INTERDISCIPLINARY INNOVATIONS UTILIZING PET ROBOTS TO MEET RESEARCH, EDUCATION, AND CARE NEEDS

Meredith Troutman-Jordan,[1] and Boyd Davis,[2] *1. University of North Carolina Charlotte, Charlotte, North Carolina, United States, 2. UNC Charlotte, Charleston SC, South Carolina, United States*

Studies of the impact of robotic companion pets are proliferating, authored by several disciplines, each with different concerns. Roboticists focus on technology design and artificial emotional intelligence as opposed to general preferences for soft, furry, interactive animals. Others worry that as people interact with potentially deceptive technology, they may think the pet is alive. While aware of these serious concerns, gerontologists have focused on how lonely older persons without cognitive impairment respond to social 'helper' robots. More recent studies emphasize the possible impact of animatronic pets on persons with dementia (PWD). Therapeutic benefits of these pets are just being established. Our current pilot study is timely in that it now involves semi-structured interviews with formal/ informal caregivers of PWD who have been given a robot pet. We are eliciting perceptions, opinions, and observations of the PWD's response to robotic pets. We recruited 8 gerontology students as much-needed assistants for a research-driven topics course to afford them field exposure to PWD, caregivers, and direct research experience. Because students seldom have experience either with robotic pets or PWD, they read selected articles and received training/practice in semi-structured interviewing techniques. Students next conducted interviews with caregivers of PWD who have interacted with the pets. All interviews are audio-recorded, transcribed and deposited in the Carolinas Conversations Collection. Content and thematic analysis of transcriptions, student activity logs and bi-weekly reflective discussions will inform next steps in intervention research, testing therapeutic outcomes such as agitation reduction by pet robots for PWD.

LOW COGNITIVE PERFORMANCE INCREASES THE RISK OF HOSPITAL-ASSOCIATED COMPLICATIONS IN OLDER ADULTS

Juliana Souza-Talarico,[1] Siomara Yamaguti,[2] Adriana Dutra,[3] and Daniel Apolinario,[3] *1. The University of Iowa, Iowa City, Iowa, United States, 2. Hospital do Coracao HCor, Hospital do Coracao (HCor), Sao Paulo, Brazil, 3. Hospital do Coracao HCor, Hospital do Coracao HCor, Sao Paulo, Brazil*

Considering the limited evidence regarding the factors that contribute to long-term consequences after hospitalization of older people, we analysed the relationship between cognitive performance and hospital-associated complications (HAC). One thousand, three hundred Individuals aged 60 and older (mean age 82.3, 53.3% female), not assigned to palliative care and admitted in medical and surgical wards from a private hospital, were followed up from admission to 30 days after discharge. HAS was evaluated using a multicomponent measure that combines 12 hospital-associated complications (delirium, functional decline, falls, pressure injuries, bronchoaspiration, non-planned ICU transfer, physical restraints, hospital stay > 30 days, death, long-term care transfer, and readmission). Cognitive performance was assessed using the "10-point cognitive screener (10-CS)", which combines temporal orientation, category fluency, and word recall evaluation. Results: Overall, 464 (35.7%) participants had one or more HAC during their admission. Patients with HAC showed lower 10-CS scores than those with in HAC ($p < 0.001$). Adjusting for sociodemographic data, medication, chronic diseases, delirium screening, functional performance, each 10-CS point decreased the HAC changes by 19.2% (odds ratio = 0.808; 95% CI = 0.660 – 0.990). Conclusion: These findings show that low cognitive performance was significantly associated with the risk of developing HAC during hospitalization and within 30 days after discharge. That evidence forms the critical foundation for the next steps towards validating the accuracy of these models in predicting vulnerability to HAC and developing screening tools to be used at the point of care.

LUNG FUNCTION RESERVE AND PHYSICAL FUNCTION IN HEALTHY OLDER ADULTS: FINDINGS FROM BLSA

Joey Saavedra,[1] Ajoy Karikkineth,[2] Luigi Ferrucci,[2] and Eleanor Simonsick,[3] *1. Iowa State University, Ames, Iowa, United States, 2. National Institute on Aging, Baltimore, Maryland, United States, 3. National Instute on Aging/NIH, Baltimore, Maryland, United States*

Forced Expiratory Volume in 1-second (FEV1) that falls below the lower limit of normal (LLN) is a well-established correlate of functional limitation and disability. However, less is known about the functional implications of gradations of lung function above the LLN. We examined the cross-sectional association between gradations of healthy lung function and usual gait speed, reported walking ability, and fast 400m walk performance in 750 persons (50.7% men) aged 55-95 free from respiratory disease and mobility limitations, participating in the Baltimore Longitudinal Study of Aging (BLSA). The 2012 Global Lung Initiative (GLI) reference equations were used to calculate FEV1 Z-scores, with healthy lung function categorized as follows: $-1.6 < Z \leq -1.0$ (pre-clinical), $-1.0 < Z \leq -0.3$ (low normal), $-0.3 < Z \leq 0.3$ (normal), $0.3 < Z \leq 1.0$ (high-normal), and $Z > 1.0$ (high). Associations between gradations of healthy lung function and physical function were evaluated using multivariate linear regression, adjusting for age, sex, height, weight, and waist circumference. Compared to the 'pre-clinical' category, the difference in 400m walk time was 0.71 ($p>.05$), -6.60 ($p>.05$), -12.21 ($p<0.05$), and -15.52 ($p<0.01$) seconds for the 'low normal', 'normal', 'high-normal', and 'high' categories, respectively. No associations between gradations of healthy lung function and normal gait speed or walking ability were found ($p>0.05$). Higher levels of lung function reserve are associated with better 400m walking performance, thus efforts to promote and/or reduce loss of lung function reserve may help individuals maintain high functional capacity in later life.

MAINTENANCE OF PHYSICAL FUNCTION IN ADULT AND OLDER ADULT MICE USING AEROBIC EXERCISE

Ted Graber, Megan Pajski, Christopher Byrd, Nainika Nadigama, Alyssa Fennel, Emily Seguin, and Anna Seguin, *East Carolina University, Greenville, North Carolina, United States*

As we age, physical and neuromuscular function declines gradually. Exercise is a therapy to improve neuromuscular ability. Pre-clinical models are needed to understand molecular mechanisms contributing to age-associated functional decline and how exercise affects that downward trajectory. Our goal was to compare the differences in effects of two validated mouse models of endurance exercise designed to mimic human training studies: high intensity interval training (HIIT) and voluntary wheel running (VWR). We hypothesized that both adult and older adults (10 and 26 months old at end, respectively: 10m and 26m) would respond to both exercise regimens by improving or maintaining exercise/physical capacity, but that adult mice would benefit more. We randomly assigned male C57BL/6 mice into experimental groups: 10m: (VWR, HIIT, sedentary control, CON, n=8 per group), and 26m (VWR, n=8, HIIT, n=10). We measured functional ability (pre- and post-intervention) using CFAB (comprehensive functional assessment battery), our composite scoring system (grip strength, inverted cling, treadmill endurance, activity rate, rotarod), tracked body composition (EchoMRI), and measured muscle wet mass. We found that significant retention of ability (CFAB difference, repeated measures ANOVA, $p<0.05$) and fat percentage (ANOVA., %change: 10m: CON +125%, HIIT +101%, VWR +52%; 26m: VWR -42%, HIIT +26%, $p<0.05$) was promoted by both exercise modalities compared to control, and furthermore HIIT may have better efficacy in the adult versus the older mice. In conclusion, both exercises are valid models with derived benefits as expected in similar human studies. We anticipate future work using these models to undertake mechanistic investigations.

MAPPING THE ENDOGENOUS KETOGENIC SYSTEM ACROSS AGES, SEX AND DIETS

Brenda Eap,[1] Mitsunori Nomura,[1] Oishika Panda,[2] Thelma Garcia,[1] and John Newman,[3] *1. Buck Institute for Research on Aging, Buck Institute for Research on Aging, California, United States, 2. Buck Institute for Research on Aging, Buck Institute of Research on Aging, California, United States, 3. Buck Institute for Research on Aging, Novato, California, United States*

Understanding how our cells maintain energy homeostasis has long been a focus of aging biology. A decline in energy metabolism is central to many age-related diseases such as Alzheimer's disease, heart failure, frailty, and delirium. Intervening on pathways involved in energy homeostasis can extend healthy lifespan. When our primary energy substrate glucose, is scarce, our bodies use ketone bodies (i.e. beta-hydroxybutyrate, acetoacetate, acetone). Aging is associated with glucose intolerance and insulin insensitivity, yet what role ketone body metabolism might play in compensating for impaired glucose utilization in age-related diseases is understudied. Here, we investigated how the body's endogenous ketone body production and utilization pathways are modulated by age across the lifespan of female and male C57BL/6 mice (4 mo old, 12 mo old, 22 mo old). We show how different ages have different metabolic and gene expression responses to 1-week ketogenic diet (KD) or ketone ester diet. We observed an apparently compensatory ketogenic response in older animals fed normal diet, with a stronger compensatory response driven by KD. We observed tissue-specific changes, including induction of ketone body production enzymes in the aging heart. When comparing the ketogenic capacity between sexes, females had a higher basal level and less variation with age, underscoring the importance of sexual dimorphism in metabolism. Overall, these findings suggest that older animals use ketone bodies to meet energetic demands in a normal diet context. This study supports the potential roles of ketogenic therapies such as exogenous ketones to improve energy homeostasis in conditions of aging.

MENTORSHIP PROGRAM CONTENT RATINGS: ADVANCING DIVERSITY IN AGING AND ALZHEIMER'S DISEASE RESEARCH AND CAREERS

Sheri Thompson,[1] and Lauren Pineda,[2] *1. University of California San Diego, encinitas, California, United States, 2. UCSD, UCSD, California, United States*

MADURA is an R25 Advancing Diversity in Aging Research (ADAR) undergraduate training program funded by the National Institute on Aging and based at the University of California San Diego. Its objectives are to improve retention and academic success of underrepresented minority (URM) trainees, and to increase graduate/medical school applications and/or entry into Aging/ADRD careers. This multi-component program includes paid research lab experience, research and academic skills training, peer support, faculty-led small groups, guest seminars, and additional professional development opportunities. The Year 1 Cohort of 32 students consisted of Hispanic/Latinx and other students under-represented in collegiate MSTEM studies. Almost ¾ of the mentees also came from disadvantaged backgrounds, per current NIH criteria. Evaluation data have been collected through brief, weekly, anonymous online student surveys, plus more comprehensive quarterly mentee and mentor surveys. This poster will describe the Program structure and 20+ group activities, trainings, seminars, and modalities, and report student ratings of satisfaction and utility. 92% of trainees rated the overall program value as Excellent, and 92% also rated effectiveness in promoting Aging/ADRD careers among underrepresented students as Excellent. Quality ratings of components such as pay, research placements, group training and group mentorship were rated as Excellent or Good by 96%. Relative student component rankings, specific suggestions for improvements, plus Mentee and Mentor perspectives on research-specific training needs, will also be presented. Based upon these experiences and data, the authors will make specific suggestions for future URM research training, mentorship program content, and expanded delivery modalities.

NEURON-SPECIFIC MECHANISMS CONTROL THE MITOCHONDRIAL REGULATOR PGC-1A

Eric McGregor,[1] Dylan Souder,[1] Josef Clark,[2] Timothy Rhoads,[2] Kevin Elicieri,[2] Mark Beasley,[3] Darcie Moore,[2] and Rozalyn Anderson,[4] *1. University of Wisconsin--Madison, Madison, Wisconsin, United States, 2. University of Wisconsin-Madison, Madison, Wisconsin, United States, 3. University of Alabama at Birmingham, University of Alabama at Birmingham, Alabama, United States, 4. University of Wisconsin College of Medicine, University of Wisconsin, Madison, Wisconsin, United States*

Mitochondrial dysfunction has been proposed as a hallmark of the aging process. Specifically, as a function of aging,