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Nutrition, Exercise & Alzheimer and Clinical Trials on Sarcopenia

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LECTURES

THE TASK FORCE ON PREVENTIVE TRIALS IN ALZHEIMER. S. Andrieu^{1,2}
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Background : Prevention of neurodegenerative disease, such as Alzheimer disease (AD), is a growing public health problem and several potential factors (lifestyle, cognitive stimulation and preventive drugs) have been identified in large observational studies. In order to demonstrate the real effectiveness of these factors randomized controlled trials (RCTs) are needed but few RCTs were developed in the past and first results have so far been generally conflicting with those of epidemiological studies, perhaps due to methodological issues. Such trials raise specific methods because they require large numbers of subjects and lengthy follow-up periods. Methods ; We will present a systematic review of RCTs for the primary prevention of neurodegenerative dementia or cognitive decline. Trials involving only patients with dementia or some specific cognitive impairment were excluded from this review. The results of this systematic review and the methodological issues raised (target population, methods of recruitment, outcomes, follow-up period) were discussed during two meetings involving experts identified as specialists in prevention trials for AD. The first meeting took place in Lisbon-Portugal, under the auspices of the EADC (European AD Consortium), and the second, involving North American experts, took place in Albuquerque – NM,USA. Conclusion : The methodology of primary prevention RCTs for neurodegenerative dementia is of great importance. Future trials may need to examine the effects of multiple interventions, especially those focused on lifestyle factors.

THE METABOLIC SYNDROME IS A RISK FACTOR FOR VASCULAR DEMENTIA BUT NOT FOR ALZHEIMER'S DISEASE, THE THREE-CITY STUDY. P. Barberger-Gateau¹, C. Raffaitin^{1,2}, C. Berr³, C. Tzourio⁴, J.-F. Dartigues¹, H. Gin² (1. Inserm, U897, Bordeaux, F-33076 France; Victor Segalen Bordeaux 2 University, Bordeaux, F-33076 France; 2. Diabetology-Nutrition Unit, University Hospital of Bordeaux, Pessac, F-33600 France; 3. Inserm, U888, Montpellier, F-34093 France; Montpellier 1 University, Montpellier, F-34093 France; 4. Inserm, U708, Paris, F-75651 France)

Background: The metabolic syndrome (MetS) is a cluster of five metabolic parameters (hypertension, high waist circumference, elevated triglycerides, low HDL-cholesterol, hyperglycaemia) associated with an increased risk of cardiovascular disease. This study assessed the associations between the MetS, and its individual components, with risk of incident dementia. Methods: The 7087 community-dwelling participants aged 65 yr and over were recruited from a large French multicenter prospective cohort, the Three-City study. The MetS was defined according to the National Cholesterol Education Program Adult Treatment Panel III Criteria. Incident cases of dementia were identified through a two step screening based on neuropsychological testing and clinical evaluation, and then confirmed by an independent committee of neurologists. Hazard ratios (HR) of incident dementia over four years associated with the MetS and its individual components were estimated by Cox proportional hazard models. Results: The MetS was present in 15.8% of the study participants at baseline. During the four years of follow-up, 208 incident cases of all-cause dementia were validated including 134 cases of Alzheimer's disease (AD) and 40 cases of vascular dementia. The presence of MetS increased the risk of incident vascular dementia but not AD, independently of socio-demographic characteristics and Apolipoprotein E ϵ 4 genotype. Hypertriglyceridemia was the only component of the MetS that was significantly associated with the incidence of all-cause dementia (HR = 1.45 [1.05 – 2.00]; p = 0.02) and vascular dementia (HR = 2.27 [1.16 – 4.42]; p = 0.02), even after adjustment on Apolipoprotein E genotype. Instead, a high waist circumference was associated with a decreased risk of AD (HR = 0.63 [0.43 – 0.94]; p = 0.02). Conclusions: The relationship between hypertriglyceridemia and vascular dementia emphasizes the need for detection of

dyslipidemia in older persons. Further research is needed to ascertain whether treating hypertriglyceridemia could decrease their risk of vascular dementia.

YOUNGER AGE AT TIME OF DEMENTIA DIAGNOSIS FOR A COMMUNITY-BASED SAMPLE OF CALIFORNIA HISPANICS COMPARED TO WHITE NON-HISPANICS. L.J. Fitten^{1,2,3,4}, F. Ortiz^{1,2,3}, L. Fairbanks^{1,4}, G. Bartzokis^{1,4}, P. Lu^{1,4,5}, J. Ringman^{1,5} (1. Alzheimer Disease Research Center, David Geffen School of Medicine at UCLA; 2. Greater Los Angeles Veterans Affairs Healthcare System, Sepulveda Campus; 3. Department of Psychiatry Olive View-UCLA Medical Center; 4. Department of Psychiatry and Biobehavioral Sciences, School of Medicine at UCLA; 5. Department of Neurology, David Geffen School of Medicine at UCLA)

Background and purpose: The Hispanic elderly are vulnerable to develop diabetes, hypertension, dyslipidemia, obesity and other metabolic / vascular disorders. These conditions may increase the risks for dementia or could accelerate cognitive decline in elderly demented 4-8. The study's purpose was to test the hypothesis that Hispanic elders on average are younger at time of dementia diagnosis than their White non-Hispanic counterparts. Methods: 290 demented subjects aged > 50 (180 White non-Hispanics, 110 Hispanics) were diagnosed for the first time as Alzheimer disease (AD) or vascular dementia (VascD). MMSE score ranged from mild (30-24), mild-moderate (23-17), moderate-severe (16-10), to severe (>9). Apolipoprotein genotype (APOE) and medical histories were also obtained. Results: Hispanics on average were younger than their counterparts by approximately 4 years at time of diagnosis, regardless of dementia type. The earlier age at diagnosis for Hispanics could not be explained by gender, dementia severity, APOE status, years of education, or by the presence of diabetes, hypertension and hypercholesterolemia. Only ethnicity was the main predictor. Discussion: Compared to White non-Hispanics, demented Hispanics were significantly younger at time of diagnosis at all stages of illness severity. Among the various demographic, clinical and genotypic variables considered, only ethnicity was of primary importance in predicting age at diagnosis. Conclusion: Hispanic elders were diagnosed with dementia at a younger age than their White non-Hispanic counterparts in this study. References: 1. He W, Sengupta M, VelKoff VA, DeBarros KA. U.S. Census Bureau, Current Population Reports, P23-209, 65+ in the United States: 2005. Washington, DC.: U.S. Government Printing Office, 2005; 2. Ramirez RR. We the People: Hispanics in the United States. Census 2000 Special Reports. Washington, D. C.: U.S. Census Bureau, 2004:20; 3. Himes CL. Elderly Americans. Population Reference Bureau. 2002;56:44; 4. Bruce DG, Harrington N, Davis WA, Davis TM. Dementia and its associations in type 2 diabetes mellitus: the Fremantle Diabetes Study. Diabetes Res Clin Pract. 2001;53:165-172; 5. Wu JH, Haan MN, Liang J et al. Impact of diabetes on cognitive function among older Latinos: a population-based cohort study. J Clin Epidemiol. 2003;56:686-693; 6. Panza F, Solfrizzi V, Colacicco AM et al. Cerebrovascular disease in the elderly: lipoprotein metabolism and cognitive decline. Aging Clin Exp Res. 2006;18:144-148; 7. Hassing L, Hofer, SM., Nilsson, SE., Berg, S., Pedersen, NL., McClearn, G., and Johansson, B. Comorbid type 2 diabetes mellitus and hypertension exacerbates cognitive decline: evidence from a longitudinal study. Age and Ageing. 2004;33:355-361; 8. Gregg EW, Yaffe K, Cauley JA et al. Is diabetes associated with cognitive impairment and cognitive decline among older women? Study of Osteoporotic Fractures Research Group. Arch Intern Med. 2000;160:174-180

PHYSICAL ACTIVITY AND COGNITIVE FUNCTION IN HUMANS. P.C. Heyn (Physical Medicine and Rehabilitation Department, School of Medicine, University of Colorado Denver, USA)

The research on the effects of physical activity on brain behavior and function has grown substantially over the past ten years. Meta-analytic reviews of the literature demonstrate that physical activity is beneficial to the cognitive performance of older adults (Etnier et al., 1997; Colcombe & Kramer, 2003; Heyn et al., 2004). Recent prospective evidence suggests that a causal relationship with higher levels of physical activity being predictive of better performance on standardized cognitive tests (Albert et al., 1995; Dik et

al., 2003; Lytle et al., 2004; van Gelder et al., 2004; Weuve et al., 2004) and of a lesser risk of clinical cognitive impairment (Abbott et al., 2004; Laurin et al., 2001; Podewils et al., 2005; Rovio et al., 2005; Yaffe et al., 2001) at subsequent testing times years later. The purpose of this presentation is to review current research that is designed to support the relationship between physical activity and cognitive function in older adults with cognitive impairments and at risk for Alzheimer's disease. This presentation will include the latest research about the effects of exercise on Mild Cognitive Impairment (MCI), which is now believed to represent a prodromal phase of AD in most instances (Petersen 2001, 2005; Morris 200; Bruscolli, 2004). This will be of value to IANA members because of the focus on exercise effects on metabolism and on how physical activity can serve as a lifestyle intervention to promote and protect cognitive function in older adults. Given the projected increase in prevalence of Alzheimer's disease, this will provide information valuable to clinicians and allied health care professionals involved in the prevention and care of dementia. Presentation Main Objective(s): 1) to examine current evidence on the effects of physical activity on AD and related cognitive impairments, 2) to review common research issues related to AD physical rehabilitation, 3) to offer recommendations for exercise practice based on evidence from the literature.

UNDERNUTRITION IN HOSPITALIZED OLDER ADULTS: PATTERNS AND PREDICTORS, OUTCOMES, AND OPPORTUNITIES FOR INTERVENTION.

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Undernutrition in older adults is a well-recognized and serious problem with significant health, economic, and social consequences. Older adults who are hospitalized because of an acute illness may be at increased risk for experiencing undernutrition because of underlying illness, low dietary intake, or both. Undernutrition may be present upon admission or acquired during hospitalization. Older adult hospital patients who are undernourished are at increased risk for experiencing adverse events while in the hospital, following discharge, or both. Routine nutritional assessment and intervention while in the hospital and following discharge may result in improvements in patient care and outcomes and reductions in health service utilization and costs. The purpose of this paper is to present an overview of research that has been conducted examining undernutrition in hospitalized older adults. First, findings from observational studies examining patterns and predictors of undernutrition in hospitalized older adults will be described. Highlighted in this description will be a discussion of the methodological challenges of measuring undernutrition in the hospital setting. Second, clinical outcomes and costs associated with undernutrition in hospitalized older adults will be presented. Adverse events occurring both while in the hospital and subsequent to discharge will be included in this discussion. Third, a description of interventions that have already been implemented in hospitalized older adults will be described. Finally, future areas of inquiry and opportunities for evidence-based nutritional interventions targeted at older adults during and following hospitalization will be suggested. The emphasis of this discussion will focus on changes in clinician behavior and hospital practices.

HEALTH PROMOTION PROGRAM AND NUTRITION IN ALZHEIMER DISEASE. THE NUTRIALZ STUDY.

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Objective: To evaluate the positive impact of a nutritional program to reduce the loss of function in people with dementia living at home. Secondary aims: To Reduce weight loss, to Decrease the caregiver burden and to improve clinical practice of professionals in relation to nutrition. Methodology: Cluster randomized multi centre study. 11 centers have participated. All of these centers were Alzheimer outpatients or day care centers. 6 Centers were randomized as Intervention centers and 5 as controls. Bbaseline assessment: sociodemographic and socioeconomic variables (age, gender, educational level, marital status); diagnostic, treatments, MMSE, list of comorbid conditions; activities of daily living (ADL, IADL), Zarit Scale, brief-NPI, and nutritional status measured by the BMI, Mini Nutritional Assessment and the Eating Behaviour scale. Use if social and health resources were assessed by the RUD. Intervention: The intervention was multi-component. One part was focused on the professionals, were we agreed a common protocol. The second part was focused on the families with different actuations: A briefcase with information and recommendations on nutrition and Alzheimer disease, 4 family sessions and a system to help the families to follow the weight curve. Results: A total of 946 persons participated in the study. 656 participants (70 %) completed the follow up at 12 months. Of the 290 losers, 64% had to interrupt the study because they moved to an institution (31%), death (25%) or had medical complications (9%). Mean age was 78,99 (SD 7,27) , 68,1 % were women; 44,9% lives with their partner; 74,2% has a dementia type Alzheimer, and it has been 5,25 years since symptoms of dementia and 2,78 years since the diagnosis; mean MMSE score was 15,41 (SD 6,18); mean weight was 64,31 (SD12,52) kg; mean BMI was 26,96 (SD4,53) (<19: 2,8; 19-21:5,4; 21-23: 9,9; >=23:81,9). Mean ADL without difficulties was 3,24/6(SD 2,09); mean IADL without difficulties was 0,71/8 (SD 1,56); mean number of symptoms in the NPI was 4,43 (2,59) severity score 7,87 (SD 5,94) and distress score 11,33 (9,01); mean Zarit scale was 27,41 (SD15,50); mean MNA was 23, 19 (SD 3,49). >17: 5,2 %, 17-23: 31,6 %, >=23: 63,2 %. MNA score decreased with increasing difficulty in the activities of daily living. The score of the MNA decreased with increasing dementia severity. Preliminary analysis of the principals results haven't seen any statistically significant difference between the two groups at one year looking at the change in the ADLs or in weight after adjusted for baseline MNA score, MMS, Zarit

and ADL. Conversely the nutritional risk measured by the MNA of the control group was increased, whereas the risk of the intervention group was decreased after 1 year. 74% of families in the intervention group and 9 % in the control group said that they had received information and recommendations regarding nutrition and 67% and 9 % respectively received information on physical exercise. In the intervention centers (49%), they have recommended diet supplements and complements in a higher percentage than in the control centers (5%).

EFFECT OF FISH OIL SUPPLEMENTATION ON COGNITIVE PERFORMANCE IN OLDER SUBJECTS: A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL.

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Introduction: High intake of n-3 polyunsaturated fatty acids may protect against age-related cognitive decline. However, results from epidemiological studies are inconclusive and results from randomized trials in non-demented elderly are lacking. Methods: Double-blind, placebo-controlled trial involving 302 cognitively healthy (MMSE>21) individuals aged 65 years or older. Participants were randomly assigned to 1800 mg/d EPA-DHA, 400 mg/d EPA-DHA, or placebo capsules for 26 weeks. The primary outcome was cognitive performance, which was assessed using an extensive neuropsychological test battery that included the cognitive domains of attention, sensorimotor speed, memory and executive function. Analysis was by intention-to-treat. Results: Mean age of the subjects was 70 years and 55% was male. Overall there were no significant differential changes in any of the cognitive domains for either 1800 mg or 400 mg EPA-DHA supplementation compared to placebo. In a subgroup of 92 subjects who carried the APOE-ε4 allele we observed a significant improvement in the domain of attention after 26 weeks for the low-dose (p=0.03; 0.47 [95%CI 0.03-0.91]) as well as for the high-dose fish oil group (p=0.04; 0.49 [0.01-0.96]) compared to placebo. A significant improvement in this domain was also observed in men (n=167) in the low-dose fish oil group (p=0.05; 0.36 [0.01-0.72]). Conclusion: In this randomized double-blind placebo-controlled trial we observed no effect of EPA-DHA supplementation for 26 weeks on cognitive performance. However, our data suggested that in subjects carrying the APOE-ε4 allele and in men, EPA-DHA may improve attention. Based on these findings, longer-term EPA-DHA supplementation studies to investigate effects on cognitive performance are warranted, especially in groups at higher risk for cognitive decline.

ORAL COMMUNICATIONS

PHYSICAL ACTIVITY AND ENHANCED FITNESS IMPROVE COGNITIVE FUNCTION IN OLDER PEOPLE WITHOUT KNOWN COGNITIVE IMPAIRMENT, A COCHRANE SYSTEMATIC REVIEW.

M. Angevaren, G. Aufdemkampe, H.J.J. Verhaar, A. Aleman, L. Vanhees (University of Applied Science, Utrecht, the Netherlands)

Several studies have shown that physical activity, cardiovascular fitness and cognitive function in older individuals are associated. The assumption is made that improvements in cardiovascular fitness mediate the benefits in cognitive capacity. This Cochrane systematic review intended to investigate the hypothesized link between physical activity aimed at improvement of cardiorespiratory fitness and cognitive function. To assess the effectiveness of aerobic physical activity on cognitive function in healthy people over 55 years of age, the review included RCTs reporting activity, parameters of fitness and cognition within the same study design. We searched MEDLINE, EMBASE, PEDro, SPORTDiscus, PsycINFO, CINAHL, Cochrane Controlled Trials Register, Dissertation abstracts international and ongoing trials registers from their beginning to December 2005 with no language restrictions. Eight out of 11 studies reported that aerobic exercise interventions resulted in increased cardiorespiratory fitness (VO2max) of the intervention group of approximately 14% and this improvement coincided with improvements in cognitive capacity. The largest effects on cognitive function were found on motor function and auditory attention, effect sizes (ES) of 1.17 and 0.52 respectively. Moderate effects were observed for cognitive speed (ES 0.26) and visual attention (ES 0.26). Although aerobic exercise rendered significant effects on subcategories of cognition, the majority of comparisons yielded no significant results. There is evidence that aerobic physical activities are beneficial for cognitive function in healthy older adults. Larger studies are required to confirm whether the aerobic training component is necessary. The clinical relevance and reproducibility of such data would be enhanced if clinicians and scientists in the field could agree upon the use of a smaller battery of cognitive tests.

LET'S GIVE PEOPLE WITH ALZHEIMER'S (AD) WHAT THE BEAGLES GOT... HERE'S HOW ! S. Arkin (U. of Arizona, USA)

For years, researchers have compared rats, mice and, most recently, dogs, who were given enriched environments and diets, with animals that got standard care, and – surprise! The animals that got better treatment performed better! Multiple studies have shown that humans that exercise and engage in varied cognitive and social activities are at less risk for dementia. The U. of Arizona's AD Rehab by Students program showed that people that already have dementia also benefit from multiple types of stimulation. This program provided 2-8 semesters of student-administered fitness, memory, language, and volunteer work interventions to 24 AD patients and compared them annually on global and neuropsychological measures with a similar untreated group from the CERAD

(Consortium to Establish a Registry for Alzheimer's Disease) database. Those completing 4-8 semesters showed no significant between year changes after their 1st year on the Clinical Dementia Rating and on 5 or 6 cognitive measures. The AD Rehab group showed a slower rate of decline. Students got academic credit; caregivers got respite; community agencies got volunteer help. The program can be replicated for the cost of a modest addition to a faculty member's salary and gym membership fees. Several published articles describe details and outcomes (Arkin, 2003, 2005) and a video-illustrated manual is available to assist with replication (Arkin, 2005). (Arkin, S. (Jan. 05). Language-enriched exercise for clients with AD. (Continuing Education course) Desert Southwest Fitness: Tucson, AZ. Arkin, S. (2003) Student led exercise sessions yield significant fitness gains for AD patients. American Journal of Alzheimer's Disease and Other Dementias (AJAD), 18, 159-170. Arkin, S (2007). Language-enriched exercise plus socialization slows cognitive decline in AD patients. AJAD, 22 (1) 1-16.)

FRAILTY GRIP IS ASSOCIATED WITH GLUCOSE INTOLERANCE: RESULTS FROM THE EPIDEMIOLOGICAL DIABETES REDUCTION ASSESSMENT WITH RAMIPRIL AND ROSIGLITAZONE MEDICATION STUDY POPULATION. H. Florez, H. Gerstein, P. Sheridan, J. Bosch, R. Goldberg (University of Miami - Geriatrics Institute and Diabetes Research Institute, Miami, FL, USA; McMaster University - Department of Medicine, Hamilton, Ontario, Canada)

Frailty is a physiological state of increased vulnerability to stressors associated with comorbidities and disability and characterized by decreased grip strength (frailty grip). To determine the prevalence of frailty grip and its relationship with the presence of hyperglycemia we evaluated 24,595 subjects (60.4% women) in the Epidemiological follow-up study of the Diabetes Reduction Assessment with Ramipril and Rosiglitazone Medication, a large, international, multi-center study. These subjects had an oral glucose tolerance test and grip strength measured at baseline. The prevalence of frailty grip, determined using as cutoffs the bottom quintiles of grip strength specific for sex and degree of obesity, increased across the spectrum of glucose intolerance in both men (from 17.8% in normoglycemic subjects to 23.3% in diabetics) and women (from 18.2% in normoglycemic subjects to 24.1% in diabetics). The presence of frailty grip was associated with age (Odds Ratio, OR= 1.47, 95% C.I.: 1.37-1.57), South Asian region (OR=3.90, 95% C.I.: 3.64-4.19) fasting plasma glucose \geq 126 mg/dl (OR=1.22, 95% C.I.: 1.10-1.36), and 2-hour post-challenge plasma glucose \geq 200 mg/dl (OR=1.40, 95% C.I.: 1.27-1.53). These results suggest that fasting and postprandial hyperglycemia are associated with decreased grip strength in subjects who have abnormal glucose values. One should consider the presence of frailty grip and the assessment of sarcopenic-obesity in patients screened for glucose intolerance and diabetes.

THE VALUE OF HIGH PROTEIN ORAL SUPPLEMENTS DURING REHABILITATION OF GERIATRIC HIP FRACTURE IS RELATED TO REDUCED COMPLICATIONS AND POTENTIAL COST SAVINGS. K.M. Kaspar¹, S.M. Drawert (1. Nestlé Nutrition R&D Center Minneapolis, Nestlé HealthCare Nutrition, Inc., Minnetonka, MN, USA)

Introduction/Objective: An intervention's value resides in its ability to reduce mortality, morbidity, or save money. Evidence was reviewed toward estimating the value of early intervention with high protein oral nutritional supplements (HP ONS) during hip fracture recovery. Design/Methodology: The available clinical guidelines and medical literature were identified through the National Guideline Clearinghouse™ and Pubmed. Potential savings per hip fracture patient were calculated based on average rehabilitative care cost for hip fracture (USD \$13746 or CHF 16934), investment in 1 serving/d of HP ONS during rehabilitative stay, and efficacy of a HP ONS to reduce rehabilitative stay (by 20%) in comparison to an energy supplement. Results: Clinical practice guidelines from ESPEN and other premier associations recommend routine use of HP ONS for older adults during hip fracture recovery based on grade A evidence. This is consistent with the measured reduction in unfavorable outcome from a Cochrane review of nutritional supplementation for older adults post hip fracture. For instance, use of HP ONS after hip fracture has been shown to reduce rehabilitative stay by up to 20%. Thus, an investment of USD \$74 (CHF 91.3) for 1 serving/d of HP ONS during rehabilitative stay, has potential to generate approximately USD \$2692 per hip fracture patient in rehabilitative care cost savings. Conclusion/Discussion: The diffusion of best practices often takes 17 years to become standard clinical care. Given that the national healthcare burden of hip fracture is over USD \$5 B per year, rapid adoption of early intervention with HP ONS deserves consideration as a viable low cost solution for reducing the economic impact of hip fracture. Disclosure: Kala Kaspar and Susan Drawert are employees of Nestlé HealthCare Nutrition, Inc., or its affiliates.

INTRAMUSCULAR FAT IN OLDER ADULTS AND THE IMPACT OF RESISTANCE TRAINING. R.L. Marcus, J. Kidde, L. Dibble, O. Addison, P.C. LaStayo (University of Utah, Department of Physical Therapy, Salt Lake City, Utah, USA)

Introduction: Sarcopenia is associated with increased total body fat as well as increased fat within and around muscle. Intramuscular fat (IMF) is thought to increase with age and to negatively impact both mobility and metabolism in older adults. The impact of resistance training on IMF in older adults is not well known. Aims: To describe the 1) magnitude of IMF in the thigh muscles of adults with varying co-morbidities between 18 and 87 years of age, and 2) impact of resistance training on both lean and IMF tissue of the thigh in individuals 55 years of age and older. Methods: Aim 1. Subjects (n=88), aged 18-87 years, included chronic stroke survivors, post-menopausal women with impaired glucose tolerance, cancer survivors, anterior cruciate ligament deficient individuals, and

individuals two years after a total knee replacement. Both IMF and lean tissue cross-sectional area were calculated from magnetic resonance imaging (MRI) scans. A regression analysis between age and percentage of thigh IMF was performed. Aim 2. A subset of these individuals over 55 years old (n=32, mean age 69) participated in a 12-week resistance training program. Paired t-tests were used to compare pre-training and post-training MRI scans relative to changes in thigh IMF and lean tissue. Results: A significant (p<0.01) positive relationship exists between age and percentage of thigh IMF (r=0.47), suggesting that aging is associated with an increase in thigh IMF. A significant (p<0.05) decrease in thigh IMF (11.0%), and increase in thigh lean tissue (7.0%) was found in individuals 55 years and older who participated in a 12-week resistance training program. Conclusions: Skeletal muscle composition impacts both mobility and metabolism. Fat within muscle increases with age and is associated with adverse health consequences in the elderly. Resistance training, in addition to increasing lean tissue, may reduce IMF in older adults. Future studies should determine the functional and metabolic impact of these changes.

PHYSICAL ACTIVITY AND ALZHEIMER'S DISEASE IN A POPULATION STUDY. N. Scarmeas, Y. Stern, N. Schupf, J.A. Luchsinger (Columbia University Medical Center, USA)

Background-Objective: We sought to explore the levels of physical activity (PA) of subjects diagnosed with Alzheimer's disease (AD) in the community. We also investigated whether engagement in physical activity before AD onset is associated with altered risk for getting AD in the future. Methods: A subset of a multiethnic community cohort of elderly in New York underwent PA evaluations (number of minutes of weekly participation in [light, moderate or severe] physical activities; multiplied by Metabolic Equivalents corresponding to each physical activity and categorized as PA low-middle-high tertiles). Subjects were also evaluated with standardized neurological and neuropsychological measures every ~1.5 years: 116 were diagnosed with AD at initial evaluation (prevalent AD), 101 developed AD during the course of 1.8 (\pm 0.8; [0.4-10.5]) years of follow-up (incident AD), while 1116 subjects never became demented. We examined PA as a predictor (reference group = low PA tertile) in logistic regression and survival-Cox models, with prevalent AD status and time to incident AD correspondingly as the outcomes. All models were adjusted for cohort effect, age, gender, ethnicity, education, APOE genotype, a medical comorbidity index, caloric intake and body mass index. Results: As compared to those who remained non-demented, participants with prevalent AD were physically less active (PA middle tertile Odds Ratio [OR] 0.66 [0.22-1.32]; PA high OR 0.47 [0.22-1.03]; p for trend = 0.05). Risk for incident AD was lower for subjects with more PA at baseline (PA middle tertile Hazard Ratio 0.70 [0.40-1.22]; PA high tertile HR 0.53 [0.26-1.08]; p for trend = 0.07). Conclusions: AD patients are less physically active than non-demented. Higher levels of physical activity before dementia symptoms are associated with lower risk for developing AD in the future. Support: PO1-AG07232, AG028506.

OLDER ADULTS' PERCEPTIONS ABOUT THE ROLE OF NUTRITION AND DIET ON BRAIN HEALTH. J.R. Sharkey¹, J.N. Laditka², S.B. Laditka³, R. Liu⁴, A. Hochhalter⁵, J.F. Robare⁶ (1. Texas Healthy Aging Research Network (TxHAN), Texas A&M Health Science Center School of Rural Public Health; 2. University of South Carolina HAN; 3. University of South Carolina HAN; 4. University of South Carolina HAN; 5. Scott & White Memorial Hospital and TxHAN; 6. University of Pittsburg HAN, USA)

Background: The achievement and maintenance of good nutritional health, which is essential to functioning and quality of life among older adults, may be influenced by its relative importance to individuals. Although research suggests that good diets may promote brain health, little is known about the attitudes about nutrition and brain health among older adults. Methods: Using grounded theory and constant comparison methodology, verbatim transcripts from 50 audio-recorded focus groups conducted in 2006 by the Healthy Aging Research Network (HAN) in 9 U.S. states were independently coded and analyzed for themes, issues, and beliefs. Focus groups were composed of African American, Hispanic, non-Hispanic White, Vietnamese, and Chinese older adults, and were conducted in urban and rural areas. Results: Groups generally reported eating at least as many fruits and vegetables as others. Participants more commonly reported media messages about diet, especially dietary supplements, than any other factor. When asked, "How can we keep our brains healthy?," they rarely mentioned a good diet. When informed that research suggests healthy diets may promote brain health, participants said they would improve diets, but were uncertain about their commitment. They emphasized that environmental barriers to good nutrition were common. Additional areas of discussion included concerns about ability to stay sharp with age and the role of the media in informing people of ways to maintain brain health. Conclusions: Aging Americans are interested in brain health, but uncertain about their ability to follow recommended health behaviors. Public policies may promote good nutrition for brain health.

HIGH-FAT FEEDING AND AGE IMPACT VOLUNTARY WHEEL RUNNING AND COGNITIVE FUNCTION IN RATS. N. Tümer, M. Judge, T.C. Foster, B. Erdos, I. Cudykier, P.J. Scarpace (Geriatric Research, Education and Clinical Center, Dept. of Veterans Affairs Medical Center Medical Center and Dept. of Pharmacology, University of Florida, Gainesville, FL, USA)

Obesity is a risk factor for Alzheimer's disease as well as disability. We examined the impact of high-fat (HF) feeding on cognitive function and voluntary wheel running (WR) in young (5-month) and aged (26-month) F344xBN rats provided a HF diet (60% fat; 5.2 kcal/g) or standard chow (15% fat; 3.3 kcal/g) for 5-months. HF fed animals exhibited

greater weight gain compared with chow. Final body weights were 415±12 vs 471±14 g, young; and 545±25 vs 631±14 g, aged). After 13 weeks, an object recognition test was performed. Memory retention was exhibited in both the young and aged rats on the chow diet (discrimination indexes of .25 ± .09, .42 ± .07, respectively). There was a tendency for the young rats on the HF diet to have reduced memory (P=0.06), and memory was significantly impaired in the aged, HF fed rats (P<0.05). WR activity, examined after 18 weeks, decreased by 87% with age (1077±139 vs 135±22 meters/day, P<0.001), and nearly 50% with HF feeding in the young rats (576±72 M/day, P<0.001). In aged rats, there was tendency towards a further decrease with HF (82±28 M/day). These data indicate that high-fat feeding decreases cognitive function in aged high-fat fed and decreases WR in young high-fat fed rats. Whereas age greatly affects WR activity, high-fat feeding in aged rats only marginally further decreases WR activity. These data indicate high-fat feeding impacts both cognitive function and physical activity, but differentially with age. Supported by VA Medical Research, NIH AG-26159, P30 AG028740.

LOW LEVELS OF PLASMA PHOSPHATIDYLCHOLINE DOCOSAHEXAENOIC ACID ARE ASSOCIATED WITH RISK OF ALL-CAUSE DEMENTIA AND ALZHEIMER'S DISEASE: THE RANCHO BERNARDO STUDY. L.A. Weiss, J. Bergstrom, D. Kritiz-Silverstein, Elizabeth Barrett-Connor (Division of Epidemiology, Department of Family and Preventive Medicine, University of California, San Diego, USA)

Background: Diet may play an important role in the etiology of dementia and Alzheimer Disease. Several studies suggest that omega-3 fatty acids may protect the brain from dementia. Objective: We examined the relation of plasma phosphatidylcholine docosahexaenoic acid (PC DHA) levels on risk of all-cause dementia and Alzheimer's Disease in older adults. Methods: This nested case-control study included 276 men and women aged 67-100 (mean: 80) years from the Rancho Bernardo Study who were evaluated in 1991-93 for all-cause dementia and Alzheimer's Disease. Diagnoses were based on a neurological and neuropsychological evaluation using the Criteria of the National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association. Plasma PC DHA was measured by gas chromatography in blood. Logistic regression analyses were used to test the association of PC DHA on risk of all-cause dementia and Alzheimer's Disease. Results: There were 45 cases of all-cause dementia and 33 cases of possible or probable Alzheimer's Disease. In age- and sex-adjusted analyses, the lowest quartile of PC DHA was associated with a 2.29 (95% Confidence Interval (CI): 1.09, 4.83) increased odds of all-cause dementia, and a 2.52 (95% CI: 1.11, 5.72) increased odds of Alzheimer's Disease compared to the three higher quartiles. Additional adjustment for apolipoprotein E and education did not materially change these associations. Conclusion: This study offers additional evidence that docosahexaenoic acid appears to protect against dementia. Clinical trials of dietary or supplemental docosahexaenoic acid are warranted.

ROLE OF DHA IN COGNITIVE AGING AND ALZHEIMER'S DISEASE. K. Yurko-Mauro¹, E. Nelson¹, J. Quinn² (1. Martek Biosciences Corporation, Columbia, Maryland; 2. Oregon Health and Science University, Portland, Oregon, USA)

DHA is the principle long chain omega-3 fatty acid in brain and retina and plays an important role in neural and visual development. DHA is an integral component of neural membrane phospholipid and is involved in multiple neuronal functions including membrane fluidity, ion fluxes and signal transduction pathways. Dietary consumption of DHA (fatty fish, organ meats) is low (<70mg/d) in Western diets versus intakes worldwide. Decreases in plasma DHA are associated with cognitive decline in healthy elderly (1) and Alzheimer's patients (2). Greater DHA intake and greater plasma DHA levels are inversely correlated with relative risk of incident Alzheimer's disease (AD) (3) and all-cause dementia (4). Many epidemiological studies have verified these findings and will be reviewed in this presentation. Aged animal models and transgenic Alzheimer mouse models (5,6,7) have demonstrated significant effects of DHA supplementation in elevating DHA brain levels, reducing behavioral memory deficits and reducing brain amyloid and tau levels. A review of recent animal work will be presented. Clinical studies of the effects of DHA as a nutritional neuroprotective agent in age-related cognitive decline and as therapy for mild to moderate Alzheimer's disease are currently underway. An overview of current clinical studies will be given and baseline/demographic data of some of the ongoing studies will be presented. References: 1. Heude B, Ducimetiere P, Berr C. Cognitive decline and fatty acid composition of erythrocyte membranes-- The EVA Study. *Am J Clin Nutr* 2003; 77: 803-808; 2. Tully AM, Roche HM, Doyle R, et al. Low serum cholesteryl ester-docosahexaenoic acid levels in Alzheimer's disease: a case-control study. *Br J Nutr* 2003; 89: 483-90; 3. Morris MC, Evans DA, Bienias JL, et al. Dietary Fats and the Risk of Incident Alzheimer Disease. *Arch Neurol* 2003; 60: 194-200; 4. Schaefer, E., Bongard, V., Beiser, A., et al. Plasma Phosphatidylcholine Docosahexaenoic Acid Content and Risk of Dementia and Alzheimer Disease. *Arch Neurol* 2006; 63: 1545-1550; 5. Calon F, Lim GP, Yang F, et al. Docosahexaenoic Acid Protects from Dendritic Pathology in an Alzheimer's Disease Mouse Model. *Neuron* 2004; 43: 633-645; 6. Lim GP, Calon F, Morihara T, et al. A diet enriched with the omega-3 fatty acid docosahexaenoic acid reduces amyloid burden in an aged Alzheimer mouse model. *J Neurosci* 2005; 25:3032-40; 7. Green, K, Martinez-Coria, H, Khashwji, H, et al. Dietary Docosahexaenoic Acid and Docosapentaenoic Acid Ameliorate Amyloid-β and Tau Pathology via a Mechanism Involving Presenilin 1 Levels. *J Neurosci* 2007; 27(16):4385-4395.

TESTOSTERONE AND GROWTH HORMONE IMPROVE BODY COMPOSITION AND MUSCLE PERFORMANCE IN OLDER MEN: THE HORMA TRIAL. F.R. Sattler^{1,4}, C. Castaneda-Sceppa², E.F. Binder³, E.T. Schroeder⁴, Y. Wang⁵, S. Bhasin⁶, M. Kawakubo⁵, Y. Stewart¹, C. Hahn⁵, P. Colletti⁷, R. Roubenoff², K.E. Yarasheski³, S.P. Azen⁵ (1. Department of Medicine; 4. Division of Biokinesiology, 7. Department of Radiology; 5. Department of Preventive Medicine, of the University of Southern California, Los Angeles, CA; 2. Jean Mayer USDA Human Nutrition Research Center on Aging of Tufts University, Boston, MA; 3. Department of Medicine, Washington University, St. Louis, MO; 6. Section of Endocrinology, Diabetes, and Nutrition, Boston University, Boston, MA, USA. National Clinical Trials Number: NCT00183040)

Context: Impairments in the pituitary-gonadal axis with aging are associated with loss of muscle mass/function, fat accumulation, cardiovascular complications and reduced quality of life. Objective: Test the hypothesis that physiologic supplementation with testosterone and growth hormone together improves body composition and function in 65-90 year-old men with low testosterone and IGF-1. Design: Factorial (2X3) two tiered, randomized, double masked investigation. Setting: Three university research centers located in the western, central and eastern United States. Study Participants: 122 community dwelling men 70.8±4.2 years-of-age with BMI 27.4±3.4kg/m², testosterone ≤550ng/dL, and IGF-1 in lower adult tertile (≤167ng/dL) were enrolled and randomized; 112 completed the study. Interventions: Transdermal testosterone (5g or 10g/day) during suppression of endogenous testosterone with leuprolide acetate (7.5mg/monthly) and growth hormone (0, 3, or 5ug/kg/day) for 16 weeks. Main Outcome Measures: Body composition, muscle performance, and safety tests. Results: By week 17, total lean mass increased (1.0±1.7kg-to-3.0±2.2kg) as did appendicular lean tissue (0.4±1.4kg-to-1.5±1.3kg), whereas total fat mass decreased (0.4±0.9kg-to-2.3±1.7kg) as did trunk fat (0.5±0.9kg-to-1.5±1.0kg) for the six groups (p<0.05 for 22 of 24 within group comparisons) and by dose levels for the four parameters (p<0.05 for linear trend). Maximum voluntary strength of upper and lower body muscles increased by 14±34% to 35±31% (p<0.05 in four highest dose groups) that correlated with changes in appendicular lean mass. Aerobic endurance increased (p<0.05) in all six groups (average 96±137sec longer). Systolic and diastolic blood pressure increased similarly in each group (p<0.05) with mean increases of 12±14 and 8±8mmHg, respectively. Other predictable adverse events were minor-to-modest and reversible. Conclusions: Combined supplementation with testosterone and growth hormone to achieve youthful levels produced significant gains in total and appendicular lean mass, muscle strength, and aerobic endurance with significant decreases in whole body and trunk fat with expected adverse events.

POSTERS

MILD CONTINUOUS EXERCISE ENHANCES THE ACTIVITY OF NEUTRAL SERINE PROTEASES IN GRANULOCYTES THAT REGULATE BIOPHYLAXIS. Y. Aoki, T. Yamamoto, T. Otuka (Department of Food and Health Science, Faculty of Human Life Science, Jissen Women's University, Tokyo, Japan)

Mild exercise of long periods increased neutral serine protease activity in granulocytes that regulate biophylaxis. Mice were forced to exercise by running wheel for 30 min/day in 6 days per week. After 3, 6 and 9 months bone marrow cells were obtained from both tibia and femurs. They were layered on the top of Percoll (specific gravity 1.089) and centrifuged at 27,000xg for 20 min. The layer mainly consisted of mature granulocytes was collected and the percent of mature granulocytes was counted. Mature granulocytes were sonicated and centrifuged. From the precipitate proteases were extracted with 0.5M potassium phosphate buffer (pH7.0) at 37°C for 30 min. Medullasin activity was determined by employing apo-ornithine transaminase as substrate (1). Cathepsin G activity was measured by determining the release of p-nitroaniline from N-succinyl-(ala)₂-prope-p-nitroanilide as substrate (2). Both medullasin and cathepsin G activity in granulocytes increased significantly as compared with those of sedentary controls after 3 months. The increase was more prominent in 6 and 9 months exercise than in 3 months. The amount of GM-CSF in plasma determined by the ELISA development kit was significantly elevated in exercise mice than that of sedentary controls. Both medullasin and cathepsin G in granulocytes were shown to increase biophylactic activity (1,2). These results indicate that mild exercise of long periods enhances biophylactic activity through elevation of the activity of neutral serine proteases in granulocytes such as medullasin and cathepsin G. References: 1. Y. Aoki et al, *J. Clin. Invest.* 69,1223-1230, 1982; 2. T Yamazaki, Y. Aoki, *Immunology*, 93,115-121, 1998.

A RANDOMIZED CONTROLLED TRIAL ON EARLY PHYSIOTHERAPY INTERVENTION VERSUS USUAL CARE IN ACUTE UNIT FOR ELDERLY. POTENTIAL BENEFITS IN LIGHT DIETARY INTAKES. C. Blanc-Bisson, I. Bourdel-Marchasson (CHU Bordeaux, Pôle de gérontologie, Hôpital Xavier Arnoz, 33600 Pessac, France)

Objective: to evaluate effect of early intensive physiotherapy rehabilitation on specified primary outcomes: maximal and sustained isokinetic strength at clinical stability and Secondary outcomes: weight loss, current weight, energy intakes, protein intakes, autonomy, mobility. Design: prospective randomized controlled trial with 2 arms: early intensive physiotherapy rehabilitation and usual care. Intervention until clinical stability with primary outcomes measured after intervention. Setting: patients aged 70 years and older living in community, bedsores or reduced mobility but autonom within 3 months.

Patients with uncontrolled disease or limiting mobility pathology were excluded. Patients: a total of 76 patients were accrued, 55 women and 21 men; mean age was 85.4 years. Measurements: hospitalization length stay, bedsores status, arm and leg circumference, triceps skin fold, usual weight, body mass index, dietary intakes (Kcal/kg/D, g protein consumption/kg/D previous and after intervention), falls during hospitalization, 10 meter walking time and step number, Tinetti test, get up and go test, endurance coefficient, fatigue index, plantarflexors, knee flexors and extensors repetitions, right hand dynamometer. Results: Only for patients from early intensive physiotherapy group correlation was established between leg circumference and dietary intakes ($r=-0.577$, $p=0.020$), protein consumption ($r=-0.534$, $p=0.030$), walking Tinetti test ($r=-0.570$, $p=0.021$) after intervention. Patients from usual care group had higher dietary intakes (Kcal/kg/D) ($p=0.022$) and protein consumption (g/kg/D) ($p=0.016$) whereas patients from early physiotherapy group had higher BMI ($p=0.051$) at this time. There were no difference in other clinical status, walking and physiotherapy performance tests. Conclusion: Intensive early rehabilitation physiotherapy correlate leg circumference and walking Tinetti test, daily dietary intakes, protein consumption after 1 month of hospitalization in comparison with usual care.

WHO ARE THE MALNOURISHED CLIENTS IN HOME CARE? FACTORS ASSOCIATED WITH MALNUTRITION INDICATORS USING THE RESIDENT ASSESSMENT INSTRUMENT FOR HOME CARE (RAI-HC). M.A. Boccock, H.H. Keller (University of Guelph, Canada)

Objectives: The purpose of this study was to determine the prevalence of malnutrition measured by RAI-HC nutrition and hydration items and to determine other factors independently associated with this risk in older home care clients. Participants: RAI-HC data for all first assessments for clients aged 65 years and older ($n = 4552$) collected from 1999 to 2001, by 12 community care access centres (CCACs) in Ontario, Canada were included for analysis. Design and Measurements: Malnutrition was defined as the presence of any one of significant unintentional weight loss, cachexia, a noticeable decrease in food or fluid intake, or consuming one or fewer meals per day. Other items on RAI-HC associated with malnutrition were identified with bivariate analyses ($p < 0.0001$) and regression analyses were completed in an attempt to identify independent predictors. Results: Overall malnutrition for older adults was 14%. Almost 10% ($n = 442$) of these clients reported weight loss; cachexia was rare (1%) and less than 5% ate infrequent meals or reported decreased dietary intake. The fully adjusted logistic model for malnutrition (Wald χ^2 (14, $N = 4551$) = 832.76, $p < .0001$; $c = .84$) included the following factors: loss of appetite (OR 6.29, 95% CI 4.98-7.93), dysphagia, (OR 1.88, 95%CI 1.48-2.40), insufficient fluid intake (OR 13.91, 95%CI 9.29-20.85), end-stage disease (OR 12.60, 95%CI 8.02-19.81), perceived health status (OR 2.77, 95%CI 2.31-3.31), self reported poor health (OR 1.75, 95%CI 1.43-2.15), functional decline (OR 2.09, 95%CI 1.64-2.66), mood status (OR 1.32, 95%CI 1.04-1.69), social functioning (OR 1.22, 95%CI (0.98-1.51), cognitive performance (OR 1.05, 95%CI 0.81-1.37), and trade-offs (OR 2.22, 95%CI 1.29-3.83). Conclusions: Based on selected malnutrition indicators used in the RAI-HC, the prevalence of malnutrition appears to be low when compared to similar populations. Other RAI-HC items associated with overall malnutrition indicators may be useful for determining 'malnutrition risk' and developing future malnutrition screening indices for older adults receiving home care that identify older clients sooner.

A PLASMA PANEL OF NUTRIENT BIOMARKERS IS MORE RELIABLE THAN FFQ IN SUBJECTS AT RISK FOR DEMENTIA. G. Bowman¹, J. Baxter¹, B. Oken¹, B. Frei², M. Traber², S. Leonard², J. Kaye¹, J. Shannon³, J. Quinn¹ (Department of 1. Neurology and 3. Endocrinology, Oregon Health & Science University; 2. Linus Pauling Institute, Oregon State University, USA)

Objective: To examine reproducibility of plasma nutritional biomarkers and nutrient estimates from NCI Diet History Questionnaire (FFQ) in subjects at risk for dementia. Background: Nutrients implicated in the pathogenesis include antioxidants, the dietary determinants of serum homocysteine, omega 3 fatty acids and cholesterol. It remains unclear whether modification of these dietary factors reduces the risk of cognitive decline, in part because practical and reliable instruments for assessing nutrient status in high-risk subjects are not available. Methods: Thirty-eight subjects (19 amnesic-Mild Cognitive Impairment, 19 Non-Impaired Elderly) participated in an observational study of nutrient status derived from plasma and FFQ collected together at two time points one month apart. Results: Fifty-percent of the 12 nutritional biomarkers were more reproducible than serum cholesterol (ICC > .82) while Eicosapentaenoic acid was the sole FFQ derived nutrient to meet this standard (ICC = .96). FFQ was more reproducible in MCI than cognitively intact elderly for antioxidants (mean ICC = .84 vs .73 in NIE), B vitamins (MCI = .65 vs NIE = .53), fatty acids (MCI = .85 vs NIE = .70) and cholesterol (MCI = .78 vs NIE = .52). FFQ derived estimates of DHA ($p = .02$) and EPA ($p = .03$) correlated with their respective plasma measures. Lower plasma EPA ($p = .04$) and higher gamma-tocopherol ($p = .005$) were appreciated in MCI compared to controls. Vitamin B6, total Omega 3, total omega 6 / omega 3, ascorbic acid, DHA, and alpha-tocopherol trended toward difference in the groups. Conclusions: Using serum cholesterol as a benchmark, we found a greater proportion of nutritional biomarkers meeting this standard compared to nutrient estimates from FFQ. The lack of association between many of the plasma and FFQ nutrients challenges validity of FFQ in this setting. Nutritional biomarkers are reliable and worthy of larger prospective study in subjects at risk for dementia. Acknowledgements: UL1 RR024140 (GB, JQ), Oregon Tax Check-Off Alzheimer's Fund (GB), NCCAM T32 AT002688 NRSA (GB, BO), NIA-AG08017 (JK).

BODY COMPOSITION IN SWEDISH OLD PEOPLE AGED 65-99 YEARS, LIVING IN RESIDENTIAL CARE FACILITIES. M. Carlsson¹, Y. Gustafson¹, S. Eriksson¹, H. Littbrand¹, L. Häglin² (1. Department of Community Medicine and Rehabilitation, Geriatric Medicine; 2. Department of Public Health and Clinical Medicine, Family Medicine, Umeå University, Umeå, SE-901 85, Umeå, Sweden)

Background: It is important to evaluate body composition changes in subjects with an existing multi-system reduction in capacity, as a small decrease in fat-free mass can cause serious impairments. Objective: The aim of the study was to describe body composition in old people living in institutions, using Bioelectrical Impedance Spectroscopy (BIS). Methods: Body composition data were collected in a study of 173 subjects with functional and cognitive impairment, aged 65 to 99 years, living in residential care facilities. An impedance spectrometer (Xitron Hydra 4200; 5 to 1000 kHz) was used to assess the amount of both fat-free and fat mass. Height was adjusted for by a calculating fat-free mass and fat mass index (kg/m²). The Harpenden caliper and a tape measure were used to assess body fat, arm-fat and arm-muscle area (mm²). Mini Nutritional Assessment (MNA) was used for assessment of nutritional status. Results: A large proportion of the study subjects was at risk of malnutrition or was malnourished. The amount of both fat-free and fat mass was inversely related to age, significantly in women but not in men. Bioelectrical impedance spectroscopy and anthropometry provide comparable information about body composition, except for fat mass. Conclusion: These selected population of old, functionally impaired people with multiple diseases, were at risk of malnutrition or were already malnourished. Women, had significantly lower FFM and higher FM, inversely related to age, than men. Bioelectrical impedance spectroscopy and anthropometrical measurements, seem to be comparable, except for FM%, which could be underestimated by skinfold thickness values and/or overestimated by BIS.

ASSOCIATIONS BETWEEN NUTRITION AND COGNITIVE FUNCTIONING IN OLDER ADULTS. V. Danthiir¹, C. Wilson¹, T. Nettelbeck², N. Burns², G. Wittert², M. Noakes¹, P. Clifton¹ (1. Human Nutrition, Commonwealth Scientific and Industrial Research Organisation, Adelaide, Australia; 2. University of Adelaide, Australia)

Research indicates a possible role for nutrition in the maintenance of cognitive functioning in older age. We are conducting a parallel, randomised, double-blind, placebo-controlled 18-month clinical trial ($N=395$), supplementing normal community-dwelling older adults (65-90 years) with long-chain omega-3 polyunsaturated fatty acids. Cognitive functioning is assessed comprehensively; factor scores represent the domains of working memory, fluid intelligence, short-term memory, long-term memory and retrieval, inhibition, processing speed and perceptual speed. These results report the baseline associations between the cognitive domains and a number of nutrients (e.g., omega-3 fatty acids, B vitamins), reflecting both systemic status and intake estimated from food frequency questionnaires, and health-related bio-markers.

A COMPARISON OF CHANGES IN BODY MASS INDEX OVER TIME IN ON-PUMP AND OFF-PUMP CABG PATIENTS. R.A. DiMaria-Ghalili (Hartford Center for Geriatric Nursing Excellence, University of Pennsylvania, USA)

Older adults experience weight loss the first six weeks after coronary artery bypass grafting (CABG) surgery and the more weight lost the lower their self-reported physical health as well as hospital readmission. Weight loss is a risk factor for malnutrition. Ischemia-reperfusion injury associated with the use of the cardiopulmonary bypass pump (CPB) during traditional (on-pump) CABG surgery causes catabolism. Off-pump surgery is performed without the use of CPB, avoiding the adverse effects of CPB. This study explored the extent to which the weight loss is attributed to the catabolism associated with CPB by comparing changes in weight (as measured by body mass index {BMI}) for gender, age (< 65 vs > 65 years), and pump status (on-pump vs off-pump) in primary isolated CABG patients using a longitudinal descriptive design. The total sample of 44 (mean age 64.32 ± 9.026) included 22 cases (off-pump) and 22 age-matched controls (on-pump) of which there were 24 older and 20 younger participants. Within participants, BMI changed over time from preoperative, post-operative day 5 and 4-6 weeks post-discharge, $F=3.88$, $p=0.030$, regardless of age. The effect of pump status was not statistically significant, although trends indicate off-pump patients had the smallest change in BMI between postdischarge and preoperative, than the on-pump patients ($-0.25 + 1.07$ vs $-0.8 + 1.42$, respectively). Although the off-pump patients lost less weight over time than on-pump patients, this is not statistically significant. Further study is needed to determine the mechanisms underlying weight loss in older post-operative CABG patients.

EFFECT OF CALCIUM, FOLATE AND VITAMIN D3 FORTIFIED MILK ON NUTRITIONAL STATUS AND MARKERS OF INFLAMMATION AND IMMUNITY IN AUSTRALIAN AGED CARE RESIDENTS. J.A. Grieger, C.A. Nowson, N.T. Wattanapenpaiboon (School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia)

In residential care, inadequate calcium and folate intakes; and low serum vitamin D (25(OH)D) concentrations are common. There is accumulating evidence to indicate that ageing is associated with dysregulated immune and inflammatory responses. We assessed whether daily provision of calcium, folate and vitamin D fortified milk for six months improved vitamin D status (and markers of inflammation and immunity: Interleukin-6, tumor necrosis factor alpha, C-reactive protein, insulin-like growth factor-I (IGF-1)), in a group of Australian aged care residents. One hundred and seven residents (61% female)

completed the six month study (mean (SD) age: 79.9 (10.1) years; body weight: 68.4 (15.4)kg). The median [inter-quartile range, IQR] volume of fortified milk consumed was 160 [149]ml/day. The median daily vitamin D intake increased to 10.4 [8.7]µg (P<0.001). Serum 25(OH)D increased by 23 ± 2nmol/L (83 (107)%, P<0.001), yet remained in the insufficient range (mean 45 ± 2nmol/L). Consumption of >160ml milk/day (n=54 (50%)), however increased serum 25(OH)D levels into the adequate range (53 ± 2nmol/L) and reduced serum parathyroid hormone by 24% (P=0.045). There was no effect on markers on inflammation, but there were correlations between the changes in serum 25(OH)D with the changes in IGF-1 (r= -0.29, p=0.006) and IL-6 (r=+0.26, p=0.008) and these remained after adjustment of change in body weight. Although vitamin D status improved, it did not reach the level thought to reduce fracture risk. A vitamin D supplement would therefore be recommended to ensure vitamin D sufficiency. We could not find any effect on markers of inflammation, although there was some indication that change in vitamin D status was related to the change in IL-6, a marker of inflammation and inversely to IGF-1, a marker of cell growth, which may warrant further investigation.

EFFECTIVENESS OF A COGNITIVE PROGRAM ON BRAIN FUNCTION OF INDIVIDUALS DIAGNOSED WITH PROBABLE ALZHEIMER'S OR OTHER DEMENTIAS IN THREE STUDY SITES. J. Holstein¹, C. Robinson¹, C. Hartmann¹, S. Rueb², L. Heffel², S. Dintaman³, J. Reynolds³, L. Fleming³, M. Crull³, J. Goldey³, L.L. Serper⁴ (1. CJE, Chicago, Il; 2. Centennial Hospital and Blakeford AL, Nashville, Tn; 3. FFCINC, Richmond, In; 4. The Serper Method™, Brookline, Ma, USA)

Objective: To evaluate effectiveness of a cognitive program for maintaining or increasing cognitive function for persons diagnosed with early or mid-stage probable Alzheimer's or other dementias. Research took place in three separate pilot studies: Site 1: 10 participants over 9 months, Site 2: 10 participants over 3 months, Site 3: 12 participants over 5 months. **Design:** Diagnosed persons were invited to join "Study Groups" of not more than four participants and were guided through a structured learning program 2x per week. Brain exercises and conversation followed the subject matter. Interventionists were trained as Cognitive Educators™. **Measurements:** As pre- and post evaluations: Site 1 used NexAde, Geriatric Depression Scale and MMSE; Site 2, GDS, Clock Test, and MMSE in a randomized-control trial; Site 3, the MMSE. **Results:** Site 1: Participants showed increases in NexAde scores for focus, attention, memory recognition, memory recall and MMSE. Site 2: Showed a decrease in depression for the intervention group, and a positive trend on the Clock Test. Site 3: Showed an increase in MMSE scores. In all sites, families and staff reported improvement in participants' socialization and daily involvement. **Conclusions:** Participants in Sites 1 and 3 showed increases in mental function while those in Site 2 did not. Longer interventions might be necessary for cognition to be impacted. Site 2, however, showed a decrease in depression along with anecdotal observations of increased socialization and daily activities, supporting the results. Site 1 did not exhibit depression on the pre-test of GDS and increased social interaction with family and friends. Considering the positive implications, larger studies over a longer period of time are warranted.

SARCOPENIA THERAPY WITH ESSENTIAL FATTY ACIDS. R. Hubbard¹, J. Westengard, M. Horning² (1. Nutrition Dept. School of Public Health, Loma Linda University, Loma Linda, CA 92350; 2. Deceased)

Sugano and Ikeda in 1996 using experimental animals, demonstrated that trans fatty acids exacerbate essential fatty acid deficiency by interfering with the metabolism of linoleic (18:2n6) and alpha linolenic (18:3n6) acids. Essential fatty deficiencies, in turn are known to lower the synthesis of eicosanoids, prostaglandins and skeletal muscle proteins. Our earliest observations of this essential fatty acid deficiency in humans, came from abnormal plasma and urine amino acid patterns that we began seeing for the first time in routine clinical amino acid analysis (AAA) work in 1986, and published in 2003. We saw high incidences of plasma and urine amino acid changes from normal metabolism that predicted muscle loss. We followed these early observations with a subsequent study of 32 active human subjects, ages 38-83. We again saw evidence of muscle loss, as indicated by increased plasma levels of alanine (p<0.0001) and decreased urinary levels of alanine, glycine, isoleucine, leucine, and lysine (all p values <0.005). Subsequent, plasma fatty acid analysis, analyzed by multiple regression analysis revealed that low levels of cis-linoleic acid were independently associated with high levels of both trans linoleic acid (p=0.049) and Mead's acid (p=0.0001 and with low levels of both urinary alanine (p=0.047) and glycine (p=0.001), and high plasma alanine (p<0.0001). These data lend support to the idea that there may be an interactive relationship between cis- and trans-linoleic acid that could disrupt prostaglandin control of amino acids in protein synthesis. To experimentally treat these amino acid and fatty acid abnormalities, we used evening primrose oil (70% linoleic & 10% γ-linolenic acids, both omega 6 fatty acids) at 2 gm/day along with meals to decrease skeletal muscle loss in three amyotrophic lateral sclerosis (ALS) subjects, three failure to thrive seniors, and four patients with multiple sclerosis (MS). Therapy of the MS patients was particularly successful.

GREEN TEA COMPONENTS AND BIOPHYLAXIS-----EFFECT OF GREEN TEA EXTRACT AND SEDIMENT COMPONENTS ON THE ACTIVITY OF NEUTRAL SERINE PROTEASES IN GRANULOCYTES THAT REGULATE BIOPHYLAXIS. Y. Ishige, Y. Aoki (Department of Food and Health Science, Faculty of Human Life Science, Jissen Women's University, Tokyo, Japan)

Components of green tea extract such as epigallocatechin or epigallocatechin gallate were already shown to increase the activity of neutral serine proteases such as medullasin and cathepsin G (1). In this report we examined the effect of other components contained

in the green tea extract such as folic acid and theanine, and also the effect of sediment components of extracted green tea. Green tea leaves were treated for 1 min with warm water heated to 90°C, filtered through filter paper, and washed with warm water. The leaves remained on the filter (the sediment) were dried at room temperature and the fine powder was obtained by crashing them. The filtrate was concentrated in a rotary evaporator and lyophilized. Addition of the powder remained on the filter to the diet of mice caused a decrease in both medullasin and cathepsin G activity in granulocytes dose-dependently. To the contrary, the lyophilized supernatant increased both activity. Components of the supernatant such as theanine and folic acid enhanced both protease activity. β-Carotene and α-tocopherol which are contained in the sediment of heated green tea decreased both protease activity. Medullasin in granulocytes was already shown to play an essential role in biophylaxis and in the development of inflammation (2). Also cathepsin G was revealed that it plays an important role in biophylaxis (3). Therefore, results shown above indicate that green tea components change bioplylactic activity by altering neutral serine protease activity in granulocytes. References: 1. JNHA,9, 143, 2005; 2. Drug News & Perspectives, 5, 534-541, 1992; 3. Immunology, 93, 15-121, 1998

ROLES CHANGES IN FOOD-RELATED ACTIVITIES FOR DEMENTIA CARE PARTNERS. H.H. Keller (Department of Family Relations and Applied, Nutrition, University of Guelph, Guelph, ON. N1G 2W1, Canada)

In the community, one of the common challenges experienced by care partners for a family member with dementia is the loss and uptake of food-related roles. Relatively little research has described the changes in roles within family members. Understanding how the daily routine of meals can contribute to care partner stress is the first step towards potentially addressing this area through education or training and respite or formal care services. This study explored role changes as described by family care partners living with or caring for a family member with dementia. Twenty-three family care partners were interviewed on the changes that had occurred in the shopping and cooking roles as a result of dementia. Most participants were female (70%) and spouses (65%), however, six of the 23 (26%) did not reside with the person with dementia at the time of the interview. Changes and strategies to make shopping and cooking manageable were identified through qualitative analysis of semi-structured interview data. Some care partners were new to the role, while others had previously shared the cooking and/or shopping role with the person with dementia. Challenges involved learning new tasks and how to involve the person with dementia. Female spouses who were habitual cooks also underwent changes and challenges with these roles. They had to adjust to less time for these activities and doing them in different ways than in the past. For some, these food-related roles had been pleasurable activities, which now had become stressful. Although stress or burden was not explicitly measured, much of the discussion on changing or shifting of roles, whatever the context and prior relationship, involved stress for these care partners. It is anticipated that the stresses associated with role change in older care partners could lead to increased burden with consequent negative outcomes.

COORDINATING SECONDARY AND TERTIARY NUTRITION PREVENTION IN THE COMMUNITY WITH NUTRITION SCREENING. H.H. Keller (Department of Family Relations and Applied Nutrition, University of Guelph, Guelph ON. N1G 2W1, Canada)

Secondary and tertiary nutrition prevention efforts are limited for older adults living in the community. Such programs are minimally funded by various government levels and there appears to be a lack of concern around the nutritional health of this growing segment of the population. Nutrition risk screening in the community can: 1) raise awareness of older adults of their potential nutrition problems, 2) raise awareness of health and service professionals as well as government bodies, 3) help to identify key areas of concern, 4) be used to map out a care process for older adults found to be at risk, 5) aid in informed decision making around interventions and treatments, and 5) be used to monitor the benefits of preventive efforts. Several studies that have involved nutrition risk screening conducted by the author's research group will be highlighted to demonstrate the wide applicability of this activity in community prevention efforts. Selected process evaluation results of the Bringing Nutrition Screening to Seniors in Canada and Evergreen Action Nutrition programs will be presented. Outside of a nutrition care process, nutrition screening has considerable value and needs to be included in a wide variety of settings and practitioner care and service processes. Screening as a means of early identification can promote secondary and tertiary prevention for older adults and is currently and underused process in the community. (Keller HH, Hedley MR, Wong SS-L, Vanderkooy P, Tindale J, Norris J. Community organized food and nutrition education: participation, attitudes, and nutritional risk in seniors. J NutrHealth Aging 2006; 10(1):15-20; Keller HH, Haresign H, Brockest B. Bringing Nutrition Screening to Seniors (BNSS) Process Evaluation. Can J Diet Pract Res 2007;68(2): 86-91; Keller HH. Promoting food intake in older adults living in the community: a review. App Phys Nutr Met 2007;32: 991-1000)

IS THERE A RELATIONSHIP BETWEEN MUSCLE, MOBILITY AND PHYSICAL ACTIVITY IN ELDERLY CANCER SURVIVORS? P.C. LaStayo, R.L. Marcus, S. Smith, J. Kidde, L. Dibble, C. Butler, M. Hill (University of Utah, Department of Physical Therapy, Salt Lake City, Utah, USA)

Introduction: Sarcopenia may contribute to deficits in mobility and physical activity in the older cancer survivor since more than one-half of cancer survivors are 65 years or older. **Purpose:** The purpose of this study is to evaluate knee extension muscle strength and the cross-sectional area (CSA) of lean and fat tissue in the thigh and the quadriceps to determine if any relationship exists between sarcopenia-related factors and levels of

mobility and physical activity. Methods: Older, (mean=74 years) individuals (n=42; male=15; female=27) who are survivors of the most common cancers (lung, prostate, colon and breast) were included. Knee extension strength was determined via a maximum voluntary isometric contraction while mobility and physical activity levels were determined using five tests and measures: 1) a timed up and go; 2) a six minute walk, 3) stair ascent; 4) stair descent and 5) average number of steps taken/day. Magnetic resonance imaging scans of the thigh were used to determine average CSA (cm²) of intramuscular lean (IML) and intramuscular fat (IMF) tissue after eliminated subcutaneous fat and bone and isolating the fascial border of the whole thigh and the quadriceps to create an intramuscular-only region of interest. Results: A significant (p<0.05) positive relationship exists between knee extension strength (r value range= 0.48 to 0.65) and IML (r value range= 0.34 to 0.46) when referencing it to the measures of mobility. A significant (p<0.05) inverse relationship exists between IMF (r value range= -0.34 to -0.46) when referencing it to measures of mobility and physical activity. Sarcopenia-related factors account for 12-42% of the variability in mobility/physical activity in this older cancer survivor population. Conclusions: Skeletal muscle impacts both mobility and physical activity in older cancer survivors. Interventions designed to mitigate sarcopenia in this older cancer survivor population may impact mobility and physical activity levels.

REVERSING CHRONIC MUSCLE AND MOBILITY DEFICITS FOLLOWING TOTAL KNEE JOINT ARTHROPLASTY VIA RESISTANCE EXERCISE. P.C. LaStayo, R.L. Marcus, L. Dibble, J. Kidde, C. Peters, W. Meier (University of Utah, Department of Physical Therapy and Department of Orthopaedics, Salt Lake City, Utah, USA)

Introduction: A total knee arthroplasty (TKA) improves older individual's quality of life. Impairments in muscle and mobility, however, can be profound and can adversely impact function even years after TKA, suggesting sarcopenia-related problems may be recalcitrant. Purpose: The purpose of this study is to compare quadriceps muscle and mobility parameters following 12 weeks of resistance exercise via negative, eccentrically-induced, work (RENEW) vs. traditional resistance exercise (TRAD) in those 1-2 years following TKA. Methods: Older, (mean=67 years) individuals (n=17) with either unilateral or bilateral TKA (n= 20 knees; mean duration since surgery = 20 months) assigned at random to either RENEW or TRAD were tested before and after 12 weeks of training. Knee extension strength was determined via a maximum voluntary isometric contraction while mobility was determined using four tests: 1) a timed up and go; 2) a six minute walk, 3) stair ascent; and 4) stair descent. Magnetic resonance imaging was used to determine quadriceps volume (cm³). Results: A significant time x group interaction (p<0.05) exists for improvements in muscle volume (RENEW=12%; TRAD=3%) and stair descent (RENEW=23%; TRAD=7%). While no other statistically significant interactions were noted, the 7-24% improvement-trend in mobility across groups suggests resistance exercise can positively impact mobility. Likewise, the 4-fold greater improvement in strength with RENEW vs. TRAD highlights a trend that high-force resistance exercise is feasible and clinically effective. Conclusions: Muscle and mobility status can improve in older TKA recipients long after surgery. Both RENEW and TRAD are clinically effective, though the outcome following RENEW suggests a potential resistance exercise dose-response effect.

ENDOGENOUS ESTROGENS AND COGNITIVE FUNCTION IN POSTMENOPAUSAL WOMEN: THE RANCHO BERNARDO STUDY. G.A. Laughlin, D. Kritz-Silverstein, D. von Muhlen, E. Barrett-Connor (University of California, San Diego, USA)

Objective: To examine the association of endogenous estrogens with cognitive function in postmenopausal women, and its dependence on adiposity and other CVD risk factors. Background: Most biological and epidemiologic evidence suggests a beneficial effect of exogenous estrogens on cognitive function in postmenopausal women, however in randomized clinical trials (WHI, HERS) estrogen therapy increased the risk of cognitive impairment and dementia. Methods: Participants were 245 non-estrogen using, community-dwelling postmenopausal women aged 47-89 (median=70) in 1984-87 when endogenous estrogen levels were measured. Cognitive function was assessed in 1988-91 (baseline) and again in 1992-96 using the verbal fluency test (VFT), the mini-mental status exam (MMSE) and Trails B. Results: There was no significant association of quartile of estrone, estradiol, or bioavailable estradiol with baseline VFT, MMSE or Trails B score or with 4 year change in MMSE and Trails B. However, women in the two highest quartiles of estrone had significantly increased odds of greater 4 year decline in VFT (highest tertile vs lower). Using the lowest estrone quartile as reference, the odds ratios (95% confidence intervals) were 1.3 (0.7, 2.7), 2.4 (1.2, 4.8), and 2.3 (1.1, 4.6) for quartiles 2 thru 4 adjusting for age, education, depressed mood and baseline VFT. Additional adjustment for CVD risk factors that distinguished women above versus below the estrone median (higher BMI, waist girth, blood pressure, IL-6 and CRP) did not alter results. Total and bioavailable estradiol levels were not independently related to change in verbal fluency. Conclusions: Higher endogenous estrone levels are associated with greater decline in verbal fluency in postmenopausal women, independent of obesity and obesity-related CVD risk factors. These results agree with clinical trial data showing an adverse effect of higher estrogens on cognitive function in older women.

DEUTERIUM DEPLETED WATER - ANTIOXIDANT AND SCAVENGER IN THE EXPERIMENTAL CADMIUM CHLORIDE INDUCED OXIDATIVE STRESS, IN MALE RATS. L. Olariu, M. Petcu, C. Tulcan, M. Pup (Faculty of veterinary medicine, Timisoara, Romania)

Objectives: The deuterium depleted water has a special influence on cell and tissue development. A decrease of the deuterium concentration in tissues or the body, slows down

the proliferation of many types of cancer. The aim of this work was to determine the antioxidant properties of deuterium depleted water on rats with cadmium induced oxidative damages (20 ppm cadmium/ b.w. single dose as cadmium chloride). Methods: Malondialdehyde, glutathione level and the activities of catalase, superoxid dismutase, glutathione reductase and glutathione peroxidase in rats' blood were determined by spectrometric methods. Cadmium was determined in rats' liver and kidney by the graphite furnace technique of absorption spectrometry. Results : After 61 days of deuterium depleted water treatment and intoxication with 20 ppm cadmium/ b.w. in single dose as cadmium chloride, the malondialdehyde, reduced glutathione values, superoxid dismutase and glutathione reductase activities were slightly higher than controls, while catalase activity was lower than control. Conclusions: In a short period time (1 month), deuterium depleted water has a prooxidant effect (malondialdehyde values increased) but after a longer exposure, deuterium depleted water could partially counteract the damages due to cadmium intoxication by stimulating the cell antioxidant defense system. Important cadmium concentrations reduction were observed both in the deuterium depleted water pretreated and cadmium intoxicated group, respectively in the 61 days deuterium depleted water treated and cadmium intoxicated group. Deuterium depleted water was acting as an effective cadmium scavenger, as there were registered 21.84 times lower in liver and 5.75 times lower cadmium values in kidney as at cadmium intoxicated group (p<0.001).

DEVELOPMENT OF A CULTURALLY-TAILORED HEART + BRAIN HEALTH-FOCUSED NUTRITIONAL EDUCATION INTERVENTION: BUENOS HÁBITOS ALIMENTICIOS PARA UNA BUENA SALUD. P. Otilingam, M. Gatz (Department of Psychology & Alzheimer Disease Research Center, University of Southern California, USA)

The purpose of the Buenos Hábitos Alimenticios para una Buena Salud ("Good Eating Habits for Good Health") study is to evaluate a nutritional education intervention stressing the link between heart and brain health. Here we describe the steps taken to develop the intervention. Strong scientific evidence indicates an association between cardiovascular risk and both vascular dementia and Alzheimer disease. In a population-based Latino sample, hypertension and cardiovascular disease were the strongest predictors for vascular dementia. Dietary fat change modifies cardiovascular disease risk. More recently, saturated fat-rich diets were shown to increase cognitive decline risk but mono- and poly-unsaturated fat-rich diets decreased risk. Informed by bilingual and bicultural health educators, we developed a two-part intervention stressing skills, self-efficacy, and barrier reduction for Latinas, as they often are the nutritional gatekeepers. Part I covers fat types and their ties to heart and brain health. The heart health piece highlights current best practices. The brain health piece emphasizes the link between heart and brain health, modifiable dementia risk, dementia nomenclature and symptoms. Part II covers food procurement, preparation, and consumption. The results of this study can give insight into the development of population-based nutritional education interventions aimed at dementia incidence reduction in high risk groups. Particularly, health educators will be informed as to whether emphasizing the brain health connection promotes dietary behavior change.

NEURONAL SIRT1 ACTIVATION AS A NOVEL MECHANISM UNDERLYING THE PREVENTION OF ALZHEIMER DISEASE AMYLOID NEUROPATHOLOGY BY CALORIE RESTRICTION. G.M. Pasinetti (The Mount Sinai School of Medicine, Department of Psychiatry, One Gustave L. Levy Place, New York, NY 10029, USA)

Nicotinamide adenine dinucleotide (NAD)⁺-dependent sirtuins have been identified to be key regulators in the lifespan extending effects of calorie restriction (CR) in a number of species. In this study we report for the first time that promotion of the NAD⁺-dependent sirtuin, SIRT1-mediated deacetylase activity, may be a mechanism by which CR influences Alzheimer disease (AD)-type amyloid neuropathology. Most importantly, we report that the predicted attenuation of β -amyloid content in the brain during CR can be reproduced in mouse neurons in vitro by manipulating cellular SIRT1 expression/activity through mechanisms involving the regulation of the serine/threonine Rho kinase ROCK1, known in part for its role in the inhibition of the non-amyloidogenic α -secretase processing of the amyloid precursor protein. Conversely, we found that the expression of constitutively active ROCK1 in vitro cultures significantly prevented SIRT1-mediated response, suggesting that α -secretase activity is required for SIRT1-mediated prevention of AD-type amyloid neuropathology. Consistently we found that the expression of exogenous human (h) SIRT1 in the brain of hSIRT1 transgenics also resulted in decreased ROCK1 expression and elevated α -secretase activity in vivo. These results demonstrate for the first time a role for SIRT1 activation in the brain as a novel mechanism through which CR may influence AD amyloid neuropathology. The study provides a potentially novel pharmacological strategy for AD prevention and/or treatment. Supported in part by NIH AG14766 and the Dana Foundation for Brain Research Initiative, the Dr. Robert C. Atkins Foundation, and Department of Veterans Affairs Merit Review to GMP.

GARLIC COMPONENTS RESCUE NEURONAL CELLS FROM OXIDATIVE DAMAGE AND RESTORE SYNAPTIC INTEGRITY. B. Ray¹, N.B. Chauhan², J.A. Bailey¹, D.K. Lahiri¹ (1. Department of Psychiatry, Institute of Psychiatric Research, Indiana University School of Medicine, 791 Union Drive, Indianapolis, IN 46202, USA; 2. Jesse Brown VA Medical Center Chicago, Department of Anatomy & Cell Biology & Department of Neurology, University of Illinois at Chicago, IL 60612, USA)

Background: Synaptic loss and associated neurodegeneration are major hallmarks of Alzheimer's disease (AD). Neurochemically, amyloid beta peptide-loaded plaque depositions, hyperphosphorylated tau and oxidative stress produced by reactive oxygen species (ROS) play critical roles in AD pathogenesis. Objective: Our goal is to study the effect of certain nutritional supplements on neuronal survival and synaptic integrity and

plasticity. We tested the effect of Aged Garlic Extract (AGE), Diallyl Disulphide (DAD), an ingredient of natural garlic, and certain antioxidants in a neuronal cell culture model. Experimental design: Rat 'Pheochromocytoma' (PC12) cells were treated with Nerve Growth Factor (NGF) for fifteen days to achieve neuronal differentiation. Differentiated PC12 cells were treated with 200µM of hydrogen peroxide (H2O2) followed by the addition of different dosages of AGE and DAD separately. Cell group with only H2O2 treatment was used as control 1 and the cell group without H2O2 treatment was used as control 2. Cell viability assay (CTG method), toxicity (LDH assay), immunocytochemistry (ICC) and western blot analysis were performed after 48 hours of the treatment. Results: We observed i) a significant reduction in cell numbers in H2O2 treated cells from the untreated cells and ii) a significant loss of synaptic network by ICC. Notably, the treatment of cells with either AGE or DAD resulted in increased cell number and greater synaptic connection than H2O2 treated cells. At the molecular level, AGE or DAD treatment significantly increased levels of synaptic proteins such as SYPH and SNAP25. Under the same conditions, the treatment with a Soy compound did not yield the same effect. Studies of AGE and DAD in primary cortical neurons are in progress. Conclusion: These results suggest that garlic components, AGE and DAD, could rescue neuronal cell loss from the H2O2 mediated damage and restore synaptic integrity by increasing synaptic protein. Thus, the ability of these compounds to reverse neurodegeneration is of great therapeutic importance in Alzheimer's disease. Supported by NIH grants to DKL

RECALLED BODY IMAGE IN INDIVIDUALS WITH EARLY-STAGE ALZHEIMER DEMENTIA (AD) - COULD IT PLAY A ROLE IN MAINTENANCE OF BODY WEIGHT? B. Shatenstein, M.-J. Kergoat, I. Reid, M.-E. Chicoine, L. Vaz (Centre de recherche, Institut universitaire de gériatrie de Montréal, Département de nutrition, Université de Montréal, Montréal, Canada)

Introduction: Perception of body size (BS) among older adults with AD may influence success of dietary intervention to prevent weight loss. Objective: Examine perceived BS at different ages in AD patients. Methods: The 'Nutrition Intervention Study' (NIS) is testing individualised nutrition intervention among community-dwelling patients in early stages of AD. Patients aged 70+y and their caregivers (targeted n=70 dyads) are being recruited from six hospital-based memory clinics divided evenly between intervention and control sites. Participants are interviewed at baseline (T1) and after 6 months (T2). Perception of current BS, and BS recalled at ages (A) 25y, 45y, 55y, 65y is collected using a modified "Silhouette" method where body size is coded from 1 to 9, with 1 the thinnest and 5 representing "healthy" body weight. Results: For 60 participants with complete data at T1, 36 (60%) are women and mean age is 79.7±5.1y (range 69-90y). Only 11 (18.3%) reported the same BS across all ages. Partial correlation analysis controlling for gender, age and MMSE score showed BS to be modestly but significantly correlated with BMI at A65y and current age (r=.33, p<.05 and r=.45, p<.001, respectively). Recalled BS at A25 was strongly correlated with BS at A45 (r=-0.57, p<.0001); highly significant (p<.0001) robust correlations (r=0.51 to 0.72) were found between A45 and each of the other ages. At older ages (A55 to current) highly significant (p<.0001) strong correlations were found between recalled BS at each age (r=0.70 to r=0.89). Discussion & Conclusion: Patients with early-stage AD may be able to perceive BS accurately. Since perception of BS diminishes with time, and could be useful when offering dietary counselling to prevent weight loss, it is essential that the AD patient's primary caregiver be involved in efforts to maintain body weight.

ORAL HEALTH AND COGNITIVE FUNCTION IN THE THIRD NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES III). R. Stewart¹, W. Sabbah², G. Tsakos², F. D' Aiuto³, R.G. Watt² (1. King's College London (Institute of Psychiatry), Section of Epidemiology, London, UK; 2. Department of Epidemiology and Public Health, University College London, London, UK; 3. Periodontology Unit, UCL Eastman Dental Institute, London, UK)

Objectives: To investigate the association between oral health and cognitive function in early- mid- and late-adult life. Methods: A secondary analysis was carried out of a large, well-characterised community sample (NHANES III). Analysed variables included three measures of oral health (gingival bleeding, loss of periodontal attachment, loss of teeth) and three measures of cognitive function: the Symbol Digit Substitution Test (SDST) and the Serial Digit Learning Test (SDLT) (both in 5138 participants aged 20-59 years), and (in 1555 participants aged 70 or above) a Story Recall test. Other covariates included age, gender, ethnicity, education and poverty, and cardiovascular risk factors. Results: Worse scores on all three measures of oral health status were significantly associated with poorer performance on all three measures of cognitive function after adjustment for age. Education was an important confounding factor. However, after full adjustment for all other covariates, gingival bleeding and loss of periodontal attachment remained associated with relative impairment on SDST, and gingival bleeding was associated with relative impairment on SDLT. No effect modification by age was observed within the 20-59 year range. Conclusions: Poor oral health is associated with worse cognitive function throughout adult life. This may in part be accounted for by early life education and social status. However the possibility of direct causal pathways requires further investigation.

EPIDEMIOLOGIC STUDY OF DIETARY FATS AND INFLAMMATORY MARKERS IN OLDER ADULTS. M. Sturman, J. Kelly, D. Fleischman, S. Leurgans, D. Bennett, M. C. Morris (Rush University Medical Center, USA)

Background: Dietary fat intake may influence inflammation, a process involved in the development of Alzheimer's Disease and other chronic diseases of aging. This study investigated whether dietary fat intake was associated with circulating inflammatory markers in old age. Methods: Food frequency questionnaires (FFQ) were used to assess the

dietary fat intake saturated fat, trans fat, polyunsaturated fat, and monounsaturated fat) of 396 participants of the Memory and Aging Project, an ongoing study of incident Alzheimer's disease and brain neuropathology in older adults. The inflammatory markers measured included Interleukin 1B (IL-1B), Interleukin 6 (IL-6), Interleukin 6 soluble receptor (IL-6R), Tumor necrosis factor alpha (TNFa), Interleukin 10 (IL-10), Vascular cell adhesion molecule 1 (VCAM), Matrix metalloproteinase-9 (MMP-9), and a summary measure of the average of VCAM and MMP-9 combined. We used logistic regression of the highest quartile of each inflammatory marker on indicators of the highest 3 quartiles of intake of each dietary fat, adjusting for age and sex. Results: The highest quartile of polyunsaturated fat intake was associated positively with the highest TNFa quartile (Odds ratio = 2.2, 95% confidence interval = 1.2 - 4.2), the highest quartile of IL-6R (OR = 2.3, 95% CI = 1.2 - 4.5), and the highest quartile of the summary measure of the average of VCAM and MMP-9 combined. (OR = 2.2, 95% CI = 1.1 - 4.2). The highest quartile of trans fat intake was associated positively with the highest quartile of IL-6R (OR = 2.0, 95% CI = 1.1 - 3.9) and the highest quartile of the summary measure of VCAM and MMP-9 combined. (OR = 2.1, 95% CI = 1.1 - 4.0). Lower quartiles of intake were not associated with inflammation. Conclusions: These data suggest that high dietary intake of polyunsaturated fat and trans fat in old age is associated with the highest levels of some circulating inflammatory markers.

NUTRITIONAL STATUS, ENERGY AND NUTRIENT INTAKE AND NUTRITIONAL CARE FACTORS OF ELDERLY SERVICE HOUSING CLIENTS. M.H. Suominen¹, S. Muurinen², H. Soimi³, K.H. Pitkälä⁴ (1. The Central Union for the Welfare of the Aged; 2. National Research and Development Centre for Welfare and Health; 3. Social Services Department, Services for Elderly, City of Helsinki; 4. Department of General Practice and Primary Health Care, University of Helsinki)

Objectives: To examine the nutritional status, nutritional care factors and energy and nutrient intake of service housing clients aged 65+ years in the metropolitan region of Helsinki, Finland. Methods: In this cross-sectional study we assessed nutritional status of all service housing clients aged 65+ years in the cities of Helsinki and Espoo in Finland. Of all the clients, 67% (n=1475) participated. A trained nurse familiar with the subject carried out the MNA (Mini Nutritional Assessment) in order to assess participants' nutritional status. In addition, 398 (27% of participated) clients' energy and nutrient intake for one day were calculated from food diaries. The subject's stage of cognition was evaluated according to the "Memory" class in the Clinical Dementia Rating Scale (CDR). Results: The mean age of participants was 83 years, 78% were females, 70% of studied clients had impaired cognitive function. The nutritional status according to the MNA was good in 22% of the clients, 65% were at risk of malnutrition and 13% malnourished. Body mass index (BMI) was less than 24 in 43%, 24-29.9 in 37% and 30 or more in 20% of the clients. Malnutrition (MNA<17) was associated with dementia, infection, hip fracture, low BMI, impaired function and sight. Good nutritional status (MNA>23.5) was associated with eating normally or quite much, the possibility to portion self the food and to choose between several main food items. The mean energy intake of the clients was 1690 kcal (SD 440), protein 61.4 g (SD 18.7), fiber 14.9 g (SD 5.8), vitamin D 6.6 µg (SD 4.5), folic acid 229.0 µg (SD 123) and calcium 1107 mg (SD 404.2). Conclusions: Although the mean energy and protein intakes were acceptable among service housing clients, fiber, vitamin D, and folic acid intakes were below recommendations. In the further analysis of the data different MNA groups and other variables will give more information of the studied service housing clients' nutrition.

EFFECT OF BLACK TEA ON BIOPHYLAXIS-----COMPARISON BETWEEN GREEN TEA AND BLACK TEA ON THE EFFECT OF PROTEASE ACTIVITY IN GRANULOCYTES THAT REGULATES BIOPHYLAXIS. T. Yamamoto, C. Fujinoki, Y. Aoki (Department of Food and Health Science, Faculty of Human Life Science, Jissen Women's University, Tokyo, Japan)

Effect of the components in green tea on health are widely investigated, especially in Japan. However, black tea is more universally drunk in the world than green tea. Black tea contains several components that are not involved in green tea. In this study the effect of black tea on the activity of neutral serine proteases in granulocytes that regulate biophylaxis was investigated. Mice fed on the diet containing various amounts of black tea extract showed decreased activity of both medullasin and cathepsin G dose-dependently when compared with that of controls. This result is in contrast to that obtained by feeding green tea extract. Polyphenol monomers such as epigallocatechin or epicatechin which are rich in the green tea are oxidized to form theaflavin or thearubigin in black tea. Addition of theaflavins to the diet of mice caused a decrease in both medullasin and cathepsin G activity dose-dependently. We showed already that addition of epigallocatechin or epigallocatechin gallate to the diet of mice increased both medullasin and cathepsin G activity in granulocytes. Therefore, effect of addition of theaflavin and epigallocatechin or epigallocatechin gallate is quite different. Both medullasin and cathepsin G play an important role in biophylaxis. They stimulate DNA synthesis of lymphocytes, and enhance natural killer cell activity in vitro (1,2). Medullasin induces activated killer cells which lyse every malignant cells (3). However, medullasin injures endothelial cells in vessels and causes inflammation, therefore, medullasin is considered to play certain roles in the development of atherosclerosis. From results described above drinking of black tea and green tea are considered to cause different effect on health. References: 1. J. Clin. Invest, 69, 1223-1230, 1982; 2. Cell. Immun, 160, 24-32, 1995; 3. Jpn. J. Cancer Res, 79, 687-690, 1988.