The 44th Annual
John C. Forbes
Research Colloquium

Wednesday, March 9, 2016
Virginia Commonwealth University
School of Medicine
John C. Forbes
**John C. Forbes Graduate Student Research Colloquium**

This Colloquium consists of student research presentations in a "short talk" format. Students participating are selected on the basis of the quality and clarity of a written description of the research project and evaluated by members of the faculty. The presentations are also evaluated on the basis of the effectiveness in communicating the research described. Outstanding presentations are recognized and a monetary award is made to participants. The solicitation of papers, judging of papers and scheduling of the Colloquium are coordinated by the Student Committee composed of representatives from the Departments in which research in the sciences is conducted and the Office of Graduate Education.

The Forbes family established a fund to support the Forbes Day activities. The faculty and students on the Medical College of Virginia Campus of Virginia Commonwealth University extend our deep appreciation to the Forbes family for their continuing support of scholarly achievement.

John Campbell Forbes received his Bachelors degree in 1920 and his Masters degree in 1922 from Saskatchewan University. In 1925, he received his Doctoral degree from McGill University. He joined the faculty of the Medical College of Virginia (MCV) as an Assistant Professor in the Department of Biochemistry in 1927, being promoted to Associate Professor in 1932 and Professor in 1944. In 1965, Dr. Forbes was appointed as an Emeritus Professor. Dr. Forbes died on May 25, 1989 at the age of 94. He was internationally recognized as an authority in cholesterol-atherosclerosis research and alcoholism.

During his tenure at MCV, Dr. Forbes became the first chairman of the Committee on Graduate Studies in 1934, supervising the first two graduate students receiving their degree from MCV. Because of his insight, and dedication to the advancement and excellence in research and as a pioneer in graduate education, the School of Medicine, in recognition of Dr. Forbes, continues its awareness and promotion of those students who have and are dedicating their lives to the advancement of science.
Presentations

2:00 PM  Welcome and Introduction

2:05 PM  Paternal Pregnancy Intention and Breastfeeding Duration: Findings from the National Survey of Family Growth
         Jordyn T. Wallenborn; Dr. Saba W. Masho; Scott Ratliff
         Department of Family Medicine and Population Health, Division of Epidemiology

2:25 PM  Exploring the Psychometrics of the Retrospective Behavioral Inhibition Questionnaire (RBIQ)
         Jessica Bourdon B.S., B.A., Minyoung Lee, Ph.D., Roxann Roberson-Nay, Ph.D., John (Jack) Hettema, M.D., Ph.D.
         Virginia Institute for Psychiatric and Behavioral Genetics (VIPBG); Center for Clinical and Translational Research (CCTR)

2:45 PM  Ebola on Instagram and Twitter: How Health Organizations Addressed the Health Crisis in Their Social Media Engagement
         *Department of Health Behavior and Policy, **Richard T. Robertson School for Media and Culture, ***University of Georgia

3:05 PM  Glial Cells and Acute Alcohol Behavior in Drosophila
         Kristen Lee
         Neuroscience, Biomedical Science Doctoral Portal
         Advised by Michael S. Grotewiel, Ph.D., Department of Human and Molecular Genetics

3:25 PM  The Effects of 7,8-Dihydroxyflavone on Neurogenesis Following Traumatic Brain Injury
         Mary Wurzelmann, Department of Anatomy and Neurobiology
         Advised by Dong Sun, MD, PhD, Department of Neurosurgery

3:40 PM  The Role of Gastrointestinal Microbiota in Morphine Tolerance
         Mischel, RA, Kang, M, Dewey, W, and Akbarali, HI
         Department of Pharmacology and Toxicology
Paternal Pregnancy Intention and Breastfeeding Duration: Findings from the National Survey of Family Growth

Jordyn T. Wallenborn; Dr. Saba W. Masho; Scott Ratliff

Department of Family Medicine and Population Health, Division of Epidemiology

Objectives: Despite the benefits of breastfeeding, less than a fifth of American mothers breastfeed for the recommended duration. Paternal support plays a major role in maternal and child health outcomes; however, the influence of paternal pregnancy intention on breastfeeding duration is under investigated. This study examines the relationship between father’s pregnancy intention and breastfeeding duration.

Methods: Data from the 2011-2013 National Survey of Family Growth was analyzed using cross-sectional methodology. Women who were pregnant, never received medical help to become pregnant, whose partner was aged 18-49 years, and who responded to questions related to paternal pregnancy intention and breastfeeding were included in the analysis (N=2,089). Multinomial logistic regression, odds ratios and 95% confidence intervals were calculated. There was a statistically significant interaction between father’s age and father’s pregnancy intention (P=.0385) and all models were stratified by paternal age.

Results: Fathers aged 18 to 24 years with a mistimed pregnancy were 2.3 times more likely to have a child who was never breastfed, (AOR=2.27, 95% CI=1.39-3.70) and 1.7 times more likely to have a child who was breastfed six months or less (AOR=1.69, 95% CI=1.28-2.23) compared to fathers with an intended pregnancy and whose child was breastfed more than six months. No statistically significant association was observed among fathers 25 to 49 years.

Conclusions: Findings from this study show a relationship between mistimed pregnancies and breastfeeding duration among younger fathers. Healthcare professionals should develop breastfeeding interventions targeting fathers and young families.
Exploring the Psychometrics of the Retrospective Behavioral Inhibition Questionnaire (RBIQ)

Jessica Bourdon B.S., B.A., Minyoung Lee, Ph.D., Roxann Roberson-Nay, Ph.D.,
John (Jack) Hettema, M.D., Ph.D.

Virginia Institute for Psychiatric and Behavioral Genetics (VIPBG);
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Rationale: While much is known about behavioral inhibition (BI) as a temperamental trait and that it can lead to various anxiety disorders, little has been done to elucidate this relationship. To accomplish this, a three-phase project will be conducted from a psychiatric genetics perspective. The first phase is nearing completion and involves investigating the psychometric properties of a new BI scale, the Retrospective Behavioral Inhibition Questionnaire (RBIQ). To our knowledge, the psychometric properties of the RBIQ have not been adequately explored. Our aim was to estimate reliability, validity, and factor structure of the RBIQ prior to exploring its relationship to threat-related physiology and genomic data.

Methods: Parents of children between the ages of 9 and 13 completed the RBIQ ($N = 447$; mean age = 11.23; female = 49.36%), SCARED-P ($N = 482$; mean age = 11.20; female = 50.23%), and CBCL ($N = 516$; mean age = 11.18; female = 50.93%).

Results: Chronbach’s alpha was 0.962 for total RBIQ scores. Test-retest reliability was high between visits 1 and 2 ($ICC = 0.947, p < 0.001$). The RBIQ had the highest correlations with the SCARED-P social anxiety subscale ($r = 0.666, p < 0.01$), SCARED-P total sum ($r = 0.488, p < 0.01$), and CBCL withdrawn/depressed subscale ($r = 0.309, p < 0.01$). A 5-factor bifactor model fit the data best ($RMSEA = 0.069; CLI = 0.952; TLI = 0.945$), although there was excessive cross-loadings.

Conclusion: This factor structure is novel and is unlike the structure of similar measures of BI. Next steps include deriving a factor score to be used in later phases of this project.

Key words: behavioral inhibition, anxiety disorder, RBIQ, adolescence, psychometrics
Ebola on Instagram and Twitter: How Health Organizations Addressed the Health Crisis in Their Social Media Engagement


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Since the Ebola outbreak in West Africa was officially declared on March 22, 2014, more than 21,000 have been infected, and the virus has taken more than 8,300 lives. Along with this infectious disease pandemic, a pandemic of fear has surfaced, especially on social media platforms. Yet little is known about how public health organizations address this outbreak on social media: the types of communications, the larger context, and the associated risk perception factors that are present in the social media discussion. This study focused on social media platforms Twitter and Instagram and analyzed tweets and posts through the lens of risk communication theory. Instagram appears to be a helpful tool to engage publics in times of global health crises like the Ebola outbreak. Using more positive, solution-based messages is crucial, as is the use of images and reassuring publics while informing them of the necessary details.
Glial Cells and Acute Alcohol Behavior in *Drosophila*

Kristen Lee

Neuroscience, Biomedical Science Doctoral Portal

Advised by Michael S. Grotewiel, Ph.D.,
Department of Human and Molecular Genetics

Alcohol use disorder (AUD, highly problematic consumption of alcohol) is a complex disease that involves many genetic and environmental factors. Interestingly, sensitivity to the sedating properties of alcohol in humans correlates with the risk of developing AUD. Approximately 100 genes involved in alcohol sensitivity have been identified in the fruit fly *Drosophila*; many of these genes have human counterparts (i.e. orthologous genes) that have been implicated in human alcohol abuse. Most of the fly genes identified to date function in or are predicted to function in neurons, which has left the contribution of glial cells and the processes they mediate in fly behavioral responses to alcohol largely undescribed. Since *Drosophila* central nervous system glia cells are remarkably homologous to mammalian glia cells, we have begun to exploit glia cell function to better understand the roles of glia-specific genes and pathways in alcohol sensitivity in flies. We selected 28 glial cell-expressed genes from the published literature and then used glial-specific RNA-interference (RNAi) targeted to those genes to inhibit their function. Glial cell specific RNAi targeting of 5 genes (*axo, cp1, Ent2, Jhl-21,* and *nemy*) altered ethanol sedation sensitivity in *Drosophila*. Follow-up studies to confirm and further investigate the roles of these genes in alcohol sensitivity are ongoing. Although this project is at a fairly early stage of development, it could lay the foundation for a new area of research that will identify glial cell mechanisms that influence ethanol sedation sensitivity in *Drosophila* and, potentially, human AUD.
The Effects of 7,8-Dihydroxyflavone on Neurogenesis Following Traumatic Brain Injury

Mary Wurzelmann, Department of Anatomy and Neurobiology

Advised by Dong Sun, MD, PhD, Department of Neurosurgery

Following traumatic brain injury (TBI), the hippocampus is particularly vulnerable to damage, and BDNF, an endogenous neurotrophin that activates the TrkB receptor, has been shown to play a key role in the brain’s neuroprotective response. Activation of the TrkB signaling pathway by BDNF in the CNS promotes cell survival and aids in cell growth. However, due to its inability to cross the blood brain barrier (BBB), the therapeutic advantages of BDNF treatment following TBI are limited. 7,8-Dihydroxyflavone (7,8-DHF) is a flavonoid that mimics the effects of BDNF, is a potent TrkB receptor agonist, and can successfully cross the BBB. Our lab has previously demonstrated that administration of 7,8-DHF post-TBI results in improved cognitive functional recovery, increased neuronal survival, and reduced lesion volume. The current study examined the effects of 7,8-DHF on neurogenesis and neuronal migration in the dentate gyrus following TBI. We found that administration of 5 doses (5mg/kg) of 7,8-DHF beginning two days post-injury had the strongest effect on neurogenesis and migration, but did not have a significant prolonged effect on cell proliferation at 15 days post-injury. Our results suggest that 7,8-DHF has neurotrophic-like therapeutic effects following injury, and due to increased neurogenesis (compared to injured animals treated with vehicle), may effectively contribute to greater cell survival long-term. Additionally, potential long-term survival coupled with increased outward migration from the subgranular zone may result in increased integration of newly formed neurons into existing hippocampal circuitry, further contributing to cognitive recovery.
Gastrointestinal microbial dysbiosis is known to alter physiologic homeostasis and contribute to pathogenesis. Though morphine and other narcotics are the most widely prescribed therapy for moderate to severe pain, they have been noted to alter microbial composition and promote bacterial translocation to other tissues. Translocated microbes may then modulate local cell signaling and gene expression. One of the most immediately vulnerable compartments following bacterial dissemination is the intestinal wall, containing many terminal processes of extrinsic primary afferent neurons (EPANs) from dorsal root ganglia (DRG), as well as intrinsic neurons of the enteric nervous system (ENS). These neurons have integral roles in the major limiting factors of narcotic use -- analgesic tolerance and persistent constipation. Despite this, the impact of intestinal microbiota on the development of tolerance in these cells has not been well characterized. Here, we investigate how broad-spectrum antibiotic treatment impacts tolerance with chronic morphine exposure via 1) in vivo behavioral assessment of global analgesic efficacy, 2) cellular level tolerance investigation of DRG and ENS myenteric plexus neurons, and 3) β-arrestin2 quantification in DRG and myenteric plexus neurons.