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Alzheimer's and Related Diseases Research Award Fund

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**FINAL PROJECT REPORTS FROM THE  
2003-2004 ALZHEIMER'S RESEARCH AWARD FUND**

**UVA James P. Bennett, M.D., Ph.D. and Bradley Miller, M.D., Ph.D. (Department of Neurology/Division of Neuropathology) "Mitochondrial DNA Deletions and Mutations in Alzheimer's Disease Brain Neurons"**

This research examined the genetic contribution mitochondria make to Alzheimer's disease (AD). Several aspects of this neurodegenerative disease (i.e., largely sporadic incidence, increasing severity with age, proclivity for neuronal damage) mirror aspects of mitochondrial genetic disease. Until recently, though, it has not been possible to examine directly the mitochondrial DNA content of single neurons. This study has involved the application of a set of stains to identify neurons with either functional or non-functional mitochondrial electron transport chains (ETC, from which much of a neuron's energy currency [ATP] is generated), isolation of single neurons, and PCR (polymerase chain reaction)-based examinations of their mitochondrial DNA. The investigators found a low level of ETC-deficient neurons in the hippocampus, cortex and pontine midbrain. They have established conditions for post-staining single-neuron isolation, and the PCR studies have demonstrated the presence of mutated mitochondrial DNA in groups of isolated neurons. Additionally, a region of the hippocampal formation (the dentate gyrus) has been shown to be ETC-nonfunctional. To overcome certain limitations inherent in traditional PCR, the investigators have recently pioneered the application of a separate technique (rolling-circle amplification [RCA]) to amplify mitochondrial DNA prior to PCR. Using RCA followed by PCR, they will characterize the mitochondrial mutations on a per-neuron basis. (*Dr. Bennett can be reached at 434/924-8374; Dr. Miller can be reached at 434/924-9175*)

**VA Tech Toni Calasanti, Ph.D. (Department of Sociology) "Gender Differences in Informal Care Work for Persons with Alzheimer's Disease"**

This study explored the caregiving by husbands and wives of spouses with Alzheimer's disease and related dementias. Data were gathered through interviews with twenty-one caregivers and participant observation in support groups at multiple sites. Findings indicate that husbands and wives perform similar tasks for their spouses, and for similar reasons. However, two caregiving styles were evident. Men tend toward a more instrumental, problem-solving approach that focuses attention on accomplishing tasks, while women's more relational approach focuses attention on the care receivers as life partners. The instrumental approach allows caregivers to engage in emotional distancing; and men's lifelong experiences in mastering tasks and their more dominant positions in society allow them to manage their wives' disruptive and violent behavior, perhaps allowing them to keep their wives in their communities longer. For men, stress results when they become unable to assess problems and act accordingly. At these times, they have fewer personal resources for handling the stress. Women's relational approach, rooted in their caregiving experiences across the lifecourse, eases their gradual transitions into caring for spouses. However, their previous gender-based expectations of themselves lead women to feel more pressure to care for the "whole person," to smooth things over, and to maintain their husbands' happiness and dignity. For women, then, stress occurs when they are unable to keep themselves and their husbands on an even emotional keel and maintain their husbands' autonomy. These findings suggest that, rather than trying to see whether men or women experience the greater stress, research and interventions (such as support groups and educational materials) should focus on gender differences in styles and sources of stress and how to alleviate the latter. (*Dr. Calasanti can be reached at 540/231-8961*).

**VA Tech Shannon E. Jarrott, Ph.D. and P. Diane Relf, Ph.D. (Department of Human Development/Department of Horticulture) "Horticulture Therapy for Persons with Dementia: Replication of a Pilot Study"**

Horticulture therapy, which is the use of plant materials and gardening activities adapted to meet individualized needs and treatment goals, has been associated with increased activity, social interaction, concentration, and positive mood among persons with dementia in adult day services. This study compared the responses to horticultural programming of adults with dementia in institutional care settings to those of similar adults in more traditional dementia care programming (games, exercise, crafts), examining the behavioral and affective responses of individuals. Cognitive function scores indicated a moderate level of impairment on average. Both active and passive involvement were higher in the horticultural activities than during the traditional activities, with passive engagement being more common during the horticultural than the traditional activities. In contrast to previous research, exhibited affect in the two conditions was comparable, with interest being the most commonly observed emotion. One possible explanation is the approach and experience of the facilitator, new to the project, who was trained in horticultural therapy but had limited experience working with older adults with dementia. The findings raise questions about the extent to which an intervention depends on the nature and personality of the intervention facilitator and indicate a need to explore the effects of facilitator characteristics on participant experiences. *(Dr. Jarrott can be reached at 540/231-5434; Dr. Relf can be reached at 540/231-9279)*

**ODU Brian K. Payne, Ph.D. and Randy R. Gainey, Ph.D. (Department of Sociology and Criminal Justice) "The Social Context of Providing Care to Alzheimer's Patients: Specifying Interactions Between Social Disorganization, Service Utilization, Burden, and Mistreatment"**

Research suggests that individuals with Alzheimer's disease are at a higher risk of mistreatment and experts have attributed this high risk to the stresses that come with providing care to patients with Alzheimer's disease. In this study, the investigators examined whether neighborhood and city-wide factors contributed to caregiver burden potentially influencing mistreatment. Examining 750 cases of elder mistreatment from three cities (Virginia Beach, Norfolk, and Chesapeake), they found that Alzheimer's caregivers and their family members from disadvantaged neighborhoods were less likely than those living in more advantaged neighborhoods to rely on formal services offered by adult protective services. In addition, Alzheimer's caregivers living in disadvantaged neighborhoods were more likely to experience burden than those living in more advantaged neighborhoods. Burden, as measured by the Virginia Uniform Assessment Instrument, was higher in Norfolk than in the other cities, and most Alzheimer's and dementia cases in Norfolk primarily came from disadvantaged neighborhoods. Using mapping technology, it was determined that support groups were spread evenly across neighborhoods for the most part, but adult day care centers are not as easily accessible in the three cities. *(Dr. Payne can be reached at 757/683-3935; Dr. Gainey can be reached at 757/683-4794)*

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