
Alzheimer's and Related Diseases Research Award Fund

2019-2020 ALZHEIMER'S RESEARCH AWARD FUND RECIPIENTS ANNOUNCED

The Alzheimer's and Related Diseases Research Award Fund (ARDRAF) was established by the Virginia General Assembly in 1982 to stimulate innovative investigations into Alzheimer's disease and related disorders along a variety of avenues, including the causes, epidemiology, diagnosis, and treatment of the disorder; public policy and the financing of care; and the social and psychological impacts of the disease upon the individual, family, and community. The ARDRAF competition is administered by the Virginia Center on Aging in the College of Health Professions at Virginia Commonwealth University. Questions about the projects may be directed to the investigators or the ARDRAF administrator, Dr. Constance Coogle (ccoogle@vcu.edu).

**Carilion
Clinic *Azizza Bankole, PhD, Martha Anderson, DNP, and John Lach, PhD*
*Implementing a Caregiver-Personalized Automated Non-Pharmacological
Intervention System for Dementia-Associated Agitation (CANIS)***

Non-pharmacological interventions provided by caregivers of persons with dementia (PWD) can reduce the frequency and severity of dementia-related agitation, but the interventions must be timely and personalized to the PWD-caregiver's environment. Prior work demonstrated the ability of the Behavioral and Environmental Sensing and Intervention (BESI) system to detect early-stage agitation and provide automated notifications to caregivers for timely intervention. The intervention recommendations piloted in BESI are based on assessment battery findings, are hand-selected by a clinician, delivered via the BESI tablet app in small batches, caregiver-evaluated for usefulness, and "manually" re-adjusted. The question remaining is whether clinician evaluation of the assessment tools and hand-selection of targeted interventions can be automated to minimize or even eliminate the burden on clinical experts. Based on the categorization of interventions by potential agitation triggers and post-BESI interviews with caregivers and PWDs, the investigators aim to develop a higher level process of classifications and assessment to train the computer-generated intervention model and result in the Caregiver-Personalized Automated Non-Pharmacological Intervention System (CANIS) algorithm. By refining the trigger classifications and home context assessments, this team of computer and electrical engineers along with geriatric clinicians in partnership with dementia caregivers intend to build-out an intervention delivery mechanism to augment the BESI monitoring and notification system. *(Dr. Bankole may be contacted at 540/981-7653, aobankole@carilionclinic.org; Dr. Anderson may be contacted at 540-5202761, msaconsulting@mail.com; Dr. Lach may be contacted at 434/924-6086, jlach@virginia.edu)*

**UVA *Christopher Deppmann, PhD and John Lukens, PhD*
*Receptor Mediated Death Pathways in Alzheimer's Pathogenesis***

Neuronal death is a hallmark of Alzheimer's disease (AD). Both direct amyloid beta (A β) oligomer induced neurotoxicity and inflammation via glial cells contribute to synapse loss, neuronal cell death, and eventual cognitive decline. Importantly, AD pathology spreads over the course of decades, yet the mechanisms underlying neurodegeneration and inflammation in AD are still incompletely understood. There are dozens of receptors that could mediate the spread of toxicity; however all of these receptors converge on very few death/degeneration pathways. Notably, the requirements for cognitive decline and behavioral deficits as a consequence of activity in these pathways have not been examined in the context of neuroinflammation and neuron death. The investigators are in a unique position to delineate the molecular basis of AD spread. *(Dr. Deppmann may be contacted at deppmann@virginia.edu; Dr. Lukens may be contacted at 434/924-7782, john.lukens@virginia.edu)*

VCU Nathan A. Gillespie, PhD
Genetic and Environmental Pathways to Mild Cognitive Impairment and Biomarker Positivity Related to Alzheimer's disease

We know that cognitive decline, changes in mild cognitive impairment (MCI) and preclinical AD biomarker positivity are predictive of AD. Unfortunately, the time period when these changes begin to occur, which is in midlife, remains much understudied. This study will determine precisely when the genetic and environmental risks for MCI and biomarker positivity emerge and how they change over time. It will also identify how strongly biomarker positivity at age 56 causes changes in MCI at ages 61 and 68 years of age. Using data from a longitudinal sample of 1,237 male twins, the investigation will identify risk/resilience factors that alter the causal pathways from biomarkers to MCI (such as cognitive ability at age 20, medical and health history, psychosocial factors and genetic risks including APOE status and polygenic risk scores for AD). This longitudinal and genetically-informative study has the potential to identify people who are at-risk of AD well before their symptoms emerge and pinpoint which factors are suitable for clinical intervention. (Dr. Gillespie may be contacted at 804/502-1662, nathan.gillespie@vcuhealth.org)

Valley Health, VCU J. William Kerns, MD, and Jonathan Winter, MD
Shenandoah Valley Family Practice Residency ***Evaluation of the Impact of Race, Payer, and Other Factors on the Changing Management of Dementia Symptoms: High and Low Performing Virginia Nursing Homes Compared***

Although use of risky antipsychotic drugs is declining in Virginia long-term-care facilities (LTCFs), meaningful interpretation of this trend has challenges. Currently more than one-third of the antipsychotics prescribed in Virginia LTCFs avoid CMS examination since they are prescribed for exclusionary 'appropriate' diagnoses such as schizophrenia. In addition, prescribing of unreported alternative drugs, such as mood-stabilizers has increased precipitously, with African American males being far more likely to be treated with these drugs. While some facilities have effectively cut their use of antipsychotics to manage the behavioral symptoms of dementia, others have not had that success. High and low performing LTCFs will be assessed for differences in ethnicity, geography, population density, and changes in both prescribing of alternative mood-stabilizers, and reporting of exclusionary diagnoses. Qualitatively, the perspectives of facility managers, key clinical personnel, and medical directors of payers will be assessed to explore how and why dementia care is or is not changing to discover successful strategies and barriers to positive change. (Dr. Kerns may be contacted at 540/636-2028, bkerns@valleyhealthlink.com and Dr. Winter may be contacted at 540/631-3700, jwinter@valleyhealthlink.com)

UVA Amanda M. Kleiman, MD and colleagues
Post-operative Electroencephalographic Changes and Effects on the Incidence of Delirium Following Cardiac Surgery

Sleep impairment (e.g., reduced rapid eye-movement sleep and slow wave sleep) is prevalent following cardiac surgery. Indeed, post-operative sleep changes have been implicated in the development of post-operative cognitive dysfunction and delirium. Likewise, post-operative delirium has been shown to be an independent predictor for the development of dementia within five years following cardiac surgery. Little is known about specific electroencephalographic (EEG) changes from baseline in the post-operative period, however. This study aims to quantify the degree of sleep impairment using EEG changes following cardiac surgery and determine how these changes are associated with the development of post-operative delirium and ultimately dementia. Specifically, the investigative team hypothesizes that following cardiac surgery, mean and total sleep time and quality of sleep, as measured by more time spent in deep and REM sleep, will be significantly decreased and that patients with sleep disturbance are more likely to develop post-operative delirium. (Dr. Kleimann may be contacted at 434/924-2283, ak8zg@virginia.edu)

VCU Faika Zanjani, PhD, Jennifer Inker, PhD, and Joann Richardson, PhD
Health Coaching to Prevent Alzheimer's Disease

Behavior change health coaching is an underutilized strategy for AD prevention. Behavior change targeting AD prevention factors (e.g. alcohol, depression, physical inactivity, smoking, isolation, medication management) is extremely challenging for multiple reasons. While the failure to draw the connection between AD and health behaviors is not the least of these challenges, motivational, self-efficacy, and knowledge barriers also contribute. Because AD is a major concern, connecting behavior change to AD can be psychologically beneficial, motivating, and programmatically supportive. The investigators will utilize motivational interviewing and provide AD targeted behavior change health coaching for low-income elders to alter AD risk factors. The study aims to improve at least one single AD risk factor per participant (e.g. alcohol, depression, physical inactivity, smoking, isolation, medication management) through this intervention. As part of the iCubed Health and Wellness in Aging Populations Transdisciplinary Core, 20 diverse older adults (aged 60+) with incomes below \$12,000/year, who are living in Richmond, VA and managing diabetes will be offered individual education, motivation, self-efficacy, and referral services where needed to target AD behavioral risk factors. A patient preference health coaching behavioral change strategy will let the person decide which behavioral practices to target. Changes in cognitive functioning and AD risk factors will be monitored over the course of the study. The findings from this study will serve as the impetus for future large scale investigations and dissemination of findings. ***(Dr. Zanjani may be contacted at 804/828-0670, fzanjani@vcu.edu; Dr. Inker may be contact at 804/828-0670, inkerjl@vcu.edu; Dr. Richardson may be contacted at 804/828-1948, jtrichar@vcu.edu)***

2019-2020 ARDRAF Awards Committee

The Virginia Center on Aging acknowledges the dedicated work of this independent committee of subject matter experts and gratefully thanks them for contributing their time and expertise.

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