Where Nutrition Becomes Therapy

Presented by

The Role of Nutrition in Dementia Prevention and Management

MARCH 26 - 27, 2015

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#NutrDementia

The New York Academy of Sciences
New York City
WELCOME

The Nestlé Nutrition Institute, Nestlé Health Science, and The Sackler Institute for Nutrition Science at the New York Academy of Sciences are pleased to welcome you to our conference, The Role of Nutrition in Dementia Prevention and Management. This multidisciplinary and innovative program features leading scientists and clinicians who will present the latest research on the linkages between neuroscience and nutrition interventions that treat and prevent dementia.

Every four seconds, someone is diagnosed with dementia. As the world’s aging population continues to grow and reach unprecedented forecasts, dementia and optimal nutrition among the elderly are global health and economic challenges. Today, approximately 44 million worldwide live with dementia and by 2050 the estimate will reach 135 million. These alarming statistics have widened dementia research to not only focus on pharmaceutical solutions but to investigate prevention and progression strategies through nutritional interventions.

Today’s conference focuses on the following three critical aspects of nutrition in dementia prevention and management.

- Nutritional consequences of the aging demographic: Epidemiological perspectives
- The role of nutrition in dementia prevention
- The role of nutrition and distinct nutritional requirements in the management of dementia

The goal of this conference is to foster cross-disciplinary dialogue, new collaborations, and innovation through active participation among speakers and attendees following presentations, two moderated open discussions with expert panelists, and a networking reception. We hope to promote the importance of engaging both the neuroscience and nutrition communities through this landmark event.

To disseminate the knowledge and ideas exchanged by participants beyond the walls of the auditorium and past the event date, this conference will be archived online as an eBriefing, an open-access multimedia conference report, on the New York Academy of Sciences website.
of Sciences’ website. In addition, videos and presenter interviews also will be available on the Nestlé Nutrition Institute website at www.nestlenutrition-institute.org.

If you are not already a member of the New York Academy of Sciences, we encourage you to become active members of our community and to build networks and exchange ideas with science leaders like yourself. For more information about the Academy’s diverse live and online programming and membership, please visit www.nyas.org or email customerservice@nyas.org.

We hope that this conference exceeds your expectations, stimulates exciting discussions, and leads to productive new collaborations. Please do not hesitate to address our staff with any questions, concerns, or suggestions.

Ellis Rubinstein
President and Chief Executive Officer
The New York Academy of Sciences

Jose M. Saavedra, MD
Chairman, Nestlé Nutrition Institute Board

Greg Béhar
CEO
Nestlé Health Science S.A.

**FACULTY DISCLOSURES**

All faculty participating in this activity are required to disclose to the audience any significant financial interest and/or other relationship with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in his/her presentation and/or the commercial contributor(s) of this activity.

**Cédric Annweiler**, MD, PhD
None

**Amy R. Beaudreault**, PhD
None

**Stephen Cunnane**, PhD
None

**Jane Durga**, PhD
Employee
- Nestlé Health Science

**Agnes Flöel**, MD
None

**Gary E. Gibson**, PhD
Research Support
- Advanced Orthomolecular Research Inc.

**Deborah Gustafson**, PhD
None

**Richard S. Isaacson**, MD
Consultant
- Accera Inc

**Heather H. Keller**, PhD
Speaker’s Bureau
- Abbott Nutrition Canada
- Nestlé Health Science

**Mia Kivipelto**, MD, PhD
Speaker’s Bureau
- Nutricia
- MSD
- Janssen
Consultant
- Nutricia
- Alzheon

**Lenore J. Launer**, PhD
None

**Max Lugavere**
None

**Joshua W. Miller**, PhD
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- Emisphere Technologies, Inc.
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- expert witness
- Gnosis, S.P.A.

**Martha Clare Morris**, ScD
None

**Philip Nichols**, DPhil
Employee
- Nestlé Health Science

**Suzana Petanceska**, PhD
None
Helga Refsum*, MD, PhD
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Other Financial Support
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Irwin H. Rosenberg, MD
None

A. David Smith, DPhil, FMedSci
None

Kirsten Tillisch, MD
Research Support
• Danone Research

Katherine L. Tucker, PhD
N/A

AGENDA

DAY 1: THURSDAY, MARCH 26, 2015

8:00 AM Registration & Continental Breakfast

9:00 AM Opening Remarks
Ellis Rubinstein, The New York Academy of Sciences
Amy R. Beaudreault, PhD, The Sackler Institute for Nutrition Science
Natalia Wagemans, PhD, MD, Nestlé Nutrition Institute

SESSION 1: NUTRITIONAL CONSEQUENCES OF THE AGING DEMOGRAPHIC: EPIDEMIOLOGICAL PERSPECTIVES

Session Chair: Lenore J. Launer, PhD, National Institute on Aging

9:20 AM Keynote: Aging and the Nutrition Imperative
Irwin H. Rosenberg, MD, Tufts University

9:55 AM Mitochondrial Component of Alzheimer’s Disease and Its Relation to Nutrition
Gary E. Gibson, PhD, Weill Cornell Medical College, Burke Medical Research Institute

10:25 AM The Microbiome and the Mind
Kirsten Tillisch, MD, David Geffen School of Medicine at UCLA

11:00 AM Coffee Networking Break

11:30 AM Deteriorating Brain Glucose Uptake: Implications for the Risk and Treatment of Alzheimer’s Disease
Stephen Cunnane, PhD, Université de Sherbrooke

12:00 PM New Strategies for Alzheimer’s Prevention
Suzana Petanceska, PhD, National Institute on Aging

12:30 PM Lunch

N/A - not available at time of printing.

An * after the speaker’s name indicates that the speaker intends to discuss unlabeled uses of a commercial product, or an investigational use of a product not yet approved for this purpose. The speaker will disclose this information during his/her presentation.
**SESSION 2: THE ROLE OF NUTRITION IN DEMENTIA PREVENTION**
Session Chair: Jane Durga, PhD, Nestlé Health Science

1:30 PM  **Keynote: How Valid is the Homocysteine Hypothesis of Brain Disease?**
A. David Smith, DPhil, FMedSci, University of Oxford

2:05 PM  **Vitamin B12 and the Brain**
Helga Refsum, MD, PhD, University of Oslo, Norway

2:35 PM  **Vitamin D in Dementia Prevention**
Cédric Annweiler, MD, PhD, Angers University Hospital

3:05 PM  Coffee Networking Break

3:30 PM  **Nutrients and Foods Associated with Cognitive Function**
Katherine L. Tucker, PhD, University of Massachusetts, Lowell

4:00 PM  **Dietary Patterns and Dementia Prevention**
Martha Clare Morris, ScD, Rush University

4:30 PM  **Panel Discussion: Can We Give At-Risk Patients Specific Nutritional Advice Now, Or Do We Need More Trials?**

Panel Moderator:
Joshua W. Miller, PhD, Rutgers, The State University of New Jersey

Panelists:
Stephen Cunnane, PhD, Université de Sherbrooke
Gary E. Gibson, PhD, Weill Cornell Medical College, Burke Medical Research Institute
Suzana Petanceska, PhD, National Institute on Aging
Irwin H. Rosenberg, MD, Tufts University

5:00 PM  Reception

6:30 PM  Adjourn

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**DAY 2: FRIDAY, MARCH 27, 2015**

8:30 AM  Registration & Continental Breakfast

**SESSION 3: THE ROLE OF NUTRITION AND DISTINCT NUTRITIONAL REQUIREMENTS IN THE MANAGEMENT OF DEMENTIA**
Session Chair: Katherine L. Tucker, PhD, University of Massachusetts, Lowell

9:00 AM  **Keynote: Can Diet and Lifestyle Prevent Cognitive Impairment?**
Miia Kivipelto, MD, PhD, Karolinska Institutet

9:40 AM  **Harmful Effects of High-Normal Glucose on the Brain in Dementia Prevention**
Agnes Flöel, MD, Charité - University Medicine Berlin

10:15 AM  **Dietary Intervention to Prevent and Slow Memory Loss due to Alzheimer’s (DIPLOMA): Clinical Evidence and Application in the Alzheimer’s Prevention Clinic, Weill Cornell Medical College/New York-Presbyterian Hospital**
Richard S. Isaacson, MD, Weill Cornell Medical College, New York-Presbyterian Hospital

10:50 AM  Coffee Networking Break

11:20 AM  **Interventions to Improve Food Intake**
Heather H. Keller, PhD, University of Waterloo

11:55 AM  **Patient Perspective: Why 30-Somethings Should Get Serious About Their Brain Health**
Max Lugavere, Independent Documentary Filmmaker

12:05 PM  **Clinical Studies Panel Discussion**

Chair:
Richard S. Isaacson, MD, Weill Cornell Medical College, New York-Presbyterian Hospital
Panelists:
Cédric Annweiler, MD, PhD, Angers University Hospital
Stephen Cunnane, PhD, Université de Sherbrooke
Agnes Flöel, MD, Charité - University Medicine Berlin
Gary E. Gibson, PhD, Weill Cornell Medical College, Burke Medical Research Institute
Heather H. Keller, PhD, University of Waterloo
Miaa Kivipelto, MD, PhD, Karolinska Institutet
Martha Clare Morris, ScD, Rush University
Suzana Petanceska, PhD, National Institute on Aging
Helga Refsum, MD, PhD, University of Oslo, Norway
Irwin H. Rosenberg, MD, Tufts University
A. David Smith, DPhil, FMedSci, University of Oxford
Kirsten Tillisch, MD, David Geffen School of Medicine at UCLA

1:00 PM  Closing Remarks
Philip Nichols, DPhil, Nestlé Health Science

1:05 PM  Lunch

2:00 PM  Conference Adjourn

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in Neurology at Beth Israel Deaconess Medical Center/Harvard Medical School, and medical internship at Mount Sinai Medical Center. Prior to joining UM, he served as Associate Medical Director of the Wien Center for Alzheimer’s Disease and Memory Disorders at Mount Sinai. A graduate of the accelerated 6-year BA/MD program at the University of Missouri - Kansas City School of Medicine, he specializes in AD risk reduction and treatment, MCI due to AD and pre-clinical AD. His research focuses on nutrition and the implementation and longitudinal assessment of dietary interventions for AD management. Dr. Isaacson has a family history of AD and believes in a comprehensive, multi-modal approach toward treatment and prevention. His recent efforts have focused on the development of Alzheimer’s Universe (www.AlzU.org) an online education/behavioral research portal, with results published in the Journal of the Prevention of Alzheimer’s Disease.

**Lenore J. Launer, PhD, National Institute on Aging**

Dr. Launer is a Senior Scientist and Chief of Neuroepidemiology Section in the Intramural Research Program at NIA. She directs a suite of prospective, community-based cohorts, which provide a virtual life-course study of risk factors and early biomarkers for, and consequences of brain aging. Specific research interests include the role of microvascular disease, cerebral changes in physiologic functioning, and cardio-vascular risk factors as they are studied in observational cohorts and incorporated into prevention trials.

**A. David Smith, DPhil, FMedSci, University of Oxford**

Professor Smith is Professor Emeritus of Pharmacology at the University of Oxford. He has spent his entire academic career in the University of Oxford, graduating from Christ Church in Biochemistry in 1963 from where he joined the Department of Pharmacology to carry out research for a DPhil. He was awarded the Gaddum medal of the British Pharmacological Society in 1979. From 1984-2005 he was Chair and Head of Pharmacology and in 1985 the Medical Research Council established a new Unit (Anatomical Neuropharmacology) associated with the Department of Pharmacology with Professor Smith as Honorary Director. In 1988 he co-founded the Oxford Project to Investigate Memory and Aging (OPTIMA). He was Deputy-Head of the newly established Division of Medical Sciences at Oxford from 2000-2005. He has honorary doctorates from the Universities of Szeged and Lund and is a member of the Hungarian and Norwegian Academies of Science. In 2000 he was elected Fellow of the Academy of Medical Sciences, UK. After retiring from his University positions in 2005, he continued his research on Alzheimer’s disease. His main current interests are in identifying modifiable risk factors for dementia and for obesity and in the role of nutrition in brain health.

**Katherine L. Tucker, PhD, University of Massachusetts, Lowell**

Dr. Katherine L. Tucker is Professor of Nutritional Epidemiology in the Department of Clinical Laboratory & Nutritional Sciences at the University of Massachusetts, Lowell. She also holds adjunct appointments at the University of Massachusetts Medical School, the Friedman School of Nutrition Science and Policy and the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University. Dr. Tucker has contributed to more than 250 articles in scientific journals. Her research focuses on dietary intake and risk of chronic disease, including osteoporosis, cognitive decline, obesity, metabolic syndrome, and heart disease, and on dietary methodology. She is the director of an NIH funded Center for Population Health and Health Disparities (CPHHD), which includes the Boston Puerto Rican Health Study, a longitudinal study on the roles and interactions of stress, social support, diet, health behavior and genetic predisposition in relation to health disparities in Puerto Rican adults. She has collaborated for many years with the Framingham Studies, particularly the Framingham Osteoporosis Study, and leads a Vanguard data analysis center with the Jackson Heart Study. She is the Editor-in Chief of *Advances in Nutrition*, the review journal of the American Society for Nutrition (ASN). She is also the editor for *Human Nutrition* in Elsevier’s Reference Module in Biomedical Sciences, and was a co-editor of the recently published 11th edition of the textbook, *Modern Nutrition in Health and Disease*. She currently serves as a member of the Food and Nutrition Board at the Institute of Medicine and on the NIH study section for Kidney disease, Nutrition, Obesity and Diabetes (KNOD). She is a past-chair of the Nutritional Sciences Council at the American Society for Nutrition (ASN) and past-Associate Editor for the *Journal of Nutrition*.

**Jane Durga, PhD, Nestlé Health Science**

Jane Durga holds an MSc from the London School of Hygiene and Tropical Medicine and from the Rotterdam Medical Center and a PhD in nutrition from the Wageningen University in the Netherlands (2005). She carried out her post-doctoral studies in one-carbon me-
tabolism, specifically the effect of folic acid on age-related conditions at the Top Institute for Food and Nutrition in the Netherlands. Jane started her career at Nestlé in 2006, enabling her to roll-up her sleeves and help bring good nutrition to the market place. In 2010 she became Group Leader of the Cognitive Sciences group of the Nestlé Research Center in Lausanne. The group activities range from in vitro studies to controlled trials in children and adults as well as patient populations. In 2013, Jane joined Nestlé Health Science as R&D manager of the Brain Health Platform and is responsible for innovation of products and services.

**Philip Nichols, DPhil, Nestlé Health Science**

Dr. Philip Nichols: Pharmaceutical Physician (BMedSci, MBBS Newcastle 1991), Consultant Neurologist, Fellow of the Royal College of Physicians (FRCP, UK) and a member of the Association of British Neurologists. Postgraduate DPhil (PhD) qualification in Neuroscience (MRC Clinical Research Fellowship, St. John’s College, Oxford University 2001) and Department of Health Clinician Scientist studying the mechanisms underlying chronic Multiple Sclerosis 2002-2007. Senior Lecturer at Newcastle University 2002-2013. From 2005-2010, Dr. Nichols held the position of Chief Medical Officer and Head of Clinical Development at Cambridge Laboratories, a UK & Ireland based entrepreneurial pharmaceutical company specialising in CNS and oncology products and was a member of the value realisation team negotiating the sale of the company’s major pharmaceutical asset (Tetrabenazine, Xenazine / Nitoman) to Biovail in 2009. From 2010-2013 was Director of a UK Department of Health innovation body (HIEC North East) before joining Nestlé Health Science in 2014 as Global Clinical Affairs Manager for Brain Health.

**Amy R. Beaudreault, PhD, The Sackler Institute for Nutrition Science**

Dr. Beaudreault is the Associate Director of The Sackler Institute for Nutrition Science at the New York Academy of Sciences. In this position, she manages day-to-day activities, including facilitating Working Groups, conducting research, providing technical assistance, leading scientific conferences, developing public-private partnerships, and expanding communication. Dr. Beaudreault has 15 years’ experience in strategic communication, qualitative and quantitative research methodologies, and program development, implementation, and evaluation. Prior to joining the Academy, Dr. Beaudreault managed the Ohio State University Extension Agricultural and Safety Health Program and The Great Lakes Center for Agricultural Safety and Health (funded by the U.S. Department of Agriculture and the Centers for Disease Control and Prevention); used her public relations background while working in the research communication department at Nationwide Children’s Hospital in Columbus, OH, with an initiative to translate research to practice in biobehavioral health, perinatal research, and injury research and policy; and directed several U.S. federal contracts in Washington, DC, including contracts with the Department of Education and the Nuclear Regulatory Commission. She holds a BS in Journalism from the E. W. Scripps School of Journalism at Ohio University, and an MS in Agricultural Communication, a PhD in Agricultural Education and Extension, and a graduate certificate in survey research from The Ohio State University. Follow her on Twitter @amybeaud.

**KEYNOTE SPEAKERS**

**Miia Kivipelto, MD, PhD, Karolinska Institutet**

Miia Kivipelto is professor of Clinical Geriatric Epidemiology at Karolinska Institutet, Center for Alzheimer Research, senior geriatrician and head of the Clinical Trials Unit at the Memory Clinic, Karolinska University Hospital, where she is also Director of Research, Development and Education. Her research focuses on prevention, early diagnosis and treatment of cognitive impairment, dementia and Alzheimer’s disease (AD). Through epidemiological studies she has identified midlife vascular and lifestyle risk factors for later dementia/AD and aims to build on these observations to improve knowledge transfer and public awareness and to design intervention trials to mitigate these factors including lifestyle manipulations, such as exercise interventions.

Dr. Kivipelto is principal investigator for the population-based study Cardiovascular Risk Factors, Aging and Dementia (CAIDE) and the Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER), one of the first multi-domain intervention studies in the world aimed at preventing or postponing dementia. She is also principal investigator of the newly launched Multimodal Preventive Trials for Alzheimer’s Disease: Towards Multinational Strategies (MIND-AD) project and co-founded the European Dementia
Prevention Initiative (EDPI). In addition she is involved in two population-based studies in Stockholm (Kungsholmen Project and SNACK) and is responsible for the clinical database (Gedoc) at the Memory Clinic, Karolinska University Hospital.

Miia leads a group of multidisciplinary researchers that includes 3 associate professors/senior researchers, 5 postdocs, 9 doctoral students, and a clinical team. Her group has close connections with the University of Eastern Finland and the National Institute of Health and Welfare in Helsinki and this collaboration has led to the development of the Nordic Brain Network (NBN), which has increased the utilization and exchange of resources and information about aging. She is also involved in many international networks and scientific/steering committees.

As of December 2014, Dr. Kivipelto scientific production has led to 165 articles in peer reviewed journals, seven book chapters and approximately 350 congress abstracts. H-index 36. She has received several awards including: Axa Research Award 2014; Best PI at Ki award 2014; Karolinska Institutet Skandia’s Lennart Levi prize; Junior Chamber International Ten Outstanding Young Persons of the World 2011; Academy of Finland Award for Social Impact 2009; The Association of European Psychiatrists and European Bristol-Myers Squibb Prevention Award in Psychiatry 2007.

Irwin H. Rosenberg, MD, Tufts University
Dr. Irwin Rosenberg is Jean Mayer University Professor of Nutrition and Medicine at Tufts University’s USDA Human Nutrition Research Center on Aging (HNRCA) and the Friedman School of Nutritional Science and Policy. He was born and educated through college in Madison, Wisconsin and received his MD at Harvard Medical School with sub-specialty training in Internal Medicine Gastroenterology and Nutrition at the Massachusetts General Hospital and the Harvard Thordike Memorial laboratory and at the National Institutes of Health (NIH). After serving as chair of Gastroenterology and Nutrition at the University of Chicago, Dr. Rosenberg was appointed Director of the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts and dean of the Friedman School of Nutrition Science and Policy. His research interests include the impact of diet and nutrition on aging brain functions with special reference to the vitamins Folic acid and B12, as well as the regulation of homocysteine metabolism and maintenance of cerebrovascular integrity. Dr. Rosenberg was elected to the Institute of Medicine of the National Academy of Sciences and served as chair of its Food and Nutrition Board. He is the current editor of the Food and Nutrition Bulletin and former editor of the Nutrition Reviews.

A. David Smith, DPhil, FMedSci, University of Oxford
Professor Smith is Professor Emeritus of Pharmacology at the University of Oxford. He has spent his entire academic career in the University of Oxford, graduating from Christ Church in Biochemistry in 1963 from where he joined the Department of Pharmacology to carry out research for a D.Phil. He was awarded the Gaddum medal of the British Pharmacological Society in 1979. From 1984-2005 he was Chair and Head of Pharmacology and in 1985 the Medical Research Council established a new Unit (Anatomical Neuropharmacology) associated with the Department of Pharmacology with Professor Smith as Honorary Director. In 1988 he co-founded the Oxford Project to Investigate Memory and Aging (OPTIMA). He was Deputy-Head of the newly established Division of Medical Sciences at Oxford from 2000-2005. He has honorary doctorates from the Universities of Szeged and Lund and is a member of the Hungarian and Norwegian Academies of Science. In 2000 he was elected Fellow of the Academy of Medical Sciences, UK. After retiring from his University positions in 2005, he continued his research on Alzheimer’s disease. His main current interests are in identifying modifiable risk factors for dementia and for obesity and in the role of nutrition in brain health.

SPEAKERS

Cédric Annweiler, MD, PhD, Angers University Hospital
Dr. Cédric Annweiler completed his doctorate in Internal Medicine and Geriatrics in 2007 at the University Medical School of Saint-Etienne, France. He obtained the same year a Master of Science (Human Motor Function and Disability) at Saint-Etienne University with his work on vitamin D and gait velocity. He entered in 2008 a position of post-graduate junior attending in the Department of Internal Medicine and Geriatrics, University Hospital of Angers, France. Concurrently, he served as a consulting doctor in the University Memory
Stephen Cunnane, PhD, Université de Sherbrooke

Stephen Cunnane obtained a PhD in Physiology at McGill University in 1980, followed by post-doctoral research on nutrition and brain development in Aberdeen, London, and Nova Scotia. He was a faculty member in the Department of Nutritional Sciences, University of Toronto, from 1986-2003, where his research was in two overlapping areas—(i) the role of omega-3 fatty acids in brain development and human health, and (ii) the role of ketones in brain development and human brain evolution. In 2003, Dr. Cunnane was awarded a senior Canada Research Chair at the Research Center on Aging and became a full professor in the departments of Medicine and Physiology & Biophysics at the Université de Sherbrooke. The two main themes of his current research are to—(i) use imaging techniques to study the impact of changing brain fuel metabolism on cognitive function during aging and (ii) to understand how and why omega-3 fatty acid homeostasis changes during aging. He has published over 300 peer-reviewed research papers and was elected to the French National Academy of Medicine in 2009. Dr. Cunnane has published five books including two on flaxseed in human health and two on nutritional and metabolic constraints on human brain evolution — Survival of the Fattest: The Key to Human Brain Evolution (World Scientific 2005), and Human Brain Evolution: Influence of Fresh and Coastal Food Resources (Wiley, 2010).

Gary E. Gibson, PhD, Weill Cornell Medical College, Burke Medical Research Institute

Gary E. Gibson, PhD, is Professor of Neuroscience, Weill Cornell Medical College, the Brain and Mind Research Institute, Burke Medical Research Institute. His peer-reviewed publications include 166 RESEARCH PAPERS; 78 CHAPTERS and has edited a book based on a NY Academy of Sciences meeting. His research has explored the role of mitochondria, metabolism and calcium in brain function and dysfunction. His studies have been directed toward better understanding of Alzheimer’s disease (AD) in order to develop new therapies. His research strategy is to use autopsy brains and living cells from patients with AD to identify novel, clinically relevant abnormalities [e.g., abnormalities calcium, thiamine (vitamin B1) dependent enzymes and mitochondrial enzymes] that will provide a foundation to understand the mechanism of changes in neurons. We then model the abnor-
malities with proteins, cells and animals to understand the underlying mechanisms and to develop new therapeutic approaches. Thiamine dependent enzymes are diminished in tissues from AD patients, and interfering with thiamine dependent enzymes can exacerbate plaque formation, phosphorylation of tau and the calcium changes that occur in cells from AD patients or animal models of AD. Thus, reversing these changes is an attractive therapeutic target. The goal of our research is to understand what causes these changes, their implications for brain disease and to develop strategies to reverse them.

Richard S. Isaacson, MD, Weill Cornell Medical College, New York-Presbyterian Hospital

Richard S. Isaacson, MD, serves as Associate Professor of Neurology (Education) and Director of the Alzheimer’s Prevention Clinic at Weill Cornell Medical College/NewYork-Presbyterian Hospital. He previously served as Associate Professor of Clinical Neurology and Vice Chair of Education in the Department of Neurology at the University of Miami (UM) Miller School of Medicine. He completed his residency in Neurology at Beth Israel Deaconess Medical Center/Harvard Medical School, and medical internship at Mount Sinai Medical Center. Prior to joining UM, he served as Associate Medical Director of the Wien Center for Alzheimer’s Disease and Memory Disorders at Mount Sinai. A graduate of the accelerated 6-year B.A./M.D. program at the University of Missouri - Kansas City School of Medicine, he specializes in AD risk reduction and treatment, MCI due to AD and pre-clinical AD. His research focuses on nutrition and the implementation and longitudinal assessment of dietary interventions for AD management. Dr. Isaacson has a family history of AD and believes in a comprehensive, multi-modal approach toward treatment and prevention. His recent efforts have focused on the development of Alzheimer’s Universe (www.AlzU.org) an online education/behavioral research portal, with results published in the Journal of the Prevention of Alzheimer's Disease.

Heather H. Keller, PhD, University of Waterloo

Heather Keller, RD, PhD, is the Schlegel Research Chair in Nutrition & Aging at the University of Waterloo. Research programs cross the continuum of care and are focused on improving the nutritional status and food intake of older adults. Four areas are emphasized: nutrition care processes (e.g. screening programs), meal quality (e.g. menu planning, food fortification, pureed food), meal access (e.g. family/volunteer eating assistance), and mealtime experience (e.g. Eating Together Study). As Chair of the Canadian Malnutrition Task Force (CMTF), Heather leads an interprofessional team focused on improving the identification and treatment of malnutrition in the acute care setting. Current projects involve knowledge translation focused on improving care processes resulting from findings of the Nutrition Care in Canadian Hospitals study. A nutrition care pathway and support resources (e.g. mealtime audit tool) are currently being content validated. Heather also leads the Making the Most of Mealtimes (M3) research program focused on improving food intake in residents living in long term care. An interprofessional team from across Canada will conduct the most comprehensive prevalence study to identify determinants of food intake amenable to change. This will lay the foundation for M3 intervention research in LTC. As a scientist with the Agri-food for Healthy Aging research group, she has conducted research with Drs. Duizer, Duncan and Stark focused on improving pureed food and fortifying food products for residents in LTC. Nutrition risk screening tools (Canadian Nutrition Screening Tool and SCREENIII) have recently been validated, supporting efficient screening in hospital and community settings. Nutri-eSCREEN, a self-management site for older adults based on SCREENII is in the process of being evaluated. Future planned endeavours include translation of the Life Nourishment Theory resulting from the Eating Together study into education programs for family and formal care partners for persons with dementia.

Max Lugavere, Independent Documentary Filmmaker

Max Lugavere is the director of an upcoming millennial-focused documentary that explores the impact of diet and lifestyle on brain health. He was featured recently on NBC Nightly News and in a widely-circulated Wall Street Journal article titled “Alzheimer’s Prevention for 30-Somethings With No Symptoms.” He created and hosted Acting Disruptive, a web series viewed by millions online, dubbed “two parts big ideas, one part late night talk show” and co-produced with Tribeca Enterprises. He writes on themes of health and technology and has contributed to The Daily Beast, The Huffington Post, Psychology Today, and more. He was a prominent producer and host of Al Gore’s Emmy-nominated Current TV from 2005-2011.
Joshua W. Miller, PhD, Rutgers, The State University of New Jersey
Dr. Miller is Professor and Chair of the Department of Nutritional Sciences in the School of Environmental and Biological Sciences at Rutgers, The State University of New Jersey. His expertise is in B vitamins (folate, vitamin B12, and vitamin B6) and one-carbon metabolism. His primary research interest focuses on the influences of B vitamins and related metabolites on cognitive function and risk of Alzheimer’s disease and dementia in older adults. He also has research interests in novel strategies for assessing vitamin B12 status and absorptive capacity, as well as the effects of B vitamin deficiencies and excesses on in utero and post-natal development and subsequent risk of degenerative diseases including cancer. His work has been funded by the NIH, the American Cancer Society, and the Breast Cancer Research Programs of the State of California and the U.S. Department of Defense.

Martha Clare Morris, ScD, Rush University
Dr. Martha Clare Morris is Professor of Epidemiology, Director of the Section of Nutrition and Nutritional Epidemiology in the Department of Internal Medicine, and Assistant Provost of Community Research at Rush University Medical Center in Chicago. She received her doctoral degree in Epidemiology from the Harvard School of Public Health. She has over 20 years experience studying risk factors in the development of Alzheimer’s disease and other health problems of older persons, and in particular, how nutrition relates to these conditions. Dr. Morris’s research focuses on dietary risk factors for Alzheimer’s disease and cognitive change with aging. She has published findings on the relations of dietary patterns, antioxidant nutrients, minerals, dietary fats, and the B-vitamins to these conditions. She has a long history of NIH and other funding to examine dietary risk factors of Alzheimer’s disease and cognitive decline among 10,000 African American and Caucasian participants of the Chicago Health and Aging Project and among 1,300 participants of the Rush Memory and Aging Project.

Suzana Petanceska, PhD, National Institute on Aging
Dr. Petanceska is a program director at the Division of Neuroscience of the National Institute on Aging (NIA). She leads a number of NIA’s strategic planning and program development activities related to the research goal of the National Plan to Address Alzheimer to prevent and effectively treat Alzheimer’s disease (AD) by 2025. During her tenure at the NIA, Dr. Petanceska has been instrumental for the development of NIA’s Alzheimer’s Disease Translational Research Program and NIA’s Epigenomics of AD program. Her recent program development efforts are focused on the use of systems biology and quantitative systems pharmacology to understand the complex biology of AD, select disease relevant targets and understand in a precise and predictive manner how drugs impact human pathophysiology. Together with Dr. Paul Coleman, Dr. Petanceska serves as the Editor-in-Chief of the new open access journal: Neuroepigenetics. Dr. Petanceska received her PhD in Pharmacology from New York University. Prior to joining the NIA in 2005, she had an independent research career at the Nathan Kline Institute in Orangeburg, New York, and held a faculty position at the Departments of Psychiatry and Pharmacology of New York University Medical Center.

Helga Refsum, MD, PhD, University of Oslo, Norway
Medical school, University of Bergen, Norway, 1987. Professor of Pharmacology, University of Bergen 1994-2006. Professor of Nutrition, University of Oslo, 2004 to date. Visiting Professor of Human Nutrition, University of Oxford, UK, 2005 to date. Throughout her career, Prof. Refsum focused on the relatively narrow field of homocysteine-related amino acids and the associated B vitamins, but ranging from basic research to clinical and epidemiological studies, and in a wide number of diseases, all age groups and many ethnic populations. The research has been translational; several of the research results have been transferred into clinical routine, e.g., homocysteine testing. The research has included extensive national and international collaborations, including EU collaborations and several clinical trials involving B vitamins. Recently, Refsum and her colleagues in Oxford completed a randomized clinical trial that showed that supplementation with B vitamins may be an effective way to slow the accelerated loss of brain tissue of Alzheimer’s disease-targeted regions in elderly people with memory impairment. Prof Refsum is a member of the Norwegian Academy of Science and Letters, and she is among the most highly cited scientists in Norway.

Ellis Rubinstein, President and CEO, The New York Academy of Sciences
Ellis Rubinstein is an innovator and change agent. Leading the 198-year-old New York Academy of Sciences since November 2002, Rubinstein increased membership to 20,000 scientists in 100 coun-
tries and established an extraordinary network of Nobel Laureates, leading academicians, CEOs and heads of corporate research, and government and UN leaders. This Academy expert network has served the President of Russia, the Prime Minister of Malaysia, the Mayors of Mexico City and Barcelona, leaders of UN agencies, and ministers the world over. And it has enabled Rubinstein to develop groundbreaking international public-private partnerships in obesity and diabetes, Alzheimer’s disease, and science education. In formation is an unprecedented social network enabling a devoted cadre of the world’s most promising young scientists and engineers to inspire and mentor a global network of gifted as well as under-served children in science, technology, engineering and math.

Over 3 decades prior to the Academy, Rubinstein worked as a journalist and editor. His efforts garnered 3 National Magazine Awards, the Pulitzer Prizes of the American periodicals industry. As a Senior Editor at Newsweek, he produced the landmark cover story on the origins of modern humans, the first public airing of this research and one of the magazine’s highest-selling issues on the newsstand. As Editor for a decade of the world’s largest circulation scientific journal, Science, he created the largest global network of science journalists, pioneered in web publishing, and organized perhaps the earliest national site license with the government of China. In fact, he was the first western journalist to interview Chinese President Jiang Zemin and later became the first science journalist to interview President Bill Clinton.

Kirsten Tillisch, MD, David Geffen School of Medicine at UCLA
Dr. Kirsten Tillisch is an Associate Professor of Medicine in the Division of Digestive Diseases at the David Geffen School of Medicine at UCLA and the Chief of Integrative Medicine at the Greater Los Angeles VA. Dr. Tillisch’s clinical interests include the promotion of non-pharmacological and integrative therapies for chronic disease and wellness, functional bowel disorders, and chronic pain. Her research interests include brain-gut and microbiome-gut-brain interactions, the effects of non-pharmacological therapies such as probiotics and supplements on chronic disease, and pharmacological treatment of irritable bowel syndrome. She is a member of the Rome IV Committee on Functional Abdominal Pain. She has been an NIH funded researcher since 2006, utilizing neuroimaging techniques to study the physiology of brain gut interactions. She currently studies the central effects of Mindfulness Based Stress Reduction on symptoms of irritable bowel syndrome and post traumatic headache, the interaction between the gastrointestinal microbiota and the brain in health and gastrointestinal disease, and the role of stress in irritable bowel syndrome.

Katherine L. Tucker, PhD, University of Massachusetts, Lowell
Dr. Katherine L. Tucker is Professor of Nutritional Epidemiology in the Department of Clinical Laboratory & Nutritional Sciences at the University of Massachusetts, Lowell. She also holds adjunct appointments at the University of Massachusetts Medical School, the Friedman School of Nutrition Science and Policy and the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University. Dr. Tucker has contributed to more than 250 articles in scientific journals. Her research focuses on dietary intake and risk of chronic disease, including osteoporosis, cognitive decline, obesity, metabolic syndrome, and heart disease, and on dietary methodology. She is the director of an NIH funded Center for Population Health and Health Disparities (CPHHD), which includes the Boston Puerto Rican Health Study, a longitudinal study on the roles and interactions of stress, social support, diet, health behavior and genetic predisposition in relation to health disparities in Puerto Rican adults. She has collaborated for many years with the Framingham Studies, particularly the Framingham Osteoporosis Study, and leads a Vanguard data analysis center with the Jackson Heart Study. She is the Editor-in Chief of Advances in Nutrition, the review journal of the American Society for Nutrition (ASN). She is also the editor for Human Nutrition in Elsevier’s Reference Module in Biomedical Sciences, and was a co-editor of the recently published 11th edition of the textbook, Modern Nutrition in Health and Disease. She currently serves as a member of the Food and Nutrition Board at the Institute of Medicine and on the NIH study section for Kidney disease, Nutrition, Obesity and Diabetes (KNOD). She is a past-chair of the Nutritional Sciences Council at the American Society for Nutrition (ASN) and past-Associate Editor for the Journal of Nutrition.

Natalia Wagemans, PhD, MD, Nestlé Nutrition Institute
Dr. Natalia Wagemans is the Head of the Global Nestlé Nutrition Institute with Head Quarter in Vevey, Switzerland. She joined the Nestlé Nutrition in 2002 working in different areas of infant nutrition business in Russia, CIS, India, Bangladesh and Sri Lanka. In 2011, she joined the Nestlé Nutrition Institute (NNI) in Switzerland and was appointed
Global Head of the NNI in 2014. Her current scientific interests concentrate on the role of nutrition in the prevention and management of NCD, with a special focus on maternal and infant nutrition. Before joining Nestlé, Dr. Wagemans graduated in pediatrics from the State Medical University in Russia in 1991. She continued her training in 1991-1993 and specialized in Neonatology. She has degree of Doctor of Medicine. Her PhD scientific research was in the field of iodine deficiency and cardiovascular system in children.
Deteriorating Brain Glucose Uptake: Implications for the Risk and Treatment of Alzheimer’s Disease

**Stephen Cunnane, PhD, Université de Sherbrooke**

Brain glucose uptake is well-known to be deteriorating in Alzheimer’s disease (AD). We developed the ketone PET tracer, $^{11}$C-acetoacetate, and have reported that in contrast to 15-30% lower glucose uptake in certain brain regions, brain $^{11}$C-acetoacetate uptake is still normal in mild AD compared to cognitively normal, age-matched older persons. Hence, brain energy failure in mild AD appears to be specific to glucose. We observe a similar pattern of brain glucose uptake deficit in young adults with insulin resistance as in mild AD. Normal human brain function is maintained when up to 65% of brain fuel requirements are met by ketones (b-hydroxybutyrate and acetoacetate) instead of glucose, i.e., during prolonged fasting or strenuous exercise. The implications are that—(i) memory loss in AD could potentially be corrected or bypassed using ketones which are the body’s physiological alternative brain fuel to glucose because brain ketone uptake is still intact in mild AD, and (ii) deteriorating brain glucose uptake with age may depend as much on insulin resistance as on aging per se. Medium chain triglycerides (MCT) have cognitive benefits when brain glucose uptake is compromised, i.e., GLUT (glucose transporter) deficiency, type 1 diabetes, or mild-moderate AD. Optimal brain function depends on adequate brain fuel uptake so we suggest that medications for AD, regardless of their target, are likely to be more effective if the glucose deficit in the AD brain is simultaneously bypassed early enough to allow exhausted neurons (and astrocytes?) to receive sufficient fuel so as to function more effectively.

**New Strategies for Alzheimer’s Prevention**

**Suzana Petanceska, PhD, National Institute on Aging**

This presentation will provide an overview of National Institute on Aging’s (NIA) strategic planning and program development activities associated with the National Plan to Address Alzheimer’s with an emphasis on new research directions for AD prevention and implications for research on nutrition.
KEYNOTE LECTURE

How Valid is the Homocysteine Hypothesis of Brain Disease?

A. David Smith, DPhil, FMedSci, University of Oxford

The amino acid homocysteine is a product of intracellular metabolism and is a key intermediate in the formation of methionine, cysteine, H₂S and glutathione. Homocysteine escapes from cells into the blood where it mainly occurs bound through its sulfhydryl group to the cysteine residue of proteins. Epidemiological studies have shown that raised blood concentrations of total homocysteine (i.e., all forms) are associated with several diseases of the brain such as stroke, dementia, depression and white matter disease. Since the concentration of homocysteine is largely determined by the body’s status of three B vitamins (folate, B12 and B6), it is possible to lower the blood levels of homocysteine by administration of B vitamin supplements. Clinical trials in which these B vitamins are administered have been carried out to see if lowering the level of homocysteine can prevent diseases of the brain. The outcomes of these trials will be discussed, with special reference to dementia. I will discuss the validity of the following statement in a recent University of Oxford media release: “Taking B vitamins doesn’t slow mental decline as we age, nor is it likely to prevent Alzheimer’s disease, conclude researchers who have assembled all the best clinical trial data involving 22,000 people to offer a final answer on this debate.” I will show evidence that refutes this conclusion.

Vitamin B12 and the Brain

Helga Refsum, MD, PhD, University of Oslo, Norway

Typical vitamin B12 deficiency is characterized by megaloblastic anemia combined with neuropsychiatric symptoms. In the late 80s, two landmark papers within the B12 field were published: In 1987, Carmel et al introduced the term “atypical cobalamin deficiency” as a mild variant of B12 deficiency without anemia (J Lab Clin Med 1987;109:454-63). The following year, Lindenbaum et al showed that nearly 30% of patients with neuropsychiatric symptoms due to B12 deficiency did not suffer from anemia (N Engl J Med 1988;318:1720-8). These two papers, followed by many others from the same authors, dramatically changed our view on the importance of “subclinical” B12 deficiency for brain function. Since then, numerous observational studies have shown that also low normal vitamin B12 status is associated with neuropsychiatric disorders, including neural tube defects, depression, white matter damage, cognitive impairment and dementia. However, it is only in relation to cognition and dementia that we have substantial evidence from randomized clinical trials. Based on the results of the trials and several meta-analyses, it has been argued that B vitamins have no beneficial effect on development of dementia or cognitive decline. In this talk, I will follow up Dr. David Smith’s presentation on the limitations of meta-analyses and use data from the Vitacog trial and other studies to argue the case that B vitamins, in particular vitamin B12, slow brain atrophy and delay cognitive decline in the subgroup of the population that is likely to benefit, i.e., patients who are at risk of dementia and who also suffer from impaired B vitamin function.

Vitamin D in Dementia Prevention

Cédric Annweiler, MD, PhD¹,²

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Beyond the classically described role of regulation of calcium and bone metabolism, vitamin D exerts an effect on other target tissues, such as cortical and subcortical neurons, which are essential to cognition. Vitamin D has experimentally demonstrated neuroprotective properties (including the regulation of calcium flux, antioxidant and anti-inflammatory effects) and may protect neurons against neurodegenerative mechanisms of Alzheimer’s disease (AD). The vast majority of seniors have hypovitaminosis D. From the brain’s point of view, correction of hypovitaminosis D is justified by numerous cross-sectional and longitudinal studies reporting an association between low levels of vitamin D and poor cognitive performance, specifically executive dysfunction. Similarly, observational studies have shown an association between inadequate dietary intake of vitamin D and cognitive disorders, including an increased risk of developing AD. Although no controlled trial against placebo has examined yet the efficacy of vitamin D supplements to prevent AD, several quasi-experimental studies have found that older adults supplemented with vitamin D improved their cognitive performance after 1-15 months of treatment. It appears particularly important to maintain vitamin D levels high enough to slow or prevent or correct the neurological disorders of AD. In particular, while cognitive decline is slowed down only transiently with
the symptomatic antidementia treatments, future treatment options could be based on drug combinations in order to prevent several neurodegenerative mechanisms at once. As such, vitamin D enhances the efficacy of memantine in terms of neuronal protection and prevention of cognitive decline in AD.

**Nutrients and Foods Associated with Cognitive Function**

**Katherine L. Tucker, PhD, University of Massachusetts, Lowell**

With population aging, cognitive decline and Alzheimer’s disease represent critical health concerns. Accumulating data support an important role for nutrition in the prevention or slowing of cognitive decline. Many studies have shown protective roles for B vitamins, including vitamins B12, B6 and folate, both through their effect on homocysteine concentration, and independently. Recently, vitamin D status, which is currently insufficient in large proportions of the population, also has been shown to be important. In addition, there is evidence for omega-3 fatty acids, which are important for brain cell membranes as well as for protection against inflammation and thrombosis. In all of these cases, there is evidence that effects may depend on genetic predisposition. Although individual nutrients have been most studied, increasing evidence points not only to the major vitamins, minerals and fatty acids, but also to phytonutrients, such as flavonoids, in the diet. This moves the conversation from nutrient supplements to foods as protective against cognitive decline. Recent evidence supports the role of fruit and vegetables, particularly variety in fruit and vegetable intake as protective. Studies have also shown protective effects of cocoa and berry intakes, likely due to their polyphenol content. Nuts have also been shown to be protective due to their content of several protective nutrients. While more research is needed on individual nutrients and foods that protect cognitive function, the realization that multiple measures of diet quality relate to this outcome has moved the field to consider the total dietary pattern, which is the topic of the following presentation.

**Dietary Patterns and Dementia Prevention**

**Martha Clare Morris, ScD, Rush University**

It is useful to examine dietary patterns in relation to disease. This approach takes into account the fact that foods and nutrients are biologically interactive and act in concert rather than as solitary physiological agents. Also, public health recommendations can be better communicated by describing food groups to include or avoid in one’s diet, which is a more meaningful approach given that the nutrient composition of individual foods is less well-known by the lay public. However, the epidemiological studies of dietary patterns have shown inconsistent results. The majority of these studies have examined the Mediterranean diet and most have not found clear protective relations against cognitive decline or dementia. However, the methods of diet scoring in most of these studies make it difficult to interpret the findings. Another dietary pattern that has been examined in several studies is Dietary Approaches to Stop Hypertension (DASH). Secondary analyses of two diet intervention trials found protective benefit of the Mediterranean and the DASH diets on cognitive decline. The DASH and Mediterranean diets have many similar components, such as emphasis on natural plant-based foods and limited consumption of red meats. A newly created diet, called MIND, is a hybrid of the DASH and Mediterranean diets but with specific modifications of foods and servings that reflect the literature on nutrition and the brain. A new study shows that the MIND diet outperforms the DASH and Mediterranean diets for preventing cognitive decline and Alzheimer’s disease.

**KEYNOTE LECTURE**

**Can Diet and Lifestyle Prevent Cognitive Impairment?**

**Milia Kivipelto, MD, PhD, Karolinska Institutet**

Several modifiable risk factors have been associated with increased risk of dementia and Alzheimer disease (AD) in observational studies, including vascular, dietary and lifestyle-related factors. However, randomized controlled trials (RCT) are critically needed to confirm these associations and investigate strategies to maintain cognitive functioning and prevent cognitive impairment. Given the multifactorial etiology of late-life cognitive impairment and dementia/AD, multidomain interventions targeting several risk factors and disease mechanisms simultaneously may be needed for optimal preventive effects. Recently, multidomain lifestyle RCTs simultaneously targeting several modifiable risk factors, including diet, have been started in Europe. Among these studies, the Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER) is one of the first multimodal preventive RCTs worldwide targeting communi-
ty-dwelling older adults (60-77 years) at risk of dementia. In this population-based RCT, 1260 subjects were randomized to a multidomain intervention (diet, exercise, cognitive training, vascular risk monitoring), or a control group (general health advice). The 2-year intervention was associated with improved cognition and reduced the risk of cognitive decline, as well as enhanced diet, with increased intake of nutrients associated with positive health outcomes. Overall, FINGER is the first large, long-term RCT showing that a multidomain intervention may benefit cognition and promote healthier dietary habits. This study can serve as a model for larger RCTs and provide information critically needed to support healthy aging.

Reference

Harmful Effects of High-Normal Glucose on the Brain in Dementia Prevention
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Background: In a series of studies, we aim to elucidate whether higher glycosylated hemoglobin (HbA1c) and glucose levels exert a negative impact on memory performance and hippocampal volume and microstructure in older nondiabetic individuals with cognitive function in the normal range (healthy volunteers, HV;1) or with mild cognitive impairment (MCI).

Methods: We assessed 141 HV (72 women, mean age 63 years) for memory using the Rey Auditory Verbal Learning Test. Peripheral levels of fasting HbA1c and glucose, and 3-tesla MRI scans were acquired to assess hippocampal volume and microstructure, as indicated by gray matter barrier density. Linear regression and simple mediation models were calculated to examine associations among memory, glucose metabolism, and hippocampal parameters.

Results: In HV, lower HbA1c and glucose levels were significantly associated with better scores in delayed recall, learning ability, and memory consolidation (see Fig. 1A-C, from1). In multiple regression models, HbA1c remained strongly associated with memory performance. Moreover, mediation analyses indicated that beneficial effects of lower HbA1c on memory are in part mediated by hippocampal volume and microstructure.

Conclusion: Our results in HV indicate that even in the absence of impaired glucose tolerance, chronically higher blood glucose levels exert a negative influence on cognition, possibly mediated by structural changes in learning-relevant brain areas. Therefore, strategies aimed at lowering glucose levels even in the normal range, including caloric restriction2, caloric restriction mimetics3 or physical activity4, may beneficially influence cognition in older adults, a hypothesis currently examined in interventional trials in patients with MCI.

Dietary Intervention to Prevent and Slow Memory Loss due to Alzheimer’s (DIPLOMA): Clinical Evidence and Application in the Alzheimer’s Prevention Clinic, Weill Cornell Medical College / NewYork-Presbyterian Hospital
Richard S. Isaacson, MD, Weill Cornell Medical College / NewYork-Presbyterian Hospital

The Alzheimer’s Prevention Clinic (APC) at Weill Cornell Medical College/NewYork-Presbyterian Hospital treats patients (aged 25+) with a family history of AD to lower their risk for dementia. Longitudinal, evidence-based clinical care is personalized with respect to risk factors such as genetics, medical conditions, anthropometrics, laboratory markers (lipid, inflammatory, metabolic, and nutritional) and neuropsychological function with assessments every 6 months. Patients are instructed on multi-modal pharmacological and non-pharmacological management strategies, are comprehensively educated via an online patient education and education/behavioral research portal (www.AlzU.org), and use the AD-Nutrition Tracking System, an online database and lifestyle management tool. Patients may participate in the...
Dietary Intervention to Prevent and Slow Memory Loss due to Alzheimer’s (DIPLOMA) study. This prospective cohort study currently follows >150 cognitively normal patients, >30 possible pre-clinical AD patients (based on preliminary clinical diagnosis) with objective cognitive impairment but no or minimal subjective memory loss, and >30 patients with mild cognitive impairment due to AD. We apply emerging principles of pharmacogenomics, nutrigenomics, and clinical precision medicine to tailor individualized therapies. A principal hypothesis underlying our approach is that glucose hypometabolism promotes AD brain pathology, and targeted interventions to address distinctive nutritional and/or metabolic requirements will support mitochondrial efficiency and reduce oxidative damage, thereby contributing to neuroprotection. Our primary goal is to investigate whether pharmacogenomic/nutrigenomic interventions will produce differential, risk-reducing responses in our subpopulations (e.g., APOE/MTHFR status). We recently expanded neuroimaging to include FDG-PET, Amyloid-PET and MRI/MR spectroscopy, and plan a six-month randomized controlled clinical trial based on initial data obtained (early 2016).

**Interventions to Improve Food Intake**

*Heather H. Keller, PhD, University of Waterloo*

Nutrition is integrally linked to brain function, cognition, and dementia. Post the diagnosis of dementia, weight loss predominates; weight loss is a common signal event identified at diagnosis. A variety of hypothesized mechanisms have been suggested to explain why weight loss is more likely to occur in those with dementia. Regardless of the cause, low body weight puts these older adults at increased risk for functional impairment and comorbidity. With the progression of dementia, eating behaviors change, impacting the capacity of the older adult to sustain food intake and body weight. A variety of interventions to support food intake have been trialed, some with greater success than others. Flexibility in mealtime activities, individualization, increasing choice and social interaction appear to be key. Understanding the importance of the psychosocial environment of the meal will improve quality of life of persons with dementia and potentially support continued food intake. The Life Nourishment Theory provides a basis for understanding the importance of a shared meal for older adults with dementia and their family care partners, as well as opportunities for intervening to improve the mealtime experience.
Early childhood is recognized as a critical time for healthy growth and development, building the basis for future attainments of every child. Therefore, scaling up interventions to support adequate nutritional intake and appropriate care practices, and optimizing the synergistic impact of such strategies, is of utmost importance. What is the global state of knowledge and experience on integrating these interventions? What are some opportunities for integration and for overcoming barriers? The papers presented in this Annals volume explore the relevance and effectiveness of an integrated approach from several dimensions, including the theoretical construct, timing and pathways to outcomes, indicators for achievements, and the required delivery mechanisms at the community and institutional levels for implementation and scaling up.

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