



# the Center Report

## New Diagnostic Criteria for Alzheimer's Disease\*

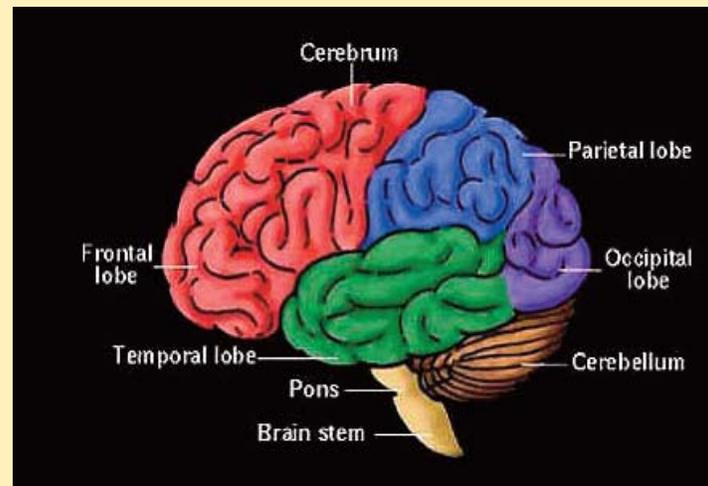
**T**wenty-five years ago, criteria for diagnosis of Alzheimer's Disease (AD) were introduced from a workgroup comprised of some of the leading experts in the field. These guidelines came at a time when individual clinicians and scientists were using approaches that differed quite a bit from group to group. These criteria revolutionized the field, providing a critically important tool to both clinicians evaluating patients and scientists, working to advance treatments for the disease.

The fundamental biology of AD is now much better understood. AD dementia is the end stage of a very long process. We are now able to recognize quite reliably the early symptoms of the disease and distinguish these subtle changes from normal memory changes of age.

Advances have also been made in technology and brain imaging, making it possible to detect early brain pathology well before the disease has advanced to the dementia stage.

In the last year, three workgroups comprised of current thought leaders in the field have reviewed the diagnostic criteria for AD and made recommendations for revisions that incorporate the new body of knowledge. Guidelines were introduced in draft form in July, 2010 at the annual International Conference on AD. The new guidelines include criteria for three stages of the disease: silent, pre-clinical disease; symptomatic, prodromal disease; and fully expressed, dementia stage of the illness. The diagnostic criteria are judged to be well supported by research, and the inclusion of biomarkers into the criteria will likely advance reliability of the diagnosis in early, ambiguous cases.

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## Fourteen Pepper Scholars Awarded

The Duke Claude D. Pepper Older Americans Independence Center (Duke Pepper Center) is a centerpiece program of the Duke Aging Center. Funded through the National Institute on Aging, the Duke Pepper Center is one of 13 centers located throughout the United States with the common goal of "increasing scientific knowledge that will lead to better ways to maintain or restore independence to older persons. The theme of the Duke Pepper Center is to support research and training that helps us better understand and modify multiple pathways of functional decline. Over the past 18 years, the Duke Pepper Center has been at the forefront of training and development of promising geriatrics researchers and advance-

ment of scientific knowledge in our theme. This past year, fourteen individuals were formally recognized as Pepper Scholars for their high quality research that contributed to enhancement of the Pepper Center objectives.

The following are the names of the scholars and titles of their research:

**Jennifer Dungan, RN, PhD** — Studies pertaining to survivorship bias in cardiovascular disease.

**Timothy Koves, PhD** — Research Core 2 Development Project 2 — Targeted Metabolomics for Sphingolipids and other Lipid Derived Species.

**Thomas Povsic, MD** — Aging, inflammatory markers and obesity.

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# Systemic Genetic Determinants of Healthy Aging in Humans

Alexander M. Kulminski, PhD

**A**ging of populations in developed countries has become a matter of government and public concern requiring effective strategies to extend healthy lifespan. Aging is characterized by increasing susceptibility to diseases and to various stresses of life. As such, aging is tightly linked to morbidity. Various aging-related diseases tend to cluster in families implying that they are heritable traits. Heritability might implicate genetic predisposition. Accordingly, understanding the genetic origin of geriatric diseases could address the problem of extending healthy lifespan in human being. The problem with this approach is that there are a large number of such traits and each of them can be caused by complex networks of genes.

Is aging the cause or the consequence of morbidity? To date, researchers generally recognize that aging is a major cause of morbidity. Studies show that children in families with long living parents typically also live long lives. As such, the process of aging itself is a complex heritable trait

which can have genetic origin. If aging causes multiple health traits, what would the consequences be if we found genes that predispose to aging? The answer is very encouraging, i.e., yielding insights into genetic predisposition to systemic changes in an aging organism could be a major breakthrough in preventing and/or ameliorating not one age-related trait, but perhaps a major subset of such traits.

Despite notable progress in each of those approaches, understanding the role of genes in systemic changes in an aging organism and, consequently, the potential of these genes for effective medical interventions is still very limited. To accelerate the progress in uncovering the genetic origins of healthy life, new promising strategies are urgently needed. With these questions in mind, we have developed a conceptually compelling strategy which is built on a hypothesis that the fundamental mechanisms of intrinsic biological aging might explain genetic predisposition to a wide spectrum of the aging-related traits and longevity. To investigate whether such a strategy could advance our understanding of healthy life, we analyzed phenotypic and genotyping data on about 9300 adults and elderly participants of the Framingham Heart Study who had been under continuous surveillance for about 60 years.

Analysis of these data reveals that lifespan and a wide spectrum of the aging-related traits can be controlled by the same complex network of genes through a common mechanism. Further analyses show that this mechanism is likely of a fundamental nature associated with intrinsic biological aging. Single nucleotide polymorphisms (SNPs) in these gene networks exhibit



Alexander M. Kulminski, PhD

correlated patterns even though such SNPs can be on non-homologous chromosomes. Carriers of the risk alleles of these SNPs appear to be at exceptionally high and significant risk of death. For instance, difference in mean lifespan of the risk and non-risk allele carriers can be as much as 18 years. Furthermore, individuals carrying the risk alleles have also substantially more health problems and typically experience cardiovascular diseases and cancer up to about seven years earlier in life than the non-risk allele age-peers. Analysis of the functional role of genes for the revealed SNPs shows that they are probably organized in biologically meaningful networks associated with such fundamental processes as cell communication, development, and immunity. Examination of the results supports a view of an important role for the nervous system in human aging and of causal connections of neurological disorders with cardiovascular diseases.

The results of this study provide substantial evidence for the hypothesized efficacy of potential health-preventing interventions through fundamental processes of intrinsic biological aging and suggest a challenging role for genes in regulating healthy aging in humans.

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## New Scan May Spot Alzheimer's\*

A small company with a new brain scan for detecting plaque, the hallmark physical sign of Alzheimer's Disease (AD), presented its results last July at an international conference in Hawaii, and experts who attended said the data look promising.

P. Murali Doraiswami, MD, a biological psychiatrist at Duke who had helped recruit patients for the study, called the results among "the most highly anticipated data from the entire meeting. The development of a validated PET scan to detect amyloid aggregates would be a major scientific milestone in our field. It would give us a powerful tool to perform clinico-pathologic correlations in living patients."

The scans use a radioactive dye (Florbetapir) that attaches to plaque in the brain, allowing it to be seen with a PET scan.

Until now, even doctors at leading medical centers have been wrong as often as 20 percent of the time: people

they said had AD were found not to have AD upon autopsy.

The results of the study showed that in 34 of 35 patients examined on autopsy, the PET scan, the pathologists' report, and the computerized pathology report agree. In one patient, the pathologist and radiologist did not see much plaque, but the two autopsy reports did. And the data showed that the scans were completely accurate in rul-

ing out AD: unlike doctors, they never said people had AD when they did not.

In addition, the company scanned the brains of 76 younger people who would not be expected to have plaque in their brains. None did.

The company hopes that the scan will become available to clinicians within a year or so.

*\*Adapted from "New Scan May Spot Alzheimer's" by Gina Kolata in the New York Times, July 12, 2010.*



**Christin Ogle, PhD**

## Welcome New Postdoc

Christin Ogle, Ph.D., comes to the Aging Center, with a Postdoctoral Fellowship, from California where she earned her PhD in Cognitive Psychology at the University of California at Davis. Her dissertation was entitled "Developmental Changes in the Suppression of Emotional Memories." Dr. Ogle's primary mentor will be Dr. David Rubin from the Department of Psychology and Neuroscience, and her second mentor will be Dr. Ilene Siegler from the Medical Psychology section of the Department of Psychiatry and Behavioral Sciences. The topic of her research during her fellowship is "Risk Prediction of Post Traumatic Stress Disorder in Older Adults."



## Global Aging: Blessing or Curse?\*

**T**he number of persons in the world over age of 60 has doubled since 1980 from 378 million to 760 million, and the projection is that it will double again in about 25 years. Is this good news or bad?

### Bad News

Ted Fishman has published a best seller called “Shock of Grey” which warns that global aging “pits young against old, child against parent, worker against boss, company against rival, and nation against nation.” This is a pretty grim and one-sided picture. First of all, there are several countervailing facts that make the picture not so grim; and there are positive aspects that the book neglects.

Consider the fear that the declining ratio of workers to retired persons will place an unsustainable burden on workers to support older people. This fear neglects that fact that the number of dependent children (under age 18) will also decline, so that the total dependency ratio (# of children plus # of retired to # of workers) will not decline by much — at least in the USA. The point is that the increase in demand for goods and services for older people will be somewhat ameliorated by the decrease in demand by children. For example, we will need more geriatricians, but fewer pediatricians.

A similar fear is that the % of Gross Domestic Product (GDP) devoted to

Social Security and Medicare and Medicaid will increase in the US from about 8% to about 15% in the next few years. However, most of this increase is due to the increase in health care costs, not to increases in SSA benefits. Actually, the Social Security trust fund is in pretty good shape and can be fixed for the foreseeable future with a few simple changes, such as removing the cap on taxed earnings and by delaying the age of full entitlement by another year or so. So the increasing health care costs are of grave concern, but that is a concern for all ages, not just older folks.

As for the fear that the old will become “greedy geezers” dominating our politics and draining resources from younger people: there is almost no evidence for that — and much evidence against it. Older people tend to support schools and health care for the young as much as do younger people. And the vaunted political power of the “grey lobby” is much exaggerated. Old voters tend to vote along party lines much the same way as younger ones do.

A third big fear is that because our labor force is shrinking and growing older, productivity will decline. Actually the shrinking labor force can be dealt with by allowing more immigration of younger workers. Also there is much evidence that older workers have some advantages over younger ones, such as having more skills, being more reliable, having less absenteeism and less turnover. These advantages tend to outweigh any loss of speed in reaction time, etc.

### Good News

There are two main causes of global aging: increasing longevity and decreas-

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## Fourteen Pepper Scholars Awarded

**Amy Pastva, PhD** — Aerobic exercise training and attenuation of the susceptibility of older adults to endotoxin-induced lung injury.

**William Michael Foster, PhD** — Genetic factors and differential response of the elderly to ozone: effects on lung function, and epithelial integrity.

**Matthew Peterson, PhD** — The Research Career Development (RCD).

**Lee Jones, PhD** — Effect of aerobic training on cardiopulmonary function and quality of life in postsurgical lung cancer patients.

**Kelli Allen, PhD** — Strength and Gait Training for Older Adults with Knee Osteoarthritis and Various Malalignment.

**Jessica Chia, MD** — Role of aging and endoplasmic reticulum stress in the pathogenesis of pulmonary fibrosis.

**Jason Allen, PhD** — Elevated plasma nitrite via dietary nitrate supplementation and its effects on vascular endothelial function and physical function in the elderly.

**Gregory Sempowski, PhD** — Impact of zoledronic acid on immune function in aged and young mice.

**David Madden, PhD** — Neuronal dysregulation and disintegration in function in frail older adults.

**Beverly Brummett, PhD** — Positive emotion and functioning in older adults.

**Helen Lum, MD** — The role of oxidative stress in metabolism and physical performance.

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## Successful Quality Improvement Activity

Both medicine and nursing endorse practice-based improvement and interprofessional teamwork and collaboration as core competencies – skills best learned through hands-on experiences. In an effort to teach these competencies, we have developed an interprofessional quality improvement course with the geriatric fellows and the Watts School of Nursing senior students. The course began in the spring semester of 2010. The four geriatric fellows working in pairs had developed quality improvement proposals as part of their longitudinal long-term care experience during the fall semester 2009. The nursing students were introduced to the concept of the FOCUS-Plan-Do-Study-Act quality improvement model through an interactive lecture. For the spring semester, two teams of 2 fellows and 19 nursing students were formed. Each pair of fellows presented their proposal to their team of nursing students. The nursing students used evidence-based literature to suggest modifications to the proposals. The fellows then collaborated with subgroups of the nursing students in two 6-week blocks to collect baseline data, carry out a small test of change, and collect post-intervention data. There were 4 scheduled meetings between the nursing students and the fellows at the project site in which the faculty provided mentoring and the students had dedicated time to plan the next steps of the project. The students also were expected to communicate via a discussion board to aid in the collaboration.



**Gwendolen Buhr, MD, MHS, CMD**  
Assistant Professor, Dept. of Medicine  
Division of Geriatrics

The experience was evaluated with a mixed-method evaluation approach consisting of the following: (1) pre and post self-efficacy surveys of quality improvement principles and interprofessional collaboration skills (quantitative 6-point scale and qualitative items) for the nursing students and the fellows, (2) assessment of the proposals using the QI Proposal Assessment Tool, (QIPAT-7), (3) assessment of the fellows' knowledge using the QI Knowledge Application Tool (QIKAT), and (4) the success of the quality improvement projects.

The self-efficacy surveys showed that at baseline the nursing students were more confident in their ability to collaborate with other professionals and locate strong evidence, but less confident in constructing a run chart and data analysis plan. The nursing students had significant improvement in self-efficacy in the following four items: (1) formulate a data collection plan, (2) construct a run chart, (3) for-

ulate a data analysis plan, and (4) carry out a data analysis plan.

The fellows did not have a significant improvement in self-efficacy, but their initial self-efficacy started out high. At baseline, the fellows needed practice-based improvement training as assessed by the QIKAT. After the course, the fellows showed significant improvement in knowledge.

The quality improvement projects were successful with each group completing a project with one plan-do-study-act cycle each. Project 1 aimed to decrease the incidence of suspected and treated Urinary Tract Infection (UTI) by 30% through the implementation of an algorithm for diagnosis of UTI. The median rate of suspected UTI decreased by 30% and the median rate of treated UTI decreased by 20%. Project 2 aimed to improve nursing staff and falls committee communication to decrease falls by 20%. The falls rate decreased by 24% over a 2-month period.

This innovative learning activity targeted fellows and senior nursing students, offering opportunities to improve teamwork and collaborative skills. Through a didactic, mentoring, and interprofessional small project group intervention, nursing students showed increased self-efficacy and fellows showed increased knowledge of QI principles. This approach should be applicable to other groups of learners. The global feedback indicated a need for more structured teaching; addi-

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## Global Aging: Blessing or Curse?\*

ing fertility. In other words, decreasing death AND birth rates. The increasing longevity results from the world’s unprecedented triumph over death from the three grim reapers: disease, starvation, and war. This is a major victory for humanity and something to be celebrated. For the first time in history, most children will reach adulthood rather than dying in childhood!

The decreasing birth rates are the other cause of global aging. This too, is a triumph that will reduce the number of unwanted children, and reduce our overpopulation, our destruction of resources and our production of the green house gases that create global warming, etc.

This will also allow families and nations to put more of their resources into better health and education of children, because there are fewer children to share these resources.

Another piece of good news: rather than becoming a decrepit burden on the younger generation, the coming older generations are becoming healthier, more active, better educated, and have had higher occupations than their parents had.

More good news: an older world should become a more peaceful world. It is pretty well established that older people are less prone to violence and crime, less

substance abuse, and are more mature and stable emotionally.

It also should lead to a more peaceful world, because studies have clearly shown that the nations most prone to violence and conflict are those with a “youth bulge” rather than the more mature ones.

### Conclusion

So I believe that the problems posed by global aging have been exaggerated and are more than balanced by the advantages and opportunities it presents. Thus, global aging is more of a blessing than a curse.

*\*The opinions in this editorial are those of the author and not necessarily those of the Duke Center for the Study of Aging.*

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## Dr. Bei Wu Joins Duke Faculty

Bei Wu, PhD, joined the faculty of the Duke University School of Nursing (DUSON) in January 2011. In addition to her position at DUSON, Dr. Wu holds faculty membership in the Center for the Study of Aging and in the Duke

Global Health Institute. She also holds adjunct professor/senior fellow positions at three academic institutions in China. Dr. Wu’s areas of research expertise include gerontology and global health.

Her research interests are aging and health — including dementia, caregiving, oral health, long-term care and health services utilization among older adults.

Dr. Wu is a fellow of the Gerontological Society of America and the Association for Gerontology in Higher Education. She is the principal investigator for four projects funded by the National Institutes of Health, with her research focusing on cognitive function, depression, and oral health.

Dr. Wu comes to Duke from the University of North Carolina at Greensboro (UNCG), where she served as an associate professor in the gerontology program since 2009. Concurrently, she served as an adjunct clinical associate professor at the School of Dentistry, West Virginia University, and also held an adjunct faculty appointment at the School of Dentistry, University of North Carolina at Chapel Hill.

Prior to joining UNCG, Dr. Wu was an associate professor in the Department of Community Medicine at West Virginia University.

Dr. Wu received her M.S. and Ph.D. in gerontology from the University of Massachusetts-Boston. She graduated from Shanghai University in the People’s Republic of China with a B.A. in sociology in 1988.



Bei Wu, PhD



## 100 of the Best Aging Resources

Seniors and baby boomers living on their own, as well as those that have caregivers, have special needs when it comes to resources for information about the most important areas of their lives. Whether it is senior news, statistics about aging, caregiver resources, ideas for healthy aging, tips for successful aging, advice for coping with Alzheimer's, or help making those end of life decisions, these highly specific resources are all available online.

Recently, Guardian Life Insurance has put together a listing of "100 of the Best Aging Resources", complete with links to the resource site. The web site address is: <http://www.guardian-insurance.com.au/ArticleLibrary/100-Best-Aging-Resources.aspx>.

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## Successful Quality Improvement Activity

tionally, although not statistically significant, there was a decrease in nursing student self-efficacy in collaboration, indicating a need for specific teaching on collaboration. In response to this feedback we are utilizing a team-based learning approach this year and have 8 dedicated hours for instruction in the principles of quality improvement and teamwork and collaboration.

# Did You Know?

Which is the best answer to the following questions?

**1. The primary mental illness of elders is**

- a. Anxiety disorders.
- b. Mood disorders.
- c. Schizophrenia.
- d. Cognitive impairment.

**2. Alzheimer's disease is**

- a. The most common type of cognitive impairment.
- b. An acute illness.
- c. A benign memory disorder.
- d. A form of affective disorder.

**3. Alzheimer's disease usually**

- a. Can be cured with psychotherapy.
- b. Can be cured with pharmacology.
- c. Goes into remission among the very old.
- d. Cannot be cured.

**Answers:**

1. **d.** Cognitive impairment is the primary mental health problem of older age. The National Institute of Mental Health studies found that about 14% of persons over 65 have mild cognitive impairment, and about 4% have severe impairment.
2. **a.** Alzheimer's disease, or progressive senile dementia, is the most common cause of cognitive impairment in old age. The essential features of this disorder are the insidious (gradual) onset of dementia and a progressive deteriorating course. Multifarct dementia, caused by a series of strokes in the brain, is the second most common cause of cognitive impairment in old age.
3. **d.** There is no cure for Alzheimer's disease at present, because by definition, it is a progressive dementia. If the dementia is cured, then it was not Alzheimer's disease.

\*Adapted from *The Facts on Aging Quiz*, 2nd Ed. by Erdman Palmore, NY: Springer Publishing Co., 1998.



# Galanos Receives National Award

**T**ony Galanos, MA, MD, has received the 2011 Hastings Center Cunniff-Dixon midcareer physician award for \$25,000 for Excellence in End-of-Life Care.

He is Medical Director of the Duke Center for Palliative Care, Associate Professor of Medicine, and Senior Fellow at the Center for the Study of Aging. This award is one of only five which recognize doctors who have made an extraordinary impact through the humanistic care of patients near the end of life.

James Tulsky, MD, Professor of Medicine said “He has gone the extra mile to make sure that they receive the care they want and need. He has done so by alleviating previously untreatable symptoms, breaking through impasses in communication and creatively matching treatment to their goals. Furthermore, it is through his dedication and perseverance that the Palliative Care Service has so solidly established itself, and his successes at Duke Hospital have paved the way for our recent growth at Durham Regional Hospital and upcoming collaboration with the inpatient oncology service. Perhaps most notably, he has served as a role model of com-



**Tony Galanos, MA, MD**

passionate care for a generation of Duke medical students and house officers.”

The awards were given by the Cunniff-Dixon Foundation, whose mission is to enrich the doctor-patient relationship near the end of life, in partnership with the Hastings Center, a bioethics research institute known for its pio-

neering work on end-of-life decision-making. The nomination and selection process was administered by the Duke Institute on Care at the End-of-Life.

“Palliative medicine was a dream years ago, when the Hastings Center began working to improve compassion and care at the end-of-life, but these five physicians have helped make that dream a reality,” said Thomas Murray, President of the Hastings Center.

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# Yi Zeng Honored

Professor Yi Zeng was elected foreign member of the Royal Netherlands Academy of Arts and Sciences, in May 2010. Also



**Yi Zeng**

his competitive renewal grant application on “Demographic Analysis on Determinants of Healthy Longevity in China” has been funded for another five years.

In 2010, he published nine articles in English, and three books and eight professional articles in Chinese.

Dr. Zeng is a professor in the Institute for Population Research and the Department of Sociology, as well as being Director of the Chinese Populations and Socioeconomic Studies Center.

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## New Diagnostic Criteria for Alzheimer’s Disease\*

Further, the guidelines provide a much needed tool for researchers working to develop treatments. Working from the same criteria, laboratories across the globe can standardize their clinical approaches, so that they may compare findings to advance AD drug development aimed at the early underlying brain disease.

If the successes from use of the 1984 criteria are an indicator of what can happen when clinicians and scientists are all “working from the same playbook”, the new criteria have promise of revolutionizing the field again, leading to prevention and treatment of AD.

*\*Adapted from “New Diagnostic Criteria for Alzheimer’s Disease” by Kathleen A. Welsh-Bohmer, PhD, and James R. Burke, PhD in The Caregiver, Fall, 2010.*



## Coming Events

### April 14–17, 2011

“The New Aging Experience”. 32nd Annual Meeting of the Southern Gerontological Society. Raleigh, NC. Contact: [LGage4SGS@aol.com](mailto:LGage4SGS@aol.com).

### April 15–16

9th Annual Leadership and Management in Geriatrics 2011, in Long Beach, CA, chaired by Dan Osterwell, MD, CMD, presented by SCAN Health Plan in collaboration with the UCLA. Contact: <http://www.geronet.ucla.edu/lmg-home>.

### April 26–30, 2011

“Aging in America.” Annual Conference of the American Society on Aging. San Francisco, CA. Contact: [www.agingconference.org](http://www.agingconference.org).

### May 11–14, 2011

Annual Geriatrics Society Scientific Meeting. Gaylord National Hotel and Convention Center, Suburban Washington, DC. Contact: [Americangeriatrics.org/annual\\_meeting](http://Americangeriatrics.org/annual_meeting).

### July 9–15, 2011

NIA Summer Institute on Aging Research Annual Workshop. Queenstown, MD. Contact: [TaylorHarden@nih.gov](mailto:TaylorHarden@nih.gov) or **301-496-0765**.

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