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Alzheimer's and Related Diseases Research Award Fund

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**FINAL PROJECT REPORTS FROM THE  
2002-2003 ALZHEIMER'S RESEARCH AWARD FUND**

**VA Tech Paul R. Carlier, Ph.D. (Department of Chemistry) “Structure-Based Design of Dimeric Memory Enhancing Drugs”**

Current FDA-approved therapies for alleviating Alzheimer's memory loss are based on the use of enzyme inhibitors to increase the concentration in brain of the neurotransmitter, acetylcholine. Unfortunately, use of these drugs (acetylcholinesterase inhibitors) is accompanied by side effects which are largely caused by interaction with unintended biological targets. This study was designed to decrease side effects by improving selectivity for the enzyme of interest, acetylcholinesterase. In the project period the investigator synthesized new acetylcholinesterase inhibitors based on the active constituent of the Chinese medicinal herb, *Huperzia Serrata* (Huperzine A). The drug candidates synthesized in this project represent a second generation of dimeric Huperzine A-derived enzyme inhibitors and their design was informed by atomic scale pictures of how the synthesized drugs attach themselves to acetylcholinesterase. Each drug candidate contains two fragments of Huperzine A, and can thus interact with acetylcholinesterase at two points, attaining a “tighter grip.” This tighter grip will hopefully translate to lower therapeutic doses and lower occurrence of side effects. The second generation of drug candidates differs from the first in the use of a more rigid connector between the Huperzine fragments; the increased rigidity should result in greater inhibitory activity. The investigator is currently awaiting bioassay results to learn if the second generation of drug candidates offers superior potency. **(Dr. Carlier can be reached at 540/231-9219)**

**VCU J. James Cotter, Ph.D., E. Ayn Welleford, Ph.D. (Department of Gerontology) and Kathy Vesley-Massey (Chesapeake Bay Agency on Aging, Inc.) “Improving the Capacity of Home Care Aides in Rural Areas Serving Persons with Alzheimer's Disease and Related Disorders”**

Training for long-term care workers serving persons with Alzheimer's disease and related disorders (ADRD), especially home care aides, is one of the most important challenges confronting the health care system. The investigators implemented two interventions (Training Only and Training with Support) to enhance rural home care aides' skills in caring for persons with ADRD, and they measured the effect of the interventions on the aides, the informal caregivers (e.g. family), and the patient. They also explored the challenges and opportunities of collaborative research between an academic medical center and a community-based agency for older persons. Aides' knowledge of Alzheimer's disease increased substantially and was maintained over the course of the study. Despite a more impaired client, the Training and Support intervention was effective in maintaining high degrees of aide and caregiver satisfaction and decreasing the caregivers' perceptions of burden. There were mixed effects for the Training Only group. The investigators identified a number of barriers and facilitators of success in conducting research with persons with ADRD in community-based settings, including the need to focus more resources on recruitment and retention of research participants. The researchers are currently investigating the effect of severity adjustment on outcomes and the potential for expanded community-based research studies to learn more about improving home care aide performance and client satisfaction. **(Dr. Cotter and colleagues may be contacted at 804/828-6071)**

**UVA Elana Farace, Ph.D. and Mark E. Shaffrey, M.D (Department of Neurological Surgery) “Neurocognitive Discrimination of Alzheimer's from Normal Pressure Hydrocephalus Verified by Brain Biopsy”**

Many elderly patients with dementia are referred each year to neurosurgeons for evaluation and possible placement of a brain shunt to drain excess cerebral spinal fluid as a means of treating Normal Pressure Hydrocephalus (NPH), a disease characterized by dementia, gait problems, and urinary incontinence. NPH can be successfully treated with the use of a shunt, or tube which drains off the excess fluid. Approximately 10-30% of all patients who present with suspected NPH may have Alzheimer's disease (AD), either as a separate diagnosis or at the same time that they have NPH. This study was intended to determine the effect of AD on whether or not NPH patients benefited from a shunt placement. The research showed that the true rate of AD in patients with presumed NPH undergoing shunt procedures was 40%, much higher than previously thought. These patients with AD tended to improve with shunt placement in terms of walking and urinary continence, but their dementia remained the same or worsened. Neuropsychological testing was diagnostically suggestive of NPH, and may contribute to a non-invasive method for determining possible NPH and AD. This research will lead to improved outcomes in patients appropriate for shunt placement in NPH, and help patients with AD avoid unnecessary neurosurgery. **(Drs. Farace and Shaffrey may be contacted at 434/2434806)**

**JMU Merle E. Mast, Ph.D. and Marilyn Wakefield, Ph.D. (Department of Nursing) “Rural Family Caregivers' Perceptions of Facilitators and Deterrents to the Use of In-Home Respite”**

Although caregivers of persons with AD cite respite as a pressing need, many caregivers do not use respite services or delay using them until very late in the disease process. To date, research has noted, but has not gained, an understanding of this phenomenon. Little is known about the extent to which specific interventions correspond to caregivers' perceptions of what they need and would find useful. This qualitative study used Grounded Theory to explore rural family caregivers' perspectives of the factors that either enhance or deter the use of in-home respite. Emergent themes include family relationships, loss/grieving, trust, caregiver self-knowledge, caregiver purpose/role/sense of obligation, family/cultural taboos, decision-making process, seeking/asking for help, barriers to asking for help, and defining moments. Caregiver distress is a major over-arching theme, clustering in four distinct and interrelated areas: “normal” aging stressors, family issues, unresolved grief, and inadequate assistance. There seems to be an inverse correlation between the level of caregiver distress and the willingness to seek out, and accept, in-home respite services. Forthcoming results will provide definitions of caregiver distress and a working model of the interrelatedness of caregiver distress to decision-making about in-home respite care. **(Drs. Mast and Wakefield may be contacted at 540/568-6314)**

**Mountain Empire Older Citizens, Inc. Marilyn Pace Maxwell, M.S.W. and Michael Creedon, D.S.W “Using the Internet for Alzheimer's Care: The Challenge for Elders and Service Organizations in Approach”**

The development of wired communities, broadly connected by computer technology, allows local organizations to interact with and support specific families and individuals in previously unexplored ways. Taking advantage of this progress in rural Southwest Virginia, the investigators examined the feasibility of computer-assisted support for family caregivers of persons with Alzheimer's disease. A telephone survey of caregivers found that 50% of respondents had access and were willing to use computers as a learning tool and to support their caregiving roles, though few currently used computer technology as an information source. Few of those without access expressed any desire to use, or learn to use, computers. Three of the eleven participants in a focus group on electronic technology and caregiving were using computers for caregiving purposes (two for an Alzheimer's chat room, one to access the Alzheimer's Association web site). Most were willing to learn to use computers for caregiving, and all regarded teenage trainers as a positive resource. These findings serve as the basis for program development and technology support services, with the ultimate goal of assuring that the needs of Alzheimer's caregivers are included in the region's plans for developing the wired community. **(Ms. Maxwell and Dr. Creedon may be contacted at 276/523-4202)**