaire (MFQ) and Magical Ideation Scale (MIS), scales presumed to be sensitive measures of vulnerability to mood disorders and psychosis proneness, respectively. We anticipated a direct association between the number of prenatal stressors reported by the mothers and vulnerability to mood disorders and psychosis. We observed a significant association between psychological stressors and MFQ scores, $\kappa(79) = 0.25$, $p = .023$, but not MIS scores. Students of mothers that had experienced 1 or 2 prenatal medical events had higher MIS scores than those reporting no medical events, $\kappa(70) = 2.05$, $p = .044$, and also showed a trend towards higher MFQ scores ($p = .083$). Prenatal events are related to psychological health in late adolescence, with an apparent dissociation between psychological events affecting mood, and medical events affecting psychosis proneness.

NOTES:

__________________________________________

__________________________________________

__________________________________________

__________________________________________

25
12. MOTOR AND NON MOTOR OUTCOMES OF THE MAO INHIBITOR PHENELZINE IN MICE WITH EAE
Curtis Benson1,2, Yohannes Haile1, Grace Wong3, Gustavo Tenorio1, Gail Rauw2, Fabrizio Guiliani1, Glen B. Baker1,2, and Bradley J. Kerr1,3
1Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada, curtis1@ualberta.ca
2Neurochemical Research Unit, Department of Psychiatry, University of Alberta, Edmonton, AB, Canada
3Department of Anesthesiology and Pain Medicine, University of Alberta, Edmonton, AB, Canada

Multiple sclerosis (MS) is an inflammatory demyelinating and degenerative disease of the central nervous system (CNS). MS is associated with motor and non-motor symptoms. Many of these symptoms can be related to changes in the levels of key neurotransmitters. Using the animal model experimental autoimmune encephalomyelitis (EAE), we have previously described the benefits of treatment with the monoamine oxidase (MAO) inhibitor phenelzine (PLZ). Daily PLZ treatment caused substantial behavioural improvements. However, not all of the improvements were maintained with daily PLZ treatment. To determine whether modifying the dose of PLZ could better sustain the motor and non-motor improvements, PLZ treatment was given on alternating days. Alternating PLZ treatment reduced the severity of EAE clinical signs, improved exploratory behaviours and reversed EAE-induced deficits in an assay of learning and memory, the novel object recognition test. In contrast, to daily PLZ treatment providing PLZ on alternating days lead to significantly higher levels of GABA upon completion of the experiment. Sustained GABA levels could account for maintained behavioural improvements observed when treating EAE animals every second day with PLZ. Examination of the MAO enzyme activity showed that with alternating treatment there was statistically less inhibition of MAO compared to mice treated daily, possibly accounting for the difference in GABA levels. In addition to neurotransmitter changes, peripheral immune cell infiltration of the CNS significantly contributes to EAE pathology. To determine whether the PLZ had any direct influence on the immune system, human peripheral blood mononuclear cells (PBMCs) and a monocyte cell line were treated in-vitro with PLZ. PBMCs treated with PLZ during activation produced significantly less IFN-γ. PLZ did not increase cell death, which was measured using the apoptotic marker Annexin V. These results indicate that PLZ alone is able to modulate immune cell activity and demonstrates another possible mechanism for the action of PLZ in EAE.

NOTES:
13. THE APPLIED GENOMICS CENTRE (TAGC). APPLICATIONS: MULTIPLEX APPROACHES TO SNP DETECTION
Aleksandra Dimitrijevic1,7, Alana Yee2, Leah M. Luoma3, Stacey Purser3, Kimberly Dillen4, Philip G. Tibbo4, Scot E. Purdon5, Hannah Pazderka6, Angus Thompson6, Darren A. Bugbee1,7, Simona Veniamin7, Susan M Kenney7, Andrew L. Mason1,7, Georgina Macintyre6,7.

1 Department of Medicine, University of Alberta, Edmonton, AB, Canada, dimitrij@ualberta.ca
2 Department of Medical Genetics, University of Alberta, Edmonton, AB, Canada
3 Department of Psychiatry, Faculty of Medicine & Dentistry, University of Alberta, Edmonton, AB, Canada
4 Department of Psychiatry, University of Dalhousie, Halifax, NS, Canada
5 CASA, Child, Adolescent & Family Mental Health, Edmonton, AB, Canada
6 Institute of Health Economics, Edmonton, AB, Canada
7 The Applied Genomics Centre, CEGIIR, Medicine, FoMD, University of Alberta, Edmonton, AB, Canada

Genetic variation associated with any complex disease, eg schizophrenia, is found in many gene and non-gene regions across the genome. In the case of ‘single-locus’ disorders, where a single gene is defective, single nucleotide polymorphisms (SNPs) at other loci act as ‘genetic modifiers’ of the phenotype. However, the study of multiple SNPs usually involves direct sequencing, TaqMan assays or microarrays that can be time-consuming and costly, particularly for the study of smaller cohorts. At TAGC, we are developing efficient strategies to simultaneously identify multiple SNPs. Herein, we demonstrate the rapid design and implementation of a protocol aimed at low-multi-SNP studies (1-10 SNPs) using small cohorts. Using psychiatric disorders in the presented examples, we describe a study from the design phase using published algorithms, through the initial DNA extraction from saliva, to SNP identification. Multiplex primers for PCR and SNaPshot (Applied Biosystems, AB) were designed by MPprimer and BatchPrimer3 programs. Participants provided saliva samples (Oragene 250 kit/Genotek) and genomic DNA was purified manually using the manufacturer’s instructions. Multiplex PCR was carried out using a Qiagen Type-IT mutation detection kit and MPprimer-defined conditions. Multiplexed fragments were visualized by agarose gel electrophoresis and/or Qiaccel. SNP-specific primers, de-salted and HPLC-purified, were extended using SNaPshot (AB) and genotypes detected (AB3100 Avant sequencer). We describe an approach to specifically multiplex up to six PCR products in a single reaction, with minimum design time and reaction optimization. The Qiagen Type-IT kit required limited optimization, and the AB SNaPshot method specifically detected SNPs in both forward and reverse directions, using de-salted primers. Significant time-, and cost-, saving makes this an attractive option for studies with hypothesis-driven queries in small cohort studies examining a limited number of SNPs. The integration of CEGIIR CFI-funded robotics platforms will allow TAGC to offer more services for SNP projects in the coming months.

NOTES:
14. RESTING-STATE FUNCTIONAL NEURAL NETWORKS IN THE HUMAN BRAIN ARE CONSISTENT ACROSS ACQUISITION PROTOCOLS AND FIELD STRENGTH

Stanislau Hrybouski\textsuperscript{1}, Corey A. Baron\textsuperscript{2}, Peter Seres\textsuperscript{2}, Rawle Carter\textsuperscript{3}, Fraser Olsen\textsuperscript{1,2}, Christian C. Beaulieu\textsuperscript{2}, Nikolai Malykhin\textsuperscript{1,2,3.}
\textsuperscript{1} Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada, shrybouski@ualberta.ca
\textsuperscript{2} Department of Biomedical Engineering, University of Alberta, Edmonton, AB, Canada,
\textsuperscript{3} Department of Psychiatry, University of Alberta, Edmonton, AB, Canada

Magnetic resonance imaging (MRI) is the most widely used method to study structural and functional connectivity in the human brain. In this project we looked at how scanner type (together with acquisition sequences) affects detectable functional connectivity in functional MRI (fMRI) datasets. To this end, resting-state scans were acquired from 15 healthy volunteers on a 1.5T Siemens system with 1-channel head coil (EPI sequence, 35 axial slices, TE = 40ms, TR = 2000ms, 240 volumes, resolution 4.0x4.0x4.0mm\textsuperscript{3}, 2 sessions) and on a 4.7T Varian Inova system with a 4-channel head coil (EPI sequence with GRAPPA acceleration factor = 2, 45 axial slices, TE = 19ms, TR = 3000ms, 200 volumes, resolution 3.0x3.0x3.0mm\textsuperscript{3}, 1 session).

All functional volumes were corrected for geometric distortion, slice acquisition delay, and in-scanner head motion using SPM8. Images were warped to MNI space and smoothed with 8mm Gaussian Kernel. Network analyses were done in GIFT software, and only voxels with z \geq 3, were labeled as active. GIFT’s component detection algorithm identified 32 independent components in our 4.7T data and 15 independent components in our 1.5T data. Close inspection revealed that this difference is due to the higher number of small sub-networks detected in the 4.7T data. This observation is in contrast to larger, well-documented networks, which are almost identical in 1.5T and 4.7T datasets. In conclusion, the higher field strength is required for studies looking at network sub-systems, but is not essential for studies of relatively large brain networks.

NOTES:

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
15. HIPPOCAMPAL SUBFIELD DIFFERENCES BETWEEN SUBJECTS WITH MAJOR DEPRESSIVE DISORDER, AS SEEN ON THE 4.7T MRI.
Yushan Huang¹, Nicholas J. Coupland², Robert M. Lebel³, Rawle Carter⁴, Allan Wilman⁵, Peter Seres³, Nikolai Malykhin¹,²,³
¹Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada, yushan2@ualberta.ca
²Department of Psychiatry, University of Alberta, Edmonton, AB, Canada
³Department of Biomedical Engineering, University of Alberta, Edmonton, AB, Canada

Magnetic resonance imaging (MRI) studies have shown volume loss in hippocampi of patients with major depressive disorder (MDD), according to preclinical and postmortem studies, specifically in the cornu ammonis (CA) and dentate gyrus (DG) subfields. We analyzed the differences in hippocampal subfields in MDD patients in vivo for the first time with the help of the high field 4.7T MRI.

11 medicated and 9 unmedicated MDD patients and 27 healthy controls - right-handed, matched for age, sex, smoking, and premorbid intellect, were included. Salivary cortisol data were also acquired for 19 healthy subjects and for 7 MDD patients.

The hippocampal tail and total hippocampus were smaller in the unmedicated compared to the medicated MDD group, with a trend toward a smaller hippocampal tail in unmedicated MDD patients compared with healthy controls. The CA in the hippocampal body was smaller in the unmedicated than controls. The DG was smaller in the hippocampal tail and total hippocampus in unmedicated compared to controls, and in the hippocampal head and total hippocampus, with a trend toward being smaller in the hippocampal tail too compared to medicated MDD patients.

Medicated MDD patients have higher increases in cortisol levels between waking time and both 30 minutes as and 8 hours after waking than both healthy controls and the unmedicated depressed.

Consistent with other MRI studies, the hippocampal tail and total hippocampal volumes seemed to be smaller in MDD patients. Larger DG volumes in medicated compared with unmedicated individuals also suggest that antidepressant treatment may reverse reductions.

NOTES:
16. CHARACTERIZATION OF SPINAL MICROGLIA
Sam Joshva Baskar Jesudasan¹, Kathryn G. Todd², Ian R. Winship³
¹Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada, baskarje@ualberta.ca
²Department of Pyschiatry, Centre for Neuroscience University of Alberta, Edmonton, AB, Canada, kgtodd@ualberta.ca
³Department of Psychiatry, Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada, iwinship@ualberta.ca

Microglia, the resident immune cells of the central nervous system (CNS), have a ramified morphology with long processes that constantly survey the brain and spinal parenchyma. Numerous studies have shown that after injury to the CNS microglia are capable of synthesizing and releasing neurotrophic factors, pro-inflammatory factors, and reactive oxygen species. However, it remains unclear whether microglia derived from the spinal cord respond similar to brain microglia (BM), and how the pro- and anti-inflammatory responses will affect the spinal cord after CNS injury. Our aim was to develop a highly reproducible system to study spinal cord microglia and compare them to brain-derived microglia. We adapted the protocol of Saura et al. (2003) using the mild trypsinization method to isolate spinal microglia from one-day old Sprague Dawley rat pups. Isolated spinal microglia (SCM) were treated with lipopolysaccharide (LPS) or ATP, agents known to induce inflammatory responses in cultured microglia. Notably, LPS-mediated NO release was significantly greater in SCM than in BM. Interestingly, basal release of NO by SCM was also significantly greater than BM. A similar trend was observed in response to ATP. Additionally, there was a decreasing trend in LPS mediated brain derived neurotrophic factor and TNFα release by SCM compared to BM. Thus our data suggest that SCM cultures respond to LPS mediated injury differently than that of BM.

NOTES:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

30
17. IDENTIFYING NEUROPSYCHOLOGICAL AND COGNITIVE ENDOPHENOTYPES OF SCHIZOPHRENIA-ASSOCIATED EXONIC VARIANTS OF NPAS3 AND COMT
Leah M. Luoma1, Georgina Macintyre1, Fred B. Berry1,2 Dan LaFreniere3,4, Stacey Purser3,4, Angela Beierbach4, Phillip Tibbo5,6, Diane W. Cox6, Scot Purdon3,4
1Department of Medical Genetics, University of Alberta, Edmonton, AB, Canada, lluoma@ualberta.ca
2Department of Surgery, University of Alberta, Edmonton, AB, Canada
3Department of Psychiatry, University of Alberta, Edmonton, AB, Canada
4Neuropsychology, Alberta Hospital Edmonton, Edmonton, AB, Canada.
5Department of Psychiatry, Dalhousie University, Halifax, NS, Canada
6Department of Medicine, University of Alberta, Edmonton, AB, Canada

Schizophrenia is a disorder of psychosis with an incidence of approximately 1% worldwide characterized by deficits in neurodevelopment, adult neurogenesis and neurotransmission. The strong but highly heterogeneous genetic component of schizophrenia may contribute to differences in clinical presentation and therapeutic response. Identification of specific sub-clinical quantifiable phenotypes (endophenotypes) of genetic variants would be invaluable to investigations of pathogenesis and outcome. Studies of schizophrenia-associated genetic variants have demonstrated links to personality traits, cognitive skills, and discrete behaviours in normal populations. These characteristics have been associated with vulnerability to multiple psychopathologies, including psychosis. Variants of catechol-O-methyltransferase (COMT), involved in metabolism of catecholamine neurotransmitters, affect synaptic dopamine, cortical thickness, cognitive flexibility and working memory. Loss of NPAS3 (neuronal PAS domain containing 3), a transcription factor implicated in neurogenesis, neurodevelopment and neurosignalling causes altered adult neurogenesis in mice and NPAS3 variants are linked to cross-disorder pleiotropic effects in humans; however, endophenotypes have not been identified.
Eighty-seven healthy teenagers (mean age 17.68 years) were recruited for cognitive, neuropsychological and genetic analyses. Individuals carrying the schizophrenia-associated allele of the COMT and NPAS3 variants were identified. NPAS3 genotype was associated with verbal working memory (p=0.004), and the general index score of the Screen for Cognitive impairment in Psychiatry (SCIP, p=0.039). COMT genotype was associated with social anhedonia (p=0.008) and errors on a continuous performance test (p=0.032). In summary, we have identified associations between NPAS3 and COMT genotypes and schizophrenia-associated neuropsychological and cognitive parameters that appear to be good candidates for endophenotype markers for psychosis.

NOTES:


31
18. MECHANISMS AND EFFICACY OF TRANSIENT AORTIC OCCLUSION FOR TREATMENT OF ACUTE ISCHEMIC STROKE

Gomathi Ramakrishnan, Bin Dong, Glenn Armitage, Kathryn G. Todd, Ashfaq Shuaib, Ian R. Winship

1Neurochemical Research Unit, Department of Psychiatry, Faculty of Medicine and Dentistry, University of AB, Edmonton, Canada, iwinship@ualberta.ca
2Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada gomathi@ualberta.ca
3Division of Neurology, Department of medicine, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, Canada, ashfaq.shuaib@ualberta.ca

The occlusion of a blood vessel results in ischemic stroke. Irreversible brain damage results in the ischemic core immediately downstream of the occlusion, where perfusion falls below 20% of baseline blood flow. The area surrounding the core with partially preserved blood flow is called the ischemic penumbra. This partial maintenance of blood flow in the penumbra is due to the presence of auxiliary channels of blood flow termed the cerebral collaterals. Augmenting blood flow through these collaterals may reduce damage due to stroke. In our study we used transient occlusion of descending aorta (TOA) for 45 minutes to increase the global cerebral perfusion after occlusion of middle cerebral artery (MCAo). The blood flow maps were measured using Laser Speckle Contrast Imaging (LSCI) prior to and during TAO. LSCI maps during TAO shows increase in collateral blood flow with no change in MCA-ACA anastomoses but with increase in blood vessel diameter. Infarct volume was measured at one week after thromboembolic MCAo involving injection of either a small or large blood clot. After injection of a small clot, TAO reduces the infarct volume primarily by shifting the clots downstream and preserving the striatum. After “large clot” MCAo, the LSCI maps show a much more dramatic change in collateral blood flow. Ongoing studies are confirming the neuroprotective efficacy and shift vs collaterals mechanism in these larger MCAo groups. Given the high failure rate of thrombolysis, augmenting collateral blood flow offers an important alternative neuroprotective strategy for ischemic stroke.

NOTES:
19. SPATIOTEMPORAL PROFILE OF SPINAL PLASTICITY FOLLOWING PHOTOPTHROMBOTIC STROKE OF THE SENSORIMOTOR CORTEX

Bernice Sist1,2, Karim Fouad2,4, Ian R. Winship1,2,3

1Neurochemical Research Unit, University of Alberta, Edmonton, AB, Canada, sist@ualberta.ca
2Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada, iwinship@ualberta.ca
3Department of Psychiatry, University of Alberta, Edmonton, AB, Canada
4Faculty of Rehabilitation Medicine, University of Alberta, University of Alberta, Edmonton, AB, Canada, karim.fouad@ualberta.ca

In the weeks following stroke, partial recovery of function has been attributed to adaptive rewiring (plasticity) in surviving neural circuits. Our group and others have demonstrated heightened plasticity in the spinal cord after focal cortical stroke, however the profile of adaptive and inflammatory responses to brain injury in the spinal cord remains undefined. This project aims to (i) define the protein expression of pro-inflammatory and trophic cytokines expressed in the spinal cord as it relates to the profile of axonal sprouting and (ii) illustrate the spatial profiles of CST axon terminals in cervical spinal cord originating from spared ipsilesional and uninjured contralesional cortex.

Rats were trained to reach on the Montoya Staircase task prior to focal photothrombotic stroke such that animal received partial or complete injury to the forelimb sensorimotor cortex (FL-SMC). Performance on the staircase task was evaluated at 3, 7, 14, 21 and 28d after stroke. Anterograde tracers were injected into ipsilesional and/or contralesional FL-SMC to evaluate axonal sprouting from the descending CST into the spinal grey matter. Quantitative immunoassays were used to evaluate neurotrophic factors, cytokine release, and growth-associated protein 43 (GAP-43, component of axonal growth cone) levels in the brain and spinal cord after focal strokes.

Results showed that cortical stroke elicits axonal sprouting and cytokine expression in the spinal cord with distinct spatiotemporal profiles. Analysis of anterogradely labeled CST fibres from spared ipsilesional motor cortex revealed altered patterns of innervation in the cervical grey matter, with a greater distribution of terminals in the intermediate laminae. Combined, our data reveals a time-limited window for spinal plasticity after stroke and distinct profiles of cytokine expression distal to the site of injury, while highlighting the importance of spared ipsilesional fibres in recovery.

NOTES:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

33
20. SUBFIELD VOLUMES IN THE POSTERIOR HIPPOCAMPUS AND CORTISOL LEVELS PREDICT PERFORMANCE ON MEMORY TASKS IN PATIENTS WITH MAJOR DEPRESSIVE DISORDER

Scott Travis¹, Yushan Huang¹, Nicholas Coupland⁵, Kathy Hegadoren²,³, Esther Fujiwara², Ashley Radomski², Rawle Carter⁹, Peter Seres⁴, Nikolai Malvykhin¹,²,⁴

¹Centre for Neuroscience, University of Alberta, Edmonton, AB, Canada, sstravis@ualberta.ca
²Department of Psychiatry, University of Alberta, Edmonton, AB, Canada
³Faculty of Nursing, University of Alberta, Edmonton, AB, Canada
⁴Department of Biomedical Engineering, University of Alberta, Edmonton, AB, Canada

Recent magnetic resonance imaging (MRI) studies suggest a specialization of hippocampal subfields and in different memory tasks. There is also a link between cortisol levels and HC subfields volumes. The purpose of the present study was to determine the association between volumes of HC subfields across the entire HC structure and performance on standard memory tests in a population of young healthy subjects. We also examined salivary cortisol levels and their effects on subfields and memory.

We acquired MRI data of 22 healthy and 8 MDD patients to obtain volumes of the cornu ammonis 1-3 (CA), dentate gyrus (DG), and subiculum (SUB). Participants were administered the Wechsler Memory Scale, 4th edition (WMS-IV) to assess memory. Pearson partial correlation coefficients revealed volumes of the posterior HC was strongly associated with memory performance across four memory indices (auditory, visual, immediate, and delayed memory), particularly in the DG. Total DG volumes also predicted delayed memory. Posterior CA volumes correlated with visual, immediate and delayed memory. Of note, global HC volumes and volumes in the anterior HC failed to significantly correlate with WMS-IV memory performance. Cortisol levels in MDD patients correlated with memory scores and subfield volumes. In healthy adults, cortisol seems to have no effect on memory or HC morphology. These findings have direct applicability to a range of neurological and psychiatric disorders.

NOTES:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Thank you for participating in the Department of Psychiatry’s 11th Annual Research Day

Please take a moment to fill out the evaluation form.

We greatly appreciate your comments.