Onsite Program & Exhibit Guide

THIRD ANNUAL

ADVANCES & CONTROVERSIES in CLINICAL NUTRITION

December 5-7, 2013

Capital Hilton, 1001 16th St. NW, Washington, DC

Jointly sponsored by the American Society for Nutrition and Tufts University School of Medicine

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American Society for Nutrition
Excellence in Nutrition Research and Practice
www.nutrition.org

Tufts UNIVERSITY | School of Medicine

ASN EST. 1928

American Society for Nutrition

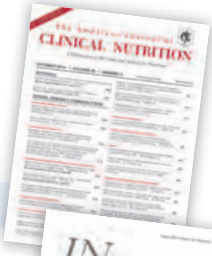
Excellence in Nutrition Research and Practice

TEN WAYS TO ADVANCE YOUR CAREER IN NUTRITION SCIENCE

Established in 1928, the American Society for Nutrition (ASN) is the premier research society dedicated to bringing together the world's top researchers and clinicians to advance our knowledge and application of nutrition science. Members of ASN receive benefits ranging from free access to the top peer-reviewed journals in the nutrition and dietetics category to reduced registration rates for topical meetings and conferences. Take advantage of the following ten ways that ASN can advance your career by becoming a member today!

1 CUTTING-EDGE SCIENTIFIC PROGRAMMING

ASN Scientific Sessions & Annual Meeting at Experimental Biology is an interdisciplinary, scientific meeting, bringing together over 15,000 scientists from throughout the world. The annual *Advances and Controversies in Clinical Nutrition* is designed to communicate significant, cutting-edge advances in nutrition research, and to stimulate discussion on emerging topics that impact human health.



2 TOP RANKED PUBLICATIONS

ASN members receive free online access to *The American Journal of Clinical Nutrition* (AJCN), *The Journal of Nutrition* (JN) and *Advances in Nutrition* (AN).

3 REDUCED REGISTRATION RATES

Members receive reduced conference registration rates to *Experimental Biology* (a $165 savings!), *Advances and Controversies in Clinical Nutrition* ($100 off!) and co-sponsored meetings throughout the year.

4 REDUCED PUBLICATION FEES

Members receive discounted print subscriptions, page charges and waived manuscript submission fees. Additionally, ASN members are eligible to receive our partner publication, *Nutrition Today*, at a 58% discount off of the regular subscription rate.

5 EDUCATIONAL RESOURCES

ASN's online educational portfolio contains podcasts, author videos, recorded webinars, videotaped conference sessions, blog entries and more.

6 MEMBERSHIP IN FASEB

You receive a variety of important additional benefits through ASN's membership in the Federation of American Societies for Experimental Biology (FASEB) alliance such as access to FASEB's Legislative Action Center, subscription discounts for *The FASEB Journal*, online access to the FASEB Member Directory and career development resources.

7 NETWORKING OPPORTUNITIES

All members are eligible to join one of our 15 Research Interest Sections (RIS). The RIS are communities designed to provide a mechanism for topic-specific discussion regarding nutrition research and practice. Additionally, members are encouraged to join one or more of the following Scientific Councils: Medical Nutrition, Global Nutrition, and Nutritional Sciences.

8 NUTRITION RESEARCH SUPPORT

ASN is your voice and is committed to increasing the investment in nutrition research. We make it our mission to provide our members with the information and resources necessary to take a stand for nutrition research.

9 AWARDS AND RECOGNITION

In recognition of our member's professional accomplishments, ASN honors scientists, clinicians and scholars for significant achievements in nutrition research and practice. The program grants over $452,000 in scientific awards, student grants, travel awards and honoraria.

10 GLOBAL CONNECTIONS

ASN is a global organization that enables its members to form relationships with top nutrition researchers throughout the world. ASN is the US Adhering Body to the International Union of Nutritional Science.

www.nutrition.org/join

Contents

Conference & Hotel Information

About the American Society for Nutrition

Established in 1928, the American Society for Nutrition (ASN) is a non-profit, multidisciplinary, scientific and educational organization devoted to advancing nutrition research to improve public health. ASN fosters collaboration among investigators in nutrition, medicine and related fields of science, and encourages the creation, translation and dissemination of nutrition knowledge. ASN publishes *The American Journal of Clinical Nutrition*, *The Journal of Nutrition* and *Advances in Nutrition*.

About Advances and Controversies in Clinical Nutrition

In its third year, ASN's *Advances and Controversies in Clinical Nutrition* aims to cultivate an interest in clinical nutrition among health care professionals. Programming is designed to communicate significant, cutting-edge advances in nutrition research and stimulate discussion on emerging or controversial topics that impact human health.

About the Capital Hilton

Located just two blocks from the White House and three Metro stations, the Capital Hilton hotel is only five miles from Ronald Reagan Washington National Airport (DCA). Set in the heart of the US capital, this downtown Washington, DC hotel serves as a convenient base when sightseeing in this historically rich city. Walk to attractions such as the National Mall, the Washington Monument and memorials.

Program At-a-Glance

Thursday, December 5

11:00 am - 1:00 pm

Satellite Session: Polyphenol-Rich Fruits and Dietary Guidance: A Case Study on the Cranberry

Sponsored and organized by Ocean Spray

1:30 – 3:30 pm

Satellite Session: The Role of Yogurt in Improving the Quality of the American Diet and Meeting Dietary Guidelines

Sponsored and organized by The Dannon Company, Inc.

1:30 – 4:30 pm

Satellite Session: The Controversial Role of Dietary Protein in Diabetes and Related Disorders

Sponsored and organized by the Egg Nutrition Center

5:00 – 7:00 pm

Opening Reception

Friday, December 6

6:30 – 8:00 am

Satellite Session and Breakfast: Preventing Sarcopenia: What is the Key to Improving Protein Metabolism?

Sponsored by DuPont Nutrition & Health

8:15 am – 8:50 am

Opening Session: The Changing Paradigm: A History of Dietary Guidance and Recommendations in the U.S.

Johanna Dwyer, DSc, RD

8:50 – 9:40 am

Fortified Foods, Supplements and All Else Missing from the Dietary Guidelines for Americans

David Heber, MD, PhD

9:40 – 10:10 am

The Key Role of the DRIs in Formulating Dietary Guidelines

Suzanne Murphy, PhD, RD

10:30 – 11:15 am

Whole Grains and Health: Does the Evidence Support Current Guidelines?

Joanne L. Slavin, PhD, RD

11:15 am – 12:00 pm

Saturated Fats, Cholesterol and Cardiovascular Disease

Ronald M. Krauss, MD

1:00 – 1:45 pm

Are Some Foods More Fattening than Others? What Does this Mean and How do we Test It?"

David B. Allison, PhD

1:45 – 2:30 pm

Are Nutrient-Gene Interactions Ready for Prime Time?

Carl L. Keen, PhD

2:30 – 3:15 pm

Is there a Role for the DGAs in Weight Management?

Susan Roberts, PhD

3:30 – 4:15 pm

Is it Ever Too Early to Intervene in Childhood Obesity?

William H. Dietz, MD, PhD

4:15 – 5:00 pm

Bariatric Surgery in Obese Children and Adolescents

Thomas H. Inge, MD, PhD

5:00 – 6:30 pm

Reception with Posters and Exhibitors

Saturday, December 7

6:30 – 8:00 am

Satellite Session and Breakfast: Thirsty for Facts: Setting the Record Straight on Low- and No-Calorie Sweeteners

Sponsored and organized by the American Beverage Association

8:15 – 9:00 am

The Benefits of Breakfast

Heather Leidy, PhD

9:00 – 9:45 am

Beyond Sodium: Total Diet Approaches to Hypertension

Connie M. Weaver, PhD

9:45 – 10:30 am

The Gluten Controversy: Much More than Celiac Disease?

Douglas L. Seidner, MD

10:45 – 11:30 am

New Technologies for Monitoring Food Intake

Dale A. Schoeller, PhD

11:30 am – 12:15 pm

The Gut Microbiome in Health: Fact or Science Fiction?

Federico Rey, PhD

1:30 – 2:45 pm

Concurrent Workshops

Workshop 1: Research on Dietary Patterns: Can it Inform Food-based Guidance?

Joanne M. Spahn, MS, RDN

Mary McGrane, PhD

Workshop 2: Maximizing the Impact of an Inter-professional Approach to Nutrition Conditions

Doug Heimburger, MD

Brian W. Tobin, PhD

Catherine Garner, DrPH, MSN, RN

3:00 – 3:45 pm

Organic Foods: Do They Make a Difference?

Roger Clemens, DrPH

3:45 – 4:30 pm

Translating Nutrition Science to Clinical Practice: What to Tell Your Patients

David Heber, MD, PhD and colleagues

Satellite Symposia

Attendance is free and continuing professional credits (CPE) for dietitians will be offered. The following programs will be conducted at The Capital Hilton.

Polyphenol-Rich Fruits and Dietary Guidance: A Case Study on the Cranberry

Sponsored by Ocean Spray
Thursday, December 5 • 11:00 am – 1:00 pm

Polyphenols are important bioactive plant nutrients contributed by a diet rich in fruits and vegetables. A growing body of evidence supports the numerous health benefits associated with polyphenol-rich foods like cranberries; however, because cranberries are naturally low in sugar and require sweetening to enjoy their great taste, cranberry products are often excluded from dietary intake recommendations or misaligned with nutrient-poor foods and beverages. During this satellite session, leading cranberry health experts will provide the latest clinical and epidemiological evidence that demonstrate the health benefits associated with cranberry consumption and the potential impact on global recommended dietary guidance.

Chair: Sylvia Rowe, President, SR Strategy

Polyphenols: From Evidence-Based Science to Global Dietary Guidance
David Baer, PhD, USDA Beltsville Human Nutrition Research Center

Promoting Health with Nutrient-Rich Diets: The Role of Cranberries in Urinary Tract Health
Kevin C. Maki, PhD, FNLA, Biofortis Clinical Research/ Midwest Center for Metabolic and Cardiovascular Health

Promoting Health with Nutrient-Rich Diets: The Role of Cranberries in Cardiometabolic Health
Janet Novotny, PhD, USDA Beltsville Human Nutrition Research Center

Promoting Health with Nutrient-Rich Diets: The Relationship Between Cranberry Beverage Consumption and Nutrient Intakes, Weight Status and Cardio-Metabolic Outcomes—NHANES Study
Kiyah J. Duffey, PhD, LA Sutherland Consulting, LLC

The Controversial Role of Dietary Protein in Diabetes and Related Disorders

Sponsored by the Egg Nutrition Center
Thursday, December 5 • 1:30 – 4:30 pm

There is solid evidence that diet, particularly in the context of weight loss, prevents the progression of impaired glucose tolerance to diabetes. However, there is a limited understanding of the optimal dietary approach, particularly with respect to macronutrient composition and protein, in particular. Feeding studies have shown that protein-rich meals and diets reduce postprandial glucose and insulin responses; however, it is not clear whether protein imparts a unique benefit aside from displacing carbohydrates and fat. This satellite symposium will review the available evidence on macronutrient composition and specifically, dietary protein, in the prevention and management of diabetes and diabetes-related risk factors.

Chair: Mitch Kanter, PhD, Executive Director, Egg Nutrition Center

Pathophysiology of Type 2 Diabetes Mellitus and Metabolic Implications of Diet
Kevin C. Maki, PhD, FNLA, Biofortis Clinical Research/ Midwest Center for Metabolic and Cardiovascular Health

Relationships between Eating Patterns, Adiposity, and Cardiovascular Risk Factors
Theresa Nicklas, DrPH, Baylor College of Medicine

Macronutrients and Metabolic Health
Barbara Gower, PhD, University of Alabama

Dietary Protein in the Practical Management of Pre-Diabetes and Diabetes Mellitus
Amy Campbell, MS, RD, LDN, CDE, Joslin Diabetes Center

The Role of Yogurt in Improving the Quality of the American Diet and Meeting Dietary Guidelines

Sponsored by The Dannon Company, Inc.

Thursday, December 5 • 1:30 – 3:30 pm

Emerging evidence supports numerous health benefits from yogurt intake, however, yogurt and dairy product consumption in the U.S. is lower than what the USDA recommends and that of many other regions of the world, namely Europe, Latin America and Asia. The goals of this session are to provide an up-to-date summary of evidence for the health benefits of regular yogurt consumption and to provide nutrition professionals with real-world recommendations on how to include yogurt in their client's diet.

Chairs: Simin Meydani, DVM, Tufts University
Sharon Donovan, PhD, RD, University of Illinois

Yogurt's Role in Dietary Guidance
Connie Weaver, PhD, Purdue University

Yogurt, Weight Management and Heart Health: A New Potential Paradigm
Paul Jacques, PhD, Tufts University

Projected Healthcare Savings Associated with Adequate Dairy and Yogurt Consumption
David McCarron, MD, University of California

Preventing Sarcopenia: What is the Key to Improving Protein Metabolism?

Sponsored and organized by DuPont Nutrition and Health

Friday, December 6 • 6:30 - 8:00 am

Sarcopenia is age-related loss of muscle mass. Recent research has been focused on prevention of this condition, exploring the effects of dietary protein (at the appropriate amounts) and exercise. This session will focus the current state of knowledge in this relatively new area, including defining sarcopenia, identifying functional and clinical outcomes, and results of interventions investigating the effects of both exercise and dietary protein interventions. Breakfast will be provided.

Chair: Ratna Mukherjea, PhD, DuPont Nutrition and Health

Elena Volpi, MD, PhD, University of Texas, Medical Branch

*Maren S. Fragala, PhD, CSCS*D, University of Central Florida*

Satellite Symposia

Thirsty for Facts: Setting the Record Straight on Low- and No-Calorie Sweeteners

Sponsored and organized by the American Beverage Association

Saturday, December 7 • 6:30 – 8:00 am

Low-calorie beverages offer consumers options to help them with their lifestyle – whether to maintain weight, help manage diabetes or simple retain sweet taste without adding calories. Despite media coverage suggesting otherwise, the overwhelming body of scientific evidence supports that low- and no-calorie sweeteners can help reduce calories and maintain a healthy weight. This panel discussion will explore the latest science on low- and no-calorie sweeteners and the role they can play in a healthy lifestyle. Breakfast will be provided.

Chair: Eileen Kennedy, DSc, RD, Tufts University

Low- and No-Calorie Sweeteners: Overview of Safety and Regulation

Bernadene Magnuson, PhD, University of Toronto

A Helping Hand: The Role for Low and No-Calorie Beverages in Weight Management

Marilyn Schorin, PhD, RD, Schorin Strategies, LLC

From Research to Practice: Use of Low and No-calorie Sweeteners in Type 2 Diabetes and Pre-diabetes

Hope Warshaw, MMSC, RD, CDE, Hope Warshaw Associates

Planning Committee & Faculty

The American Society for Nutrition extends appreciation to the following planning committee members and faculty who developed this high-quality program.

Planning Committee

Brian W. Tobin, PhD, Co-Chair
Professor and Chair, Biomedical Sciences
University of South Carolina School of Medicine, Greenville

Edward Saltzman, MD, Co-Chair
Associate Professor
Tufts University School of Medicine and Friedman School of Nutrition Science and Policy

Leticia Castillo, MD
Thomas Fariss Marsh Jr. Chair in Pediatrics
University of Texas Southwestern Medical Center

Roger Clemens, DrPH
Adjunct Professor of Pharmacology and Pharmaceutical Sciences
University of Southern California School of Pharmacy

David Heber, MD, PhD
Professor, UCLA Department of Medicine
Founding Chief of the Division of Clinical Nutrition
David Geffen School of Medicine, UCLA

Penny Kris-Etherton, PhD, RD
Distinguished Professor of Nutrition
Pennsylvania State University College of Health and Human Development

Mary Ann Johnson, PhD
Bill and June Flatt Professor in Foods and Nutrition
University of Georgia

Casey Wall, RN, MSN, PNP-BC
Tufts University School of Medicine

Xiang-Dong Wang, MD, PhD
Senior Scientist, Director, and Professor
Nutrition and Cancer Biology Laboratory
Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University

William Wong, PhD
Professor of Pediatrics
Baylor College of Medicine

Faculty

David B. Allison, PhD
Distinguished Professor, Associate Dean for Science
Director, Office of Energetics
Director, Nutrition Obesity Research Center
University of Alabama at Birmingham

Roger Clemens, DrPH
Adjunct Professor of Pharmacology and Pharmaceutical Sciences
University of Southern California School of Pharmacy

William H. Dietz, MD, PhD
Former Director, Division of Nutrition and Physical Activity
Centers for Disease Control and Prevention

Johanna Dwyer, DSc, RD
Office of Dietary Supplements, National Institutes of Health

Catherine Garner, DrPH, MSN, RN
University of South Carolina School of Medicine, Greenville

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Founding Chief of the Division of Clinical Nutrition
David Geffen School of Medicine, UCLA

Doug Heimburger, MD
Professor of Medicine
Vanderbilt University Medical Center

Thomas H. Inge, MD, PhD
Surgical Director, Surgical Weight Loss Program for Teens
Director, Center for Bariatric Research and Innovation
Cincinnati Children's Hospital

Carl L. Keen, PhD
Professor in Nutrition and Internal Medicine Chair
Department of Nutrition, University of California Davis

Ronald M. Krauss, MD
Senior Scientist and Director, Atherosclerosis Research
Children's Hospital Oakland Research Institute

Heather Leidy, PhD
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University of Missouri

Mary McGrane, PhD
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USDA Center for Nutrition Policy and Promotion

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University of Hawaii at Manoa

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University of Wisconsin Madison

Susan Roberts, PhD
Director, Energy Metabolism Laboratory
Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University

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University of Wisconsin Madison

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Vanderbilt University

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University of Minnesota

Joanne M. Spahn, MS, RDN
Director, Evidence Analysis Library
USDA Center for Nutrition Policy and Promotion

Brian W. Tobin, MD
Professor and Chair, Biomedical Sciences
University of South Carolina School of Medicine, Greenville

Connie M. Weaver, PhD
Distinguished Professor and Department Head
Department of Nutrition Science
Purdue University

Continuing Education

Target Audience

The primary target audiences for this conference are health care professionals who:

- Detect, diagnose and manage patients with chronic diseases, including cardiovascular disease and diabetes, and their associated risk factors.
- Manage the medical treatment of overweight and obese patients.
- Direct treatment to prevent diseases such as cancer, cardiovascular disease and diabetes.

Learning Objectives

At the conclusion of this activity, participants will be able to:

1. Critically appraise current nutrition controversies and advances and identify opportunities for integrating evidence-based research findings into clinical practice.
2. Describe the role of diet and other lifestyle contributors in the development of cardiovascular disease, hypertension and other chronic diseases.
3. Discuss advances in the treatment of obesity and methods to improve clinical practice and patient care.
4. Describe multidisciplinary, inter-professional strategies to treat nutrition-related diseases and complications.

Accreditation Statement

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of Tufts University School of Medicine (TUSM) and the American Society for Nutrition. TUSM is accredited by the ACCME to provide continuing medical education for physicians. This activity has been approved for *AMA PRA Category 1 Credit.*™

Tufts University School of Medicine Office of Continuing Education is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's COA. This activity provides Contact Hours for nurses.

Continuing Education Contact Hours (CHES/MCHES) Designation Statement

Advances and Controversies in Clinical Nutrition conference has been approved for a total of 14 Category 1 continuing education contact hours for CHES/MCHES in health education by the National Commission for Health Education Credentialing. *Advanced-level continuing education contact hours are not available.*

CPE Credit Designation Statement

ASN (Provider #NS010) is accredited and approved by the Commission on Dietetic Registration (CDR) as a provider of Continuing Professional Education (CPE) programs for Registered Dietitians.

CPE Accredited Provider

Commission on Dietetic Registration

the credentialing agency for the American Dietetic Association

ASN designates this educational activity for a maximum of 15 CPEUs. Dietitians and dietetic technicians, registered should only claim credit commensurate with the extent of their participation in the activity.

Learning Level 2

Suggested Learning Codes

(2000) Science of food and nutrition; (2020) Composition of foods, nutrient analysis (2040) Food science, genetically modified food; (2050) Genetics; (2070) Macronutrients: carbohydrate, fat, protein, fiber, water; (2100) Nutritional biochemistry; (3080) Physical: blood pressure, pulse, bowel sounds; (4000) Wellness and public health; (4030) Dietary guidelines, DRIs, Choose My Plate, food labeling; (4040) Disease prevention; (5110) Allergies, sensitivities; (5160) Cardiovascular disease; (5220) Gastrointestinal disorders; (5260) Hypertension; (5370) Weight management, obesity; (6020) Counseling, therapy, and facilitation skills; (7200) Team building

Faculty/Speaker Disclosure Statement and Disclosure for Discussions of Off-Label/ Investigational Use of Pharmaceutical Products

In accordance with ACCME Standards for Commercial Support of Continuing Medical Education and the Tuft University School of Medicine's disclosure policy for CME activities, all individuals who contribute to the

content or the identification/resolution of potential conflicts of interest must disclose any relationship they may have with any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients. Such disclosure is intended to provide participants with sufficient information to evaluate whether any given presentation has been influence by the faculty's relationships(s) or financial interest with said companies.

The circumstances that create a conflict of interest are when an individual has an opportunity to affect CME content about products or services of a commercial interest with which he/she has a financial relationship. The purpose for identifying and addressing potential conflicts of interest is to ensure a proper balance, independence, objectivity and scientific rigor of the medical school's educational activities. The medical school does not view the existence of a financial relationship as necessarily implying bias or decreasing the value of participation in CME activities, but must ensure that a financial interest is not a conflict of interest.

Course Directors and Planning Committee Members Disclosure Information

Leticia Castillo, MD: Nothing to disclose.

Roger Clemens, DrPH: Serves on scientific advisory committees for McDonald's Corporation, PepsiCo./Quaker Oats, Almond Board of California and the California Walnut Commission; employed by the E.T. Horn Company.

David Heber, MD, PhD: Nothing to disclose.

Mary Ann Johnson, PhD: Nothing to disclose.

Nancy F. Krebs, MD: Nothing do disclose.

Penny Kris-Etherton, PhD, RD, FAHA: Has received research grant support from the following Almond Board of California, the Dairy Research Institute, Haas Avocado, The Hershey Company, and The Peanut Institute; serves on scientific advisory boards of the following: the California Walnut Commission, McDonald's Global Advisory Council, and Unilever.

Edward Saltzman, MD: Nothing to disclose.

Brian W. Tobin, MD: Nothing to disclose.

Xiang-Dong Wang, MD, PhD: Nothing to disclose.

William Wong, PhD: Nothing to disclose.

Speakers, Moderators and Panelists Disclosure Information

David B. Allison, PhD: The University of Alabama Birmingham has received grants from PepsiCo, Inc. and Jason Pharmaceuticals (Medifast). Dr. Allison has other financial relationships with Jason Pharmaceuticals, The Sugar Association, PepsiCo/Quaker Snacks, World Sugar Research Organization, Red Bull NA, The Kellogg Company, M&M/MARS, Campbell Soup Company and Dr. Pepper Snapple Group.

Roger Clemens, DrPH: Serves on scientific advisory committees for McDonald's Corporation, PepsiCo./Quaker Oats, Almond Board of California and the California Walnut Commission; employed by the E.T. Horn Company.

William H. Dietz, MD, PhD: Nothing relevant to disclose.

Johanna Dwyer, DSc, RD: Serves on the following scientific advisory boards: Conagra Foods, McCormick Spice, May State Milling, Gerber/Nestle Fits project, and DuPont Nutrition.

Catherine Garner, DrPH, MSN, RN: Nothing to disclose.

David Heber, MD, PhD: Nothing to disclose.

Doug Heimburger, MD: Serves on the Board of Directors for the Dannon Institute.

Thomas H. Inge, MD, PhD: Receives grant support from Ethicon Endo Surgery.

Carl L. Keen, PhD: Nothing to disclose.

Ronald M. Krauss, MD: Receives grant support from the Dairy Research Institute and the Almond Board of California; serves as a consultant to the Dairy Research Institute.

Heather Leidy, PhD: Receives grant support from The Beef Checkoff, DuPont Nutrition and Health and the Egg Nutrition Center; serves on a speakers' bureau for the National Cattlemen's Beef Association and the National Dairy Council; and serves as a consultant to Hillshire Brand Foods.

Mary McGrane, PhD: Nothing to disclose.

Suzanne Murphy, PhD, RD: Nothing to disclose.

Federico Rey, PhD: Nothing to disclose.

Susan Roberts, PhD: Nothing to disclose.

Dale A. Schoeller, PhD: Nothing to disclose.

Douglas L. Seidner, MD: Serves as a consultant to B. Braun, NPS Pharmaceuticals and Walgreens Infusion.

Joanne L. Slavin, PhD, RD: Serves on scientific advisory committees for Atkins, Dow Agrisciences and The Kellogg Company.

Joanne M. Spahn, MS, RDN: Nothing to disclose.

Brian W. Tobin, MD: Nothing to disclose.

Connie M. Weaver, PhD: Receives grant support from Nestle, Dairy Research, Tate and Lyle, and the Alliance for Potato Research and Education; serves on scientific advisory committees for Pharmavite and Hillshire Brand Foods; serves as a consultant to Fonterra and the Alliance for Potato Research and Education.

This activity is being sponsored by Tufts University School of Medicine and the American Society for Nutrition. The medical school has no significant relationship with the commercial companies whose products are services are being discussed in this educational activity.

Room Locations
All General Sessions:
Presidential Ballroom
Exhibits, Posters and Reception:
Congressional Room and Foyer

Registration/Continuing Education Desk Hours

Thursday, December 5	9:30 am – 6:00 pm
Friday, December 6	7:00 am – 6:00 pm
Saturday, December 7	7:00 am – 4:30 pm

Poster Presenter Check-in*

Thursday, December 5	9:30 am – 6:00 pm
Friday, December 6	7:00 – 9:00 am

*All posters must be displayed by 9:30 am on Friday, December 6.

Exhibit & Poster Viewing Hours

Friday, December 6	10:00 – 11:00 am
	12:00 – 1:30 pm
	5:30 – 7:00 pm

Thursday, December 5

11:00 am - 1:00 pm

Satellite Session: Polyphenol-Rich Fruits and Dietary Guidance: A Case Study on the Cranberry
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Johanna Dwyer, DSc, RD, Office of Dietary Supplements, National Institutes of Health

8:50 – 9:40 am

Fortified Foods, Supplements and All Else Missing from the Dietary Guidelines for Americans
David Heber, MD, PhD, Professor, UCLA Department of Medicine, founding Chief of the Division of Clinical Nutrition, at the David Geffen School of Medicine, UCLA, and UCLA School of Public Health

9:40 – 10:10 am

The Key Role of the DRIs in Formulating Dietary Guidelines
Suzanne Murphy, PhD, RD, Professor Emeritus, Cancer Research Center of Hawaii, University of Hawaii at Manoa

10:15 – 10:30 am

Break

10:30 – 11:15 am

Whole Grains and Health: Does the Evidence Support Current Guidelines?
Joanne L. Slavin, PhD, RD, Professor, Department of Food Science and Nutrition, University of Minnesota

11:15 am – 12:00 pm

Saturated Fats, Cholesterol and Cardiovascular Disease
Ronald M. Krauss, MD, Senior Scientist and Director, Atherosclerosis Research, Children's Hospital Oakland Research Institute

12:00 – 1:00 pm

Poster & Exhibit Viewing

Lunch On Your Own

1:00 – 1:45 pm

Are Some Foods More Fattening than Others? What Does this Mean and How do we Test It?
David B. Allison, PhD, Distinguished Professor, Associate Dean for Science, Director, Office of Energetics, Director, Nutrition Obesity Research Center, University of Alabama at Birmingham

1:45 – 2:30 pm

Are Nutrient-Gene Interactions Ready for Prime Time?

Carl L. Keen, PhD, Professor in Nutrition and Internal Medicine Chair, Department of Nutrition, University of California Davis

2:30 – 3:15 pm

Is there a Role for the DGAs in Weight Management?

Susan Roberts, PhD, Director, Energy Metabolism Laboratory, Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University

3:15 – 3:30 pm

Break

3:30 – 4:15 pm

Is it Ever Too Early to Intervene in Childhood Obesity?

William H. Dietz, MD, PhD, Former Director, Division of Nutrition and Physical Activity, Centers for Disease Control and Prevention

4:15 – 5:00 pm

Bariatric Surgery in Obese Children and Adolescents

Thomas H. Inge, MD, PhD, Surgical Director, Surgical Weight Loss Program for Teens, Director, Center for Bariatric Research and Innovation, Cincinnati Children's Hospital

5:00 – 7:00 pm

Reception with Posters and Exhibitors

Saturday, December 7

6:30 – 8:00 am

Satellite Session and Breakfast: Thirsty for Facts: Setting the Record Straight on Low- and No-Calorie Sweeteners

Sponsored and organized by the American Beverage Association

8:15 – 9:00 am

The Benefits of Breakfast

Heather Leidy, PhD, Assistant Professor, Nutrition & Exercise Physiology, University of Missouri

9:00 – 9:45 am

Beyond Sodium: Total Diet Approaches to Hypertension

Connie M. Weaver, PhD, Distinguished Professor and Department Head, Department of Nutrition Science, Purdue University

9:45 – 10:30 am

The Gluten Controversy: Much More than Celiac Disease?

Douglas L. Seidner, MD, Director of the Center for Human Nutrition, Associate Professor of Medicine, Vanderbilt University

10:30 –10:45 am

Break

10:45 – 11:30 am

New Technologies for Monitoring Food Intake

Dale A. Schoeller, PhD, Professor of Nutritional Sciences at University of Wisconsin Madison

11:30 am – 12:15 pm

The Gut Microbiome in Health: Fact or Science Fiction?

Federico Rey, PhD, Assistant Professor of Bacteriology, University of Wisconsin Madison

12:15 – 1:30 pm

Lunch On Your Own

1:30 – 2:45 pm

Concurrent Workshops
Workshop 1: Research on Dietary Patterns: Can It Inform Food-based Guidance?

Joanne M. Spahn, MS, RDN, USDA Center for Nutrition Policy and Promotion

Mary McGrane, PhD, USDA Center for Nutrition Policy and Promotion

Workshop 2: Maximizing the Impact of an Inter-professional Approach to Nutrition Conditions

Doug Heimburger, MD, Professor of Medicine, Vanderbilt University Medical Center

Brian W. Tobin, PhD, Professor and Chair, Biomedical Sciences, University of South Carolina School of Medicine, Greenville

Catherine Garner, DrPH, MSN, RN, University of South Carolina School of Medicine, Greenville

3:00 – 3:45 pm

Organic Foods: Do They Make a Difference?

Roger Clemens, DrPH, Adjunct Professor of Pharmacology and Pharmaceutical Sciences within the USC School of Pharmacy

3:45 – 4:30 pm

Translating Nutrition Science to Clinical Practice: What to Tell Your Patients

David Heber, MD, PhD, Professor, UCLA Department of Medicine, founding Chief of the Division of Clinical Nutrition, David Geffen School of Medicine, UCLA

1. Interaction of Health Insurance Status and Weight-Related Medical Conditions in 58,317 Morbidly Obese Patients with Chronic Excess Caloric Intake (Category: Clinical and Community Nutrition)

Presenting Author: David L. Abraham, Department of Family Medicine, Inspira Health Network, Vineland, NJ
Additional Authors: Gus J Slotman, Department of Surgery, Inspira Health Network, Vineland, NJ

The premier nutritional derangement in the United States today is morbid obesity. Medical problems caused by extreme obesity are known. However, variation in obesity co-morbidities according to the type of health insurance has not been investigated. The purpose of this study was to identify differences in the distribution of obesity-related medical/metabolic illnesses by insurance status. Pre-operative data on 58,317 patients from the Surgical Review Corporation's BOLD database who were about to undergo adjustable gastric banding was examined in four groups: Medicaid (n=1,089), Medicare (n=6,455), Private insurance (n=47,114), and Self-Pay (n=3,659). Analysis of variance tested continuous variables. Dichotomous parameter distribution was assessed by the Chi-squared equation.

	Medicaid	Medicare	Private Insurance	Self-Pay	p value
Age	40+-11	58+-11	44+-11	44+-12	<0.0001
Weight (kg)	127+-25	128+-25	125+-23	125+-27	<0.01
BMI	47+-8	46+-8	45+-7	44+-8	<0.0001
Sex (F/M %)	89/11	73/27	79/21	79/21	<0.0001
Diabetes (DM)	28.19%	49.98%	26.36%	20.5%	<0.0001
Hypertension (HTN)	49.86%	76.16%	53.27%	44.3%	<0.0001
CHF	2.02%	6.34%	0.99%	0.49%	<0.0001
Ischemic Heart Disease (IHD)	3.49%	12.21%	3.19%	2.02%	<0.0001
Hyperlipidemia (HPL)	32.78%	57.15%	37.83%	33.81%	<0.0001
Angina	3.31%	5.02%	1.84%	1.53%	<0.0001
GERD	47.2%	49.6%	42.05%	38.51%	<0.0001
Liver Disease	5.05%	5.07%	4.59%	2.57%	<0.0001
Cholelithiasis	21.4%	26.06%	16.38%	13.53%	<0.0001
Asthma	22.41%	21.24%	14.4%	12.03%	<0.0001
Obstructive Sleep Apnea (OSA)	41.05%	52.25%	38.11%	29.93%	<0.0001
Back Pain	54.36%	58.05%	44.33%	39.66%	<0.0001
Gout	8.26%	6.86%	2.78%	1.69%	<0.0001
Irregular Menses	19.65%	27.65%	20.03%	15.85%	<0.001
Depression	40.22%	41.41%	30.06%	31.24%	<0.0001
Unemployed	34.62%	73.63%	8.46%	8.66%	<0.0001

Obesity calorie/protein derangements affect Medicare patients most adversely. Medicare BMI equals others, but nearly all Medicare metabolic, cardiopulmonary, GI, hepatobiliary, musculoskeletal, and psychological sequelae of obesity are the worst. Increased Medicare obesity years may contribute. Unemployment may be a consequence. Medicaid patients are youngest, but have obesity problems similar to Private and Self-Pay, plus high unemployment. Self-Pay has lowest weight and co-morbidities.

2. The ability of isolated anthocyanins and anthocyanin-rich tomatoes to reduce the risk of cardiovascular disease (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Sebastian Achterfeldt, Institute of Food Research, Norwich, UK
Additional Authors: Cathie Martin, Metabolic Biology, John Innes Centre, Norwich Research Park; and
Paul A Kroon, Food and Health Programme, Institute of Food Research, Norwich Research Park.

Anthocyanins (ACN) are a class of flavonoids that are present in many fruits and vegetables including strawberries, blueberries, blackcurrants and aubergines, and are responsible for their red to dark purple colours. Epidemiological studies have shown an inverse relationship between consumption of ACN and risk of diseases, particularly cardiovascular diseases (CVD). Supplementation of animal diets with ACN-rich foods and extracts has been shown to reduce the secretion of inflammatory cytokines like IL-6, reduce atherosclerosis, improve vascular function and alter gene expression. However, there is a lack of data from studies investigating the CVD protective effects of ACN per se, it is not known which ACN are most effective, and the underlying molecular mechanisms specific to ACN are not clear. The overall aim of this project is to investigate the potential for dietary ACN to induce beneficial changes in CVD risk.

Using a cultured cell model of endothelial inflammation (Human Umbilical Vein Endothelial Cells (HUVEC) stimulated with lipopolysaccharides (LPS)). In parallel, an animal feeding study using genetically modified 'purple tomatoes' that express high levels of ACN and equivalent ACN-free red tomatoes was carried out which will allow us to directly assess the ability of dietary ACN to affect CVD risk. In this study we used different concentrations of purple tomatoes (of 2.5, 5 and 10%) in the chow and compare the effect of these diets with the effects of a red tomato supplemented chow. This novel, highly controlled dietary intervention in the ApoE-/- mouse model will assess the effects of ACN-rich diets on atherosclerosis, IL 6 secretion and gene expression. The in vitro studies showed that both anthocyanins (cyanidin-3-Glc and delphinidin-3-Glc) and their aglycone forms at 20 μM were able to reduce IL 6 secretion by up to 20% compared to controls (all $p<0.01$), and this effect was independent of the length of pre-incubation with ACN and length of subsequent LPS treatment. The dietary intervention study in ApoE-/- mice is finished and tissues were collected for further analysis. The measurements of body weight gain and pellet consumption already show no significant differences between the different intervention groups. The analysis of aortic plaque size has started and preliminary data would be presented at the Advances and Controversies in Clinical Nutrition Conference in Washington, DC.

Future research will focus on the potential for ACN breakdown products to reduce IL 6 secretion, and on elucidating the underlying molecular mechanisms. Additonally, the analysis of the aortic plaque size in the used mice will be finished and genetic profiling of aortic and hepatic tissue will be undertaken to further investigate affected pathways.

Funding: This research was undertaken as part of the ATHENA project which is funded by the European Commission (Grant No. 245121) under FP7 and also by the Biotechnology and Biological Sciences Research Council (UK).

3. Effect of Processing on the Composition of Nutrient, Anti-Nutrient and Biologcal Value of Atlantic Horse Mackerel (Trachurus trachurus) (Category: Energy and Nutrient Metabolism)

Presenting Author: Olaoluwa Adeyemi, Babcock University, Ilishan Remo, Ogun State, Nigeria
Additional Authors: O. Osilesi, O. O. Adebawo and F.D. Onajobi, Department of Biochemistry, Bencarson School of Medicine, Babcock University, Ilishan Remo, Ogun state, Nigeria; and A. J. Afolayan, Botany Department, University of Fort Hare, Alice 5700, South Africa.

Trachurus trachurus (locally called kote in Nigeria) is a table fish. Its processing such as poaching, smoking and high temperature may interfere with nutrients and are potential sources of reactive di-carbonyl compounds (RDCs) and polyaromatic hydrocarbons (PAHs) that can lower its biological value. This study was therefore conducted to determine the effect of poaching, charcoal and wood smoking on the composition of protein, amino acids (lysine, methionine, threonine, isoleucine, leucine, phenylalanine and valine), fatty acids (ω3 and ω6), minerals (calcium, sodium, chloride, phosphorus, potassium and magnesium), vitamins A and E, RDCs, PAHs, shelf life, sensory quality and biological value of kote fillet; skin, head and bones (SHB), using standard methods. The general objective of this study was to evaluate the effect of cooking methods (poaching and smoking via charcoal and wood) on the nutritional composition (proximate contents, essential fatty acid , vitamins A & E, mineral and essential amino acids); some anti-nutritional contents (RDC and PAH); shelf life studies; voluntary feed intake, weight gains, digestibility and biological value of processed Trachurus trachurus. Five isocaloric / isonitrogenous diets were compounded involving soybean - groundnut cake (positive control); 0% protein (negative control); poached, charcoal and wood smoked kote fillet and SHB respectively (test diets). 40 weaned male wistar rats were randomly divided into 8 groups. Each group of 5 rats was fed on any of the 5 treatments for two weeks. Voluntary feed intake, weight gains and digestibility were recorded. At the end of experiment the rats were sacrificed. Individual blood samples were analyzed for full blood count, serum electrolytes, cholesterol, triglycerides, urea, creatinine and total proteins. Activities of alanine transaminase (ALT), aspatate transaminase (AST), and alkaline phosphatase (ALP) were run in harvested samples of liver, kidney, heart, stomach, small intestine and spleen. Lactate dehydrogenase (LDH) and creatinine kinase (CK) in the heart and kidney, in addition to cholesterol and glucose levels of the brain. All data were subjected to analysis of variance and considered significant at $p < 0.05$ with Duncan's multiple range test. All processing methods increased ($p<0.05$); protein, fat, essential amino acids, ω3 and ω6 fatty acids, vitamins A and E as well as RDCs and PAHs in fillet and SHB. Levels of macro minerals in the fillet and SHB were reduced ($p<0.05$) compared to the raw samples. Also coal smoked fillet and SHB were least preserved compared with the wood smoked samples. Fecal nitrogen was markedly low for rats reared with test diet, while digestibility was highest in rats on coal smoked kote diet compared to the control groups. The levels of red blood count and hemoglobin of rats fed with test diets were lower ($p<0.05$) than those in positive control. Variations observed in the values of serum electrolyte, proteins, creatinine, and urea were not significant ($p>0.05$). Levels of ALT, LDH and CK in the kidney, stomach and small intestine were significantly elevated ($p<0.05$) compared to the controls. Activities of AST and ALP were reduced ($p<0.05$) in rats fed with experimental diets compared to the controls. In conclusion, coal smoking process greatly improved the nutrient content and quality of kote fillet and SHB, followed by wood smoke and poaching. The best shelf life was obtained in wood at the expense of high level of anti-nutrients. Thus, processed kote SHB could be a veritable source of valuable nutrients for human food and animal feeds.

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4. Effects of Caloric Restriction on Pro-inflammatory Cytokines in Estrogen-depleted Rats (Category: Energy and Nutrient Metabolism)

Presenting Author: Hyejin Ahn, Department of Medical Nutrition, Graduate School of East-West Medical Science, Kyung Hee University
Additional Authors: Ryowon Choue1), 2)
1)Department of Medical Nutrition, Graduate School of East-West Medical Science, Kyung Hee University, 2)Research Institute of Medical Nutrition, Kyung Hee University

Increases of pro-inflammatory cytokines in estrogen deficient status are associated with accumulation of adipose tissues. Many studies emphasized that the hyperphagia in ovariectomized rats increases body fats. The purpose of the study was to investigate the effects of caloric restriction on the pro-inflammatory cytokines in estrogen-depleted rats. Seven–week–old female Sprague-Dawley rats were divided into the Sham or ovariectomized groups. Then the rats were randomized into groups fed ad libitum (Sham-AD or OVX-AD) or calorie restricted diet (Sham-CR or OVX-CR). For 8 weeks, the OVX-AD group was pair-fed with the Sham-AD group, and the CR groups were fed a diet with 50% fewer calories than their counterparts. Body fats of OVX groups were higher and uterus weights of OVX groups were lower than those of Sham groups ($p<0.05$). Serum levels of estrogen and FSH in OVX groups were lower and higher than those of Sham groups, respectively ($p<0.05$). Serum levels of pro-inflammatory cytokines (IL-1α and IL-6) in OVX-CR group were significantly lower than OVX-AD group ($p<0.05$). Serum levels of RANKL and RANKL/OPG ratio in OVX-CR group were lower than those of OVX-AD group ($p<0.05$). As a conclusion, the calorie restriction produced positive effects on the serum levels of pro-inflammatory cytokines in estrogen-depleted rats.

5. Assessment of Infant Feeding Practices and Factors Affecting Mothers' Ability to feed exclusively Among HIV Infected women Attending PMTCT Clinics in North Gondar Zone, North West Ethiopia (Category: Clinical and Community Nutrition)

Presenting Author: Azeb Atenafu, University of Gondar

To assess infant feeding practices and factors affecting mothers' ability to feed exclusively among HIV infected mothers who were attending PMTCT clinics in North Gondar Zone. A cross-sectional quantitative survey supplemented with qualitative method was conducted from May to June 2009 in 14 PMTCT clinics in North Gondar Zone. Simple random sampling technique was used to select study subjects. A total of 395 HIV infected mothers who had infants up to 12 months were included in the study. Fourteen

counselors collected data using structured questionnaire based interview. In-depth interview was conducted with 10 HIV infected mothers in the PMTCT Program by the principal investigator after the proper consent and ethical clearance. 395 subjects were studied aged 15-49 making the response rate of 98%. About 77.5% of women were breast feeding. Exclusive breast feeding was practiced by only 44.7% of mothers. Mother occupation, income size, counseling on infant feeding, partner or family support, disclosure of HIV status were significantly associated with exclusive feeding.

Prevalence of exclusive breast feeding is very low among HIV infected women in this area. Exclusive breast feeding in the first 4-6 months is feasible for most women and can be achieved by providing strong and consistent counseling messages.

Funding: I am very grateful to forward my appreciation to Amhara Regional HAPCO for sponsoring my research work. I would also like to thank data collectors for taking their precious time to collect the data.

6. **Assessing prevalence of food insecurity and factors associated among agricultural credit user households in Wogera woreda Northwest Ethiopia 2013 (Category: Clinical and Community Nutrition)**
Presenting Author: Abreham Atenafu, University of Gondar
Additional Authors: Dr Gashaw Andargie, Mr. Digesu Negese and Mrs. Azeb Atenafu, University of Gondar

1.To assess prevalence of food insecurity 2. To identify factors associated among agricultural credit user households in Wogera woreda Northwest Ethiopia 2013. Community based cross-sectional study was used on a sample size of 499 agricultural credit user households in Wogera woreda. Multi stage sampling technique was used to select the study households. Standardized HFIAS and pre tested questionnaires were used to collect important variables. Both bivaraite and multivariate analyses were carried out to identify factors associated with household food insecurity and to control confounding.

The total sample size was 499 and 494(99%) of response rate. Out of 400(81%) of households (CI:0.78,0.84) were food insecure, among these the percentage of mildly, moderately and severely food insecure were 11(2.2%), 146 (29.6%) and 243 (49.2%), respectively.50 & above ages of household head (AOR= 6.06:95% CI= 2.66,13.82), 6 & more family size (AOR=6.12,95% CI:2.11,11.77), 0.5 & less farm size (AOR = 3.40,95% CI:1.04,11.17), types of animals owned (AOR=3.37,95%CI:1.76,6.44), access to agricultural inputs nearby (AOR=2.77, 95%CI:1.46,5.24) and product market (AOR=3.65,95%CI:1.88,7.10) and weather road access (AOR=7.12,95%CI:3.09,16.40) were found to be strong association with food insecurity at a household level. The study revealed that food insecurity at a household level is high among agricultural credit users. Increase community's awareness about family planning service and making improvement on public expenditure on farm investment and building basic infrastructures are necessary conditions to improve the effectiveness of agricultural credit in turn food insecurity at a household level in the study community.

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7. **Review of the Literature for an Efficacious Stragety to Help the Projected Minority-Majority Earn Good Health (Category: Clinical and Community Nutrition)**
Presenting Author: Deborah Calhoun-Parker, Wayne State University

There is a shortfall in the literature of health studies that address and ameliorate underserved and underrepresented populations unique health challenges in general and the African American population in particular (McCarthy, Yancey & Harrison, 2007). The purpose of this study was to find efficacious interventions, employing primarily an African American population, implementing health information into a healthy lifestyle. A Medline search using keywords: African American, adult, health, intervention, life style, and health promotion, produced 367 articles and abstracts. From the total number of articles and abstracts, ten percent (N=36) resulted in efficacious interventions that helped individuals to apply the knowledge and maintain the healthy lifestyle transformation. The selection from the database results met three criteria. First, the article's participants were predominantly African Americans. Second, the article had an intervention component (e.g. counseling, education, exercise). Lastly, the focus of the article was on diet/nutrition improvement, and/or physical fitness improvement, and/or cardiovascular overall health improvement and maintenance. The results from the literature suggest an individually tailored, culturally sensitive, educational intervention, which emphasizes health disparities and its impact on the person, is the most efficacious for a predominately African American population. Tied to the intervention is the concept of a component that includes goal setting for the individual (H. deVries et al., 2008). Therefore, to assist African Americans apply health knowledge and maintain a healthy lifestyle transformation; the intervention should be individually tailored, culturally sensitive, educational, and have a goal-setting component .

8. **Low-Income Children Feel Safer Walking/Biking to School?: Physical Activity-Related Perceptions Differ by Income Status in 5th Graders Participating in 5th Gear Kids (Category: Clinical and Community Nutrition)**
Presenting Author: Michelle Cardel, University of Colorado Denver
Additional Authors: Thrudur Gunnarsdottir, Jimikaye Beck, John C. Peters, James O. Hill, University of Colorado Denver

We examined baseline health-related behaviors and perceptions by income status in children participating in 5th Gear Kids, a multi-level childhood obesity prevention program. Participants included a diverse group of 5th Graders (41.44% Non-Hispanic White, 27.85% Hispanic, 16.77% African American, and 13.94% other race/ethnicity) from two school districts in Colorado (n= 6679; mean age 10.07). Anthropometrics were measured and health-related behaviors and perceptions were assessed with a validated questionnaire

(n=3023). Free/reduced lunch (FRL) prevalence in each school was used to group schools into income levels (HIGH_INCOME <33% FRL; MED_INCOME 33-66% FRL; and LOW_INCOME >66% FRL). Overweight and obesity were significantly more prevalent in LOW_INCOME when compared to HIGH_INCOME (35.8% vs. 13.0%). Over 90% of the total sample reported eating healthy was important to them. Though more LOW_INCOME children reported they were more likely to pick the healthiest food option when it was made available to them, they consumed significantly more fast food and sugar-sweetened beverages relative to HIGH_INCOME. Significantly more HIGH_INCOME children reported that physical activity (PA) was important to them and reported increased PA relative to LOW_INCOME children. Nevertheless, HIGH_INCOME children walked/biked to school significantly less than LOW_INCOME and were significantly more likely to perceive walking/biking to school as dangerous. The importance of healthy eating did not differ between income groups; however, LOW_INCOME children reported a higher prevalence of many dietary behaviors typically associated with obesity. Physical activity was rated higher in importance in the HIGH_INCOME children, concurrent with significantly higher physical activity levels relative to LOW_INCOME children. Interestingly, LOW_INCOME children were more likely to bike/walk to school and were less likely to perceive walking/biking to school as dangerous. Differing perceptions related to physical activity across the socioeconomic gradient will be researched further in our longitudinal intervention.

Funding: Colorado Health Foundation

9. Dietary analysis in special populations: phenylketonuria as a model (Category: Clinical and Community Nutrition)

Presenting Author: Kathryn Coakley, Emory University
Additional Authors: Meaghan Reardon, Dietetic Intern, Emory University Hospital, Atlanta, GA;
Teresa D Douglas and Rani H Singh, Division of Medical Genetics, Department of Human Genetics, School of Medicine, Emory University, Atlanta, GA.

Nutrition Data System for Research (NDSR), Metabolic Pro (MP), Food Processor (FP), and Nutritionist Pro (NP) are widely-available programs used to analyze dietary intake. Accurate dietary assessment is particularly important to ensure quality research investigations and in special populations managed through diet like Phenylketonuria (PKU). This study compared nutrient intake between these four programs, assessed correlations between nutrients and health outcomes, and evaluated overall utility of programs in individuals with PKU. 26 females [15 on phenylalanine (phe)-lowering drugs] ages 12-51 provided three-day food records and blood to measure plasma amino acids. Registered Dietitians analyzed records using NDSR, MP, FP, and NP. Missing foods were entered in MP, FP, and NP based on USDA Nutrient Database and requested for NDSR. Intakes were compared between programs using Kruskal-Wallis or ANOVA based on normality. Pearson's or Spearman's correlation coefficients were used to assess associations between nutrients and metabolic control (plasma phe, tyrosine, phe:tyr).
Energy, protein, carbohydrate, and fat intake did not differ between programs. Phe and tyrosine intake were significantly lower in NP than others ($p<0.001$). Phe intake was lower in FP by 147mg/day than MP and 145mg/day than NDSR (not statistically significant, but clinically relevant). FP reported lower polyunsaturated and monounsaturated fat than NDSR and NP, and lower vitamin D, E and K than all ($p<0.05$). MP's phe:tyr intake correlated with plasma phe (0.42; $p=0.03$) and phe:tyr (0.46; $p=0.01$). FP's phe intake correlated with plasma phe:tyr (0.39;$p=0.04$). NDSR's phe:tyr intake correlated with plasma phe (0.43; $p=0.03$) and phe:tyr (0.38;$p=0.056$). NP did not correlate with metabolic control.

NDSR, MP and FP report similar nutrient intakes. FP may overestimate phe and underestimate fat and fat-soluble vitamins. NP underestimates most nutrients and does not correlate with metabolic control. There may be limitations with FP and NP, but NDSR and MP are excellent for clinical and research dietary analysis in patients with PKU. When choosing a program for dietary assessment, consider limitations, source of nutrient data, availability of nutrients reported, and accuracy of capturing diet based on population.

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10. Baseline characteristics and impact of lifestyle factors on vitamin B6 dependent tryptophan metabolism (Category: Clinical and Community Nutrition)

Presenting Author: Oana Deac, Trinity College Dublin
Additional Authors: James Mills, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, USA; Per Ueland, University of Bergen, Norway; Øivind Midttun, University of Bergen, Norway; and Barry Shane, University of California.

Tryptophan is metabolized through the kynurenine pathway in a vitamin B6 dependent manner. Abnormalities of tryptophan metabolism through the kynurenine pathway have been reported in clinical conditions. The effect of vitamin B6 status on tryptophan and kynurenine metabolites in healthy individuals is not well understood. We examined the effect of vitamin B6 status measured by serum pyridoxal phosphate (PLP) on tryptophan and kynurenine metabolites, together with the effect of lifestyle factors in a cohort of healthy young adults (n= 2507, age 18-28 years). Participants provided blood samples and anthropometric and lifestyle data (via questionnaire). Tryptophan metabolites and vitamin B6 markers were measured using LC-MS/MS methodology. Statistical analysis was performed using SPSS software (Version 20.0; Chersey UK). Written consent was obtained from all participants. Samples were made anonymous prior to analysis. With the exception of 3-hydroxykynurenine (3HKYN), all metabolites presented non-linear positive relationships with PLP status, plateauing at PLP levels around 80 nmol/L. Supplement users had lower levels of 3HKYN, while contraceptive users presented a highly significant decrease in PLP levels. Smoking and alcohol intake influenced several intermediates of tryptophan catabolism. Smoking reduced PLP levels but not pyridoxic acid (PA) or pyridoxal (PL). Alcohol intake was associated with significant increases in PLP, PL and PA. Our study is one of the largest to explore

the effects of lifestyle habits on B6 dependent intermediates of tryptophan catabolism. We found that external exposures can significantly influence this metabolic pathway in young healthy individuals. The long term impact of these exposures warrants investigation. These data will provide a useful background for future research into determining the significance of changes in kynurenine pathway metabolites in health and disease.

Funding: This work was supported by the intramural research program, NICHD, NIH.

11. Vitamin D Status and Periodontal Outcomes After Non-Surgical Periodontal Therapy (Category: Disease Prevention, Progression and Treatment)

Presenting Author: David Dodington, Brock University
Additional Authors: Peter Fritz, Dr. Peter C. Fritz Reconstructive Periodontics and Implant Surgery Clinic
Wendy Ward, Brock University

Epidemiological evidence supports a role for vitamin D in periodontal health. However, the relationship between vitamin D status and periodontal outcomes following non-surgical periodontal therapy (NSPT), which involves deep scaling and root planing, has yet to be investigated. The objective of this study was to determine if higher vitamin D status (≥ 75 nmol/L) results in better periodontal health after NSPT.

Patients undergoing NSPT at a periodontal clinic in Southern Ontario were recruited for the study. 12 males and 19 females between the ages of 35 and 85 years participated. At baseline, serum 25-hydroxyvitamin D was measured using the Liaison chemifluorescence system. Patients were divided into two groups: vitamin D sufficient (n=11) and vitamin D insufficient (n=20) where sufficiency was defined as serum 25-hydroxyvitamin D ≥ 75 nmol/L. Probing depth (% of sites ≥ 4 mm) was measured as a marker of periodontal health. Patients subsequently underwent NSPT consisting of deep scaling and root planing. Probing depth was reassessed at the 8-week follow-up. Groups were compared by ANOVA and ANCOVA. At baseline, patients who were vitamin D sufficient had a lower percent of sites with probing depth of ≥ 4 mm compared to patients who were vitamin D insufficient (47.4 ± 26.1 % vs. 63.0 ± 21.5 %, $p < 0.05$). Differences remained significant after controlling for age, gender, BMI and diabetes (known risk factors for periodontal disease). At the 8-week follow-up, patients who were vitamin D sufficient had a lower percent of sites with probing depth of ≥ 4 mm compared to patients who were vitamin D insufficient after controlling for age, gender, BMI and diabetes (5.0 ± 5.1 % vs. 9.1 ± 5.8 %, $p < 0.05$). Vitamin D sufficiency was associated with a lower percent of sites with probing depth of ≥ 4 mm at baseline and 8 weeks after periodontal therapy. Patients who were vitamin D sufficient, therefore, had better periodontal health at baseline, which aided in recovery from NSPT. It is possible that this effect was due to a reduction in periodontal tissue inflammation by vitamin D.

12. Protective Effect of Olive Oil , Almond Oil and Flaxseed Oil Against Carbon Tetrachloride - Induced Hepatotoxicity in Rat Models (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Eman Fadlalla, Ain Shams University
Additional Authors: Fadl Alla and Eman Aly Sadeek, Department of Biochemistry & Nutrition Women's College –Ain –Shams University and Taif Univresity; Abd Elal, Zinab Saleh and Aymen Aly,
National Research Center – Cairo and Taif Univresity

The present study aimed to assess the protective effect of olive , almond and flaxseed oil against carbon tetrachloride-induced hepatotoxicity in rat models. Forty male albino (Sprague Dawley) rats were divided into 5 groups; group 1 served as a control, groups (3,4 and 5) were given an oral dose of 3ml/Kg/day olive oil , almond oil and flaxseed oil, respectively for 30 days. On day 29, a single i.p. dose of 2ml/ Kg B.W. CCl4 was administered to groups (2,3,4 and 5). After 24 h, the animals were sacrificed and blood samples were collected. The results indicated that CCL4 injection was associated with significant increases in the activities of AST, ALT, ALP ($P<0.05$) compared with the respective mean control values. Also, all parameters of lipid profile , (i.e., serum total cholesterol , triacylglycerol, LDL-cholesterol, total bilirubin, MDA showed significant increases ($P<0.05$). On the other hand, serum total protein, HDL – cholesterol , the activity of serum catalase and erythrocyte SOD were lower than the respective mean values of the normal control. Pretreatment with olive oil , almond oil and flaxseed oil significantly ($P<0.05$) restored the enzyme activities of the liver AST, ALT, ALP to normal level. The mean values of lipid profile , the MDA and serum total bilirubin were also significantly reduced ($P< 0.05$). Also a significant increase ($P< 0.05$) in serum total protein , HDL-cholesterol and the activity of serum catalase and erythrocyte SOD was obtained as compared with the respective mean values for group 2. Pretreatment with olive, almond and flaxseed oil counteract CCl4- induced hepatotoxicity and oxidative stress in rats.

Funding: Ain Shams University

13. Hypolipidemic and renal protective effect of seeds mixture rich in omega-3 and omega-6 fatty acids in rats (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Eman Fadlalla, Ain Shams University
Additional Authors: Eman aly andGala Shahr Mosy, Department of Biochemistry & Nutrition Women's College –Ain –Shams University, Ewiss , Nahla Ahmed, College of Home Economics, Helwan University ; and Seddik, Aymen Aly, Department of Internal Medicine.

Assessing the In vivo Hypolipidemic and renal protective activities of seeds mixture rich in omega-3 and omega-6 fatty acids in rats. 64 male albino rats were divided into 8 groups: control group, hypercholesterolemic rats, fed the balanced diet supplemented with cholesterol at a dose level of 2 g/100 g diet; the other 6 groups of animals fed the same previous hypercholesterolemic diet supplemented with either mixture of Flax / pumpkin (FP) , Flax/Sesame (FS) , Flax/Peanut (FA) , purslane / pumpkin (PP) , purslane / Sesame (PS) and purslane /Peanut (P A) to ascertain the claim of its utilisation against diseases. The seeds mixture rich in unsaturated fatty acids were prepared at ratio of (5/1) (ω-3 and ω-6) and were orally administered ad libitum to rats diet for 30 days. High

cholesterol fed diet rats (2%) showed a significant increase in total cholesterol, total lipids, and triacylglycerol in both serum and liver. Serum phospholipids, LDL-C, and atherogenic index also significantly increased compared to control group. On the other hand , High cholesterol fed diet rats showed a significant decrease in high-density lipoproteins (HDL) . Cholesterol-enriched diet also significantly increased serum urea, creatinine, sodium and potassium levels compared to healthy control. Consumption of seeds mixture rich in omega-3 and omega-6 fatty acids by hypercholesterolemic rats resulted in a significantly decrement in lipid parameters and improvement in renal function as compared with hypercholesterolemic rats. Seeds mixtures had anti-atherogenic hypolipidemic effect which were probably mediated by unsaturated fatty acids present in seed mixture.

Funding: Ain Shams University

14. **Diet and erythrocyte membrane content of omega-3 fatty acids is associated with circulating inflammatory markers in health adults (Category: Disease Prevention, Progression and Treatment)**

Presenting Author: Michael Flock, Penn State University
Additional Authors: Ann Skulas-Ray, Jennifer Fleming and Penny Kris-Etherton, Penn State University; and William Harris, Health Diagnostics Laboratory.

Marine-derived omega-3 fatty acids, namely eicosapentaenoic acid (EPA) and docosahexanoic acid (DHA), have potential anti-inflammatory effects. However, interventions with EPA+DHA have inconsistently affected circulating inflammatory markers. The primary objective of this study was to determine the effects of supplemental EPA+DHA on inflammatory marker concentrations in healthy adults, and secondly, to evaluate the associations between red blood cell (RBC) fatty acid content and inflammatory markers. A randomized, placebo-controlled, double blind, parallel study was conducted in healthy men and women. One of five doses (0, 300, 600, 900, 1,800 mg) of EPA+DHA was given daily as fish oil supplements for approximately 5 months. RBC fatty acids and serum concentrations of tumor necrosis factor-alpha (TNF-α), interlukin-6 (IL-6), and C-reactive protein (CRP) were measured before after supplementation. A marginally significant treatment effect on TNF-α concentrations was observed ($p < 0.07$), although there were no differences between groups after adjusting for multiple between treatment comparisons. The high dose (1,800 mg/d) significantly reduced TNF-α from baseline ($p = 0.007$). EPA+DHA supplementation did not affect IL-6 or CRP concentrations. Baseline inflammatory marker concentrations were correlated with body weight, sex, blood pressure, and RBC fatty acid content. Baseline TNF-α concentrations were inversely correlated with RBC content of EPA ($p = 0.04$) and DHA ($p < 0.001$), whereas CRP was inversely correlated with docosapentaenoic acid (DPA) ($p = 0.002$). Taken together, our data suggest that increased intake of marine-derived omega-3 fatty acids is associated with lower levels of certain inflammatory markers in healthy adults.

Funding: USDA

15. **Correlation between selected nutritional parameters as measures of nutritional status in Adults People Living with HIV in South- West Nigeria (Category: Clinical and Community Nutrition)**

Presenting Author: Oluyemisi Folasire, Department of Human Nutrition, University of Ibadan, Nigeria, West Africa.
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Nutritional status assessment in people living with HIVAIDS (PLWHIV), in resource -constrained settings of developing countries remains a challenge. This is because of limitations in available equipment and skilled human personnels. Proper nutritional status assessment demands that combination of methods be used. Tools like Subjective global assessment (SGA) and Malnutrition Universal Screening Tool (MUST) combine anthropometric, dietary and clinical parameters, rather than the conventional practice involving weight and/or CD4 count monitoring, as currently used in some developing countries. But there has been conflicting evidence on their use in developing settings. The study's objective was to assessed the correlation between the SGA, MUST and weight, BMI, percentage body fat and CD4 count in a group of HIV positive in south west Nigeria. A descriptive cross sectional survey was done among 150 HIV sero-positive patients with their consent. Nutritional status of the respondents was assessed using the SGA and MUST tools, anthropometric measurement taken include weight, Body Mass Index (BMI), percent body fat using Deurenberg's formula, as well as immunologic markers measure: CD4 count. Correlation between nutritional parameters was tested at 0.05% level of significance.

A total of 150 PLWHA participated, with female: male 2:1. Mean age was 38.1± 9.0 years. Median weight 64.5 (range 36.0-106.0)kg. Mean BMI 24.50±3.9kg/m2. Mean SGA score was 6.0±3.4, mean MUST score 3.0 ±1.4, % body fat 26.5 ±7.4. Mean CD4 count 377± 194cells/mm3. There was significant correlation between the SGA scores and MUST scores r=-.641 p=0.000, SGA score and weight r=-.360 p=0.000, SGA score and BMI r= -.315, p=0.001, SGA score and SGA and CD4 count r= -.188, p=0.043.

There was also significant correlation between MUST scores and SGA scores, r= .641, p-0.000, MUST scores and weight r= -.442, p=0.000, MUST scores and BMI r=-.391, p=0.000, MUST score and CD4 count r= -.214, p=0.021. Percentage body Fat correlated significantly with weight r=.369 p=0.000, with BMI r= .662, p=0.000, and CD4 count r=.236, p=0.011. There is positive correlation between the SGA and MUST scores, the percentage body fat and weight, BMI and CD4 count. The SGA and MUST correlated negatively with weight, BMI and CD4 count. The use of these handy tools in busy clinics in resource constrained settings will help in early identification of poor nutritional state in PLWHIV.

Funding: NIL

16. **Implementation and Adaptation of a Hypertension Care Management Session Pathway in an Inner City Primary Care Practice (Category: Clinical and Community Nutrition)**
Presenting Author: Whitney K. Franz, Johns Hopkins HealthCare, LLC
Additional Authors: Emily L. Brown, Kara M. Taylor, Kathryn A. Carson, Mekam T. Okoye, Arlene T. Dalcin, Katherine B. Dietz, Jill A. Marsteller, and Lisa A. Cooper, Johns Hopkins HealthCare LLC, Johns Hopkins University School of Medicine, Johns Hopkins Bloomberg School of Public Health

To provide a case study of real world implementation and adaptation of a care management (CM) session pathway in an inter-professional approach to improve guideline concordance and reduce disparities in hypertension (HTN) care in an inner city primary care practice. The CM program is one of three multi-level interventions being delivered through a staged quality improvement (QI) intervention, Project ReDCHiP (Reducing Disparities and Controlling Hypertension in Primary Care). CM services were available to patients with a diagnosis of HTN and most recent blood pressure (BP) ≥140/≥90 mmHg. Patients were identified by care managers (Registered Dietitians (RDs) and Pharmacists (PharmDs)) using the electronic medical record (EMR) and from clinic medical staff referrals with a goal of seeing 50% of eligible patients. The proposed CM session pathway was that patients receive three behavioral lifestyle counseling sessions with a care manager trained in motivational interviewing (MI) totaling 120 minutes. At each session, the care manager recorded measured BP and weight as well as discussion topics (medication adherence, DASH diet, weight loss and exercise), noted as primary or secondary educational content based on the time devoted to each, and if applicable, health disparity-related barriers.

Outreach revealed that some patients identified from EMR and referrals were ineligible. Of the estimated 897 patients deemed eligible by care managers and medical staff, 174 (19.4%) were seen for at least one session. At the first session, the mean systolic BP of patients was 136 (range 104-195) mmHg and mean diastolic BP was 79 (range 48-120) mmHg. Numerous outreach efforts were used to enroll and engage patients in the CM program. Of the 174 patients seen for session one, 61 patients (35%) completed 3-4 sessions with an RD and/or PharmD (mean total contact per patient=149 min; 90% totaled ≥120 min). The primary educational content covered during each contact varied by session and was tailored to meet patients' needs. Health disparity-related barriers were identified among 79% of all patients; the three most identified categories of health disparity-related barriers were behavioral, economic and medical. As a QI intervention based in MI, there was flexibility in the implementation process, such as session length and educational content. By using MI, patients steered discussion, identified personal barriers to making positive health behavior changes, and collaboratively developed an individualized care plan resulting in variability in the delivered CM session pathway. The outreach process was resource intensive and resulted in limited reach. Given the demands and challenges of primary care in an inner city clinic, integrating care managers into the health care team allows for enhanced patient-centered care and improved ability to address the complex needs of the clinic's patient population; however, more innovative outreach strategies are needed to enhance engagement.

Funding: NHLBI, P50HL105187

17. **Elevated glucagon following habitual consumption of a reduced carbohydrate may reduce perceived hunger in women with PCOS (Category: Energy and Nutrient Metabolism)**
Presenting Author: Amy M. Goss, University of Alabama at Birmingham
Additional Authors: Paula C Chandler-Laney and Barbara A. Gower, University of Alabama at Birmingham

Studies have shown a reduced CHO diet increases circulating glucagon and evidence suggests that glucagon has profound appetite-satiating effects. Whether a diet reduced in CHO promotes satiety through this mechanism in women with PCOS has not been studied. The objective of this study was to 1) compare the effects of habitual consumption of a reduced-carbohydrate (CHO) vs standard (STD) diet on glucagon and other hormones with documented effects on hunger in a postabsorptive state and in response to a solid meal challenge, and 2) identify the hormonal determinants of hunger following an overnight fast in women with PCOS. In a crossover diet intervention, 30 women with PCOS consumed a reduced-CHO diet (41:19:40 % energy from CHO:protein:fat, resp.) for 8 weeks and a standard (STD) diet (55:18:27) for 8 weeks. All food was provided for both diet phases. After 4 weeks of acclimation to the diets, participants underwent a meal test during which circulating glucose, insulin, glucagon, ghrelin, GLP-1, PYY, and cortisol were measured before and after consumption of breakfast from their assigned diets. Self-reported hunger and satiety were measured using a visual analogue scale following a 12-hr fast. A significant diet effect was observed for fasting glucagon and glucagon area-under-the-curve (AUC). During the reduced-CHO diet arm, glucagon was significantly greater following a 12-hr fast and following consumption of the reduced CHO breakfast meal compared to the STD breakfast meal. Fasting and AUC ghrelin, GLP-1, PYY, cortisol, glucose, and insulin were not significantly different between the diet arms after 4 weeks. Hunger rating from the visual analogue scale was inversely associated with fasting glucagon and cortisol. However, a threshold effect occurred for the relationship between glucagon and hunger, such that in women with glucagon >90 mg/dL there was no detectable relationship with perceived hunger. Among women with PCOS, a reduced CHO/higher fat diet may reduce hunger by elevating circulating glucagon. Further studies are needed to determine the precise mechanisms through which glucagon may affect perceived hunger and whether elevated glucagon from a reduced CHO/higher fat diet impacts ad libitum food intake.

Funding: R01HD054960

18. **Snacking in the U.S. population: What We Eat In America, NHANES 2009-2010 (Category: Policy and Nutrition)**
Presenting Author: M. Katherine Hoy, Food Surveys Research Group, U.S. Department of Agriculture, ARS, Beltsville Human Nutrition Research Center
Additional Authors: Theophile Murayi, John Clemens, Donna

Rhodes and Alanna Moshfegh, Food Surveys Research Group, ARS, Beltsville Human Nutrition Research Center

Snacking has become an integral part of the eating habits of Americans. The purpose of this research is to describe energy and nutrient intakes from foods reported as snacks, what foods contribute to nutrient intake, and when foods are consumed. The study sample included nationally representative data from individuals 2+ years (n=9042) participating in What We Eat In America (WWEIA), NHANES 2009-2010. Dietary intake data were obtained from an in-person 24-hour recall using the interviewer-administered 5-step USDA Automated Multiple-Pass Method. Data were analyzed to determine number and timing of snack occasions, and foods consumed. Snack occasions were reported as distinct eating occasions and consisted of one or more food and beverage items, including water. Survey respondents selected the name of all eating occasions from a fixed list and all reports of "snack", "drink" or "extended consumption" were included as snack occasions. WWEIA Food Categories were used to identify foods and beverages consumed at snack occasions. Snacks contributed 24% to total daily population energy intake, and about one-quarter of that came from beverages, including milk. Foods and beverages consumed as snacks provided 14(0.2)% protein, 28(0.4)% carbohydrate, 21(0.4)% fat and 21(0.3)% fiber. They also contributed 25(0.4)% to calcium and 21(0.3)% to potassium intakes, and accounted for 14(0.2)% of sodium intake. On a given day, 96% of Americans reported consuming at least one snack per day; 48% reported 2 or 3 snacks. Of all foods and beverages reported as snacks, water was the most common item mentioned and was the only item reported in approximately 22% of snack occasions. After water, the top five categories reported were fruits, sweetened beverages, coffee and tea, sweet bakery products, and candy. After 8 pm, 58(1.0)% of individuals report snack occasions and the top five categories reported, excluding water were sweet bakery products, other desserts, milk and milk drinks, savory snacks, and candy. Snacking contributes substantially to dietary intake of the U.S. population. Analysis of foods consumed provides important knowledge about what foods contribute to nutrient intake and about trends in eating behavior of the population. This can inform dietary guidance, nutrition education, and policy.

Funding: USDA

19. Diet high in refined carbohydrates can promote comparable severity of hepatic tumorigenesis in mice as high fat diet (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Blanche C. IP, JM-USDA HNRCA at Tufts University; Friedman School of Nutrition Science and Policy, Tufts University
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Liver cancer incidence is rapidly increasing in the US, and is paralleled to the rising prevalence of non-alcoholic fatty liver disease (NAFLD). NAFLD is a liver manifestation of metabolic syndrome present in over 75% of overweight and obese adults and children, and a risk factor for liver cancer development. Obesity associated with high fat diets (HFD) is shown to induce NAFLD and promote liver tumorigenesis by stimulating chronic inflammation. However, diets high in refined carbohydrates (HCD) have been associated with greater NAFLD severity in humans. This present study elucidated the effects of replacing dietary fat with refined carbohydrates on hepatic injuries and tumorigenesis in mice. Two-week old male C57Bl/6J mice were randomly injected with a liver-specific carcinogen to initiate liver cancer (cancer arm), or with saline (control arm). 6-week old mice within each arm were randomized to one of the two semi-purified diets with identical amounts of fructose and protein; 1) HFD (60% energy is fat derived); 2) HCD (66% energy is carbohydrate derived). Mice were on their respective diets ad-libitum for 24 weeks. Hepatic steatosis and inflammation, as well as liver tumor incidence, multiplicity and volume were evaluated. HCD-fed mice resulted in the same degree of carcinogen-initiated liver tumorigenesis (incidence, multiplicity and volume) and inflammation as compared to HFD, despite having significantly reduced body weight and glucose intolerance. Irrespective to carcinogen-initiation, HCD had more severe hepatic steatosis, elevated hepatic de novo lipogenesis, and increased ER-stress mediated PERK-signaling activation, as compared to HFD. HCD also promoted the activation of tumorigenic pathways including Akt and the mitogen-activated protein kinase in liver tumors, as compared to HFD. Replacing dietary fat with refined carbohydrates can promote comparable severity in hepatic tumorigenesis and injuries as HFD in mice, potentially through up-regulating PERK/Akt-oncogenic pathways. Further investigations are needed to evaluate whether these observations are physiologically relevant in humans.

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20. Lactobacillus plantarum fermented soy milk improves lipid dysregulation by modulating gene expressions, oxidative stress, and systemic inflammation in rats on an atherogenic diet (Category: Vitamins, Minerals, and Bioactives)

Presenting Author: Yunhye Kim, Yonsei University
Additional Authors: Yunhye Kim, Sun Yoon, Hayoun Oh, Wu-Joo Lee, and Seung-Min Lee, Department of Food and Nutrition, College of Human Ecology, Yonsei University, Seoul, South Korea.

We aimed to investigate whether in vitro fermentation of soy with Lactobacillus plantarum could promote its beneficial effects on lipids at molecular and physiological levels.

Rats were fed an AIN76A diet containing 1% (w/w) cholesterol (CHOL) or a CHOL diet where 20% casein was substituted with soy milk (SOY) or fermented soy milk (FSOY). Dietary isoflavone profiles, serum lipids, antioxidant enzyme activities, inflammation markers, hepatic and fecal cholesterols, and tissue gene expression were examined. The FSOY diet had more aglycones than the SOY diet. The SOY and FSOY lowered hepatic cholesterol and serum triglyceride compared to

the CHOL. The FSOY alone elevated serum high density lipoprotein cholesterols(HDL-CHOLs) and glutathione peroxidase(GPx) and superoxide dismutase(SOD) activities, reduced serum free fatty acid and monocyte chemoattractant protein-1(MCP-1) concentrations, and increased fecal cholesterol. Hepatic reduction of Niemann-Pick C1-Like 1(NPC1L1) mRNA in both SOY and FSOY groups and FSOY-specific decrease in 3-hydroxy-3-methylglutaryl-Coenzyme A reductase(HMGCR) and fatty acid synthase(FAS) mRNAs and low density lipoprotein receptor(LDLR) protein, and increase in 5′ adenosine monophosphate-activated protein kinase(AMPK) activation were observed. Furthermore, the FSOY showed elevated adipose expression of ATP binding cassette transporter A1(ABCA1), liver X-receptor α(LXRα), very low density lipoprotein receptor(VLDLR), low density lipoprotein receptor-related protein 1(Lrp1), mitochondrial uncoupling protein 2(UCP2), superoxide dismutase 3(SOD3), adiponectin(AdipoQ), adiponectin receptor 1(AdipoR1), and adiponectin receptor 2(AdipoR2) genes. The anti-atherogenic effects of soy may be enhanced through fermentation, which appear to improve gene expression in lipid metabolism, anti-oxidant capacity, and anti-inflammation.

Funding: This study was supported by the National Research Foundation of Korea (NRF) grant funded by the Korean government (No.20110003704).

21. Alleviation of alcoholic liver injury by betaine involves an enhancement of antioxidant defense via regulation of sulfur amino acid metabolism (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Young Chul Kim, College of Pharmacy, Seoul National University
Additional Authors: Sun Ju Kim, Do Young Kwon, Chul Won Ahn, College of Pharmacy, Seoul National University

Previous studies have shown that alcoholic liver injury is alleviated by betaine administration both in animals and human. In this study we examined the mechanism by which betaine prevents the progression of alcoholic liver injury and its therapeutic potential. Rats received a liquid ethanol diet for 6 wk. Betaine (1 %) was dissolved in drinking water. A different group of rats was provided with betaine for the final 2 wk of ethanol intake. Ethanol consumption elevated serum triglyceride and TNFα levels, alanine aminotransferase (ALT) and aspartate aminotransferase (AST) activities, and lipid accumulation in liver. The oxyradical scavenging capacity of liver was reduced, and expression of CD14, TNFα, COX-2, and iNOS mRNAs was induced markedly. These ethanol-induced changes were all inhibited effectively by betaine supplementation. Hepatic S-adenosylmethionine (SAM), cysteine, and glutathione (GSH) levels, reduced in the ethanol-fed rats, were increased by betaine supplementation. Methionine adenosyltransferase (MAT) and cystathionine γ-lyase (CγL) were induced, but cysteine dioxygenase (CDO) was down-regulated, which appeared to account for the increment in cysteine availability for GSH synthesis in the rats supplemented with betaine. The present data suggest that the protective effects of betaine against alcoholic liver injury may be attributed to the fortification of antioxidant defense via improvement of impaired sulfur amino acid metabolism. Betaine supplementation for the final 2 wk of ethanol intake resulted in a similar degree of hepatoprotection, revealing its potential therapeutic value in alcoholic liver.

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22. DHFR-mediated inhibition of lymphocyte proliferation by the green tea constituent epigallocatechingallate (EGCG) (Category: Vitamins, Minerals, and Bioactives)

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The major green tea flavanol epigallocatechine-3-gallate (EGCG) binds with high affinity to the dihydrofolate reductase enzyme purified from cow liver in vitro and inhibits reactivation of dihydrofolate. Tightly binding inhibitors of the dihydrofolate reductase enzyme, such as the antiproliferative drug methotrexate, are known to have a seemingly paradoxic effect on DHFR gene regulation: they increase gene expression due to a direct enzyme-mRNA interaction. We wanted to find out whether EGCG has the same antiproliferative effect on lymphocytes isolated from peripheral human blood and whether this effect is reflected by increased expression of the dihydrofolate reductase gene (DHFR). Lymphocytes obtained by Ficoll-Paque gradient separation from fresh blood of 33 adults were cultured in prewarmed complete medium containing IL-2 after initial stimulation with phytohaemagglutinin. On day 3, the cultures were divided for further growth with IL-2 stimulation, one set with EGCG treatment and another one without EGCG treatment. DHFR and MTHFR expression was measured in cells collected after 9 days. The common 19 base-pair deletion variant (rs70991108) of the DHFR gene was detected by allele-specific PCR and agarose gel electrophoresis. The proliferation rate of cultured lymphocytes decreased by 28% ($p<0.0001$) and DHFR expression increased by 37% ($p=0.05$) when EGCG was added to the culture medium at a concentration of 10 µmol/L. The changes in proliferation rate and DHFR expression with EGCG were comparable to the effect of about 0.01 µmol/L of the specific DHFR inhibitor methotrexate. Expression of the MTHFR gene, which was measured as a presumably unaffected control, was not significantly changed with EGCG treatment. The individual responses of cell proliferation and DHFR gene expression to EGCG treatment varied much more than results from duplicate control cultures. These differences did not correlate with the presence or absence of the 19 bp deletion variant of DHFR. These observations confirm previous suggestions that EGCG can inhibit lymphocyte proliferation at least in vitro. Specific inhibition of DHFR enzyme activity is a plausible mechanism for this anti-proliferative effect. The paradoxical increase of DHFR expression is expected with inhibition of the dihydrofolate reductase enzyme and parallels the effect seen with targeted inhibition of the enzyme by methotrexate. As yet unidentified genetic or other constitutional differences appear to be operative.

Funding: UNC Nutrition Research Institute

23. The Naturally Occurring α-Tocopherol Stereoisomer of Vitamin E Is Predominant in Infant Brain (Category: Vitamins, Minerals, and Bioactives)

Presenting Author: Matthew Kuchan, Abbott Nutrition
Additional Authors: Jacqueline C. Lieblein-Boff, Abbott Nutrition; Soren K. Jensen, Aarhus University; and Elizabeth J. Johnson, Tufts University

Vitamin E is essential for development, and deficiency disrupts the central nervous system resulting in neurological disorders. Alpha-tocopherol (α-T) is the most abundant and biologically active form of vitamin E. The natural stereoisomer of α-T (RRR-α-T) is known to be more bioavailable in circulation than its 7 synthetic counterparts as a result of liver selectivity. Furthermore, rodent brain exerts additional selectivity for RRR-α-T as compared to synthetic stereoisomers. However, it is unclear if biodiscrimination of α-T stereoisomers occurs in human infant brain. The objective of this novel study was to determine the distribution of α-T stereoisomers in human infant brain. Subjects were infants (n=25) who died during the first year of life from either SIDS or other conditions. Brain tissues [frontal cortex, FC (n=17); occipital cortex, OC (n=17); and hippocampus, H (n=19)] obtained from the NICHD Brain and Tissue Bank were processed using standard lipid extraction procedures and analyzed using chiral reverse phase HPLC. Data are presented as mean ± SEM μg/g tissue or ratios where appropriate.

All samples analyzed contained detectable concentrations of α-T. Our data demonstrate that the concentration of total α-T was similar in the FC (9.71 ± 0.80 μg/g), OC (8.74 ± 0.88 μg/g), and H (11.64 ± 0.69 μg/g). An important finding was that RRR-α-T is the predominant stereoisomer in all samples and brain regions analyzed compared to all other synthetic stereoisomers (P<.0001). Specifically, the concentration of RRR-α-T was 6.4 ± 0.5 μg/g in the FC, 5.7 ± 0.5 μg/g in the OC, and 7.6 ± 0.3 μg/g in the H. Furthermore, the ratio of the naturally occurring stereoisomer to all other synthetic forms was 2.4 ± 0.3, 2.3 ± 0.3, and 2.3 ± 0.3 in the FC, OC, and H, respectively. This research demonstrates for the first time that the RRR-α-T stereoisomer is predominant in all regions analyzed in infant brain. These results support the hypothesis that infant brain preferentially selects the naturally occurring RRR-α-T stereoisomer over synthetic forms. These observations may be partially explained by the enhanced bioavailability of RRR-α-T in circulation previously demonstrated in infants. Moreover, diet may also impact the concentration of stereoisomers in tissue, warranting further investigation of the impact of diet and vitamin E stereoisomers on neurodevelopment.

Funding: Abbott Nutrition

24. Lutein Stimulates the Differentiation of Human Stem Cells to Neural Progenitor Cells In Vitro (Category: Vitamins, Minerals, and Bioactives)

Presenting Author: Matthew Kuchan, Abbott Nutrition
Additional Authors: Fei Wang, Yijie Geng, Brad Feng, University of Illinois; Chron-si Lai, Abbott Nutrition

Cultured human stem cells (hSC) are widely considered to be the gold standard for the investigation of stem cell differentiation. Compound C (CC) is commonly used to very efficiently direct differentiation of hSC into neural progenitor cells (NPC). Lutein has been hypothesized by experts to play a role in neural macular development in infants, in addition to its well-established role to protect the macula from harmful blue light absorption. For this study, it was hypothesized that lutein may play a role beyond its antioxidant properties and influence stem cell differentiation. The study objective was to discern the effect of lutein on the differentiation of hSC into NPC. Lutein-mediated stimulation of differentiation into NPC would suggest that lutein is an important nutrient in the rapidly differentiating and developing infant brain. Cultured hSC remain undifferentiated without CC stimulation. CC addition results in differentiation to NPC tracked by expression of NPC protein markers SOX1 and PAX6. hSC were induced to undergo differentiation in medium with or without CC plus lutein or lycopene (both antioxidants) in order to test the impact of lutein and lycopene on stem cell maturation. Differentiation outcome was assessed by determining PAX6 and SOX1 levels after 3-9 days. As expected, CC addition resulted in a substantial increase in the expression of both SOX1 and PAX6 after 6 days compared to vehicle alone (DMSO, by 21- and 4.7-fold, respectively). The combination of CC + lutein (1 μM) further increased the SOX1 and PAX6 expression by 97-fold and 8.1-fold compared to vehicle alone after 6 days. Treatment of hSC with lutein (1 μM) alone for 6-9 days resulted in increased SOX1 and PAX6 expression vs vehicle (3.8- and 3.1-fold, respectively). These data indicate that lutein has a considerable impact on the differentiation of cultured hSC in NPC. Treatment of cells with lycopene (1 μM) had no detectable effect.

These data reveal that lutein stimulated differentiation of hSC to NPC in culture and appeared to do so independently of its well-established antioxidant properties. This suggests that lutein stimulates early development to brain cells and provides further support for the potential role of lutein in the rapidly developing infant brain.

Funding: Abbott Nutrition

25. olo-TC but not serum B12 suggests B12 deficiency in older adults despite renal impairment (Category: Policy and Nutrition)

Presenting Author: Eamon Laird, Institute of Molecular Medicine, School of Medicine, Trinity College, Dublin
Additional Authors: Dr. Leane Hoey, Dr. Mary Ward and Prof. Helene McNulty, University of Ulster Coleraine; and Dr. Miriam Casey, ercers Institute for Research on Ageing, St James's Hospital, Dublin

Vitamin B12 deficiency remains a significant public health issue within the elderly population1. Total vitamin B12 concentration is used to diagnose deficiency though a number of studies indicate holotranscobalamin (holoTC) may be superior2. Methylmalonic acid (MMA) is also a sensitive biomarker of deficiency though it can be affected by renal impairment and age3. Controversies over biomarkers of measurement, coupled with the uncertain influence of age and renal function, has led to a type of 'circular epidemiology' in the determination of a reliable first line marker of B12

deficiency. The aim of this study was to assess the effect of age and renal function on markers of B12 status in a sample of Irish older adults from the Trinity, Ulster, Department of Agriculture (TUDA) ageing cohort study.

Participants (n 5200) were recruited between Dec 2008 and October 2012 from the University of Ulster, Coleraine and those attending the memory and bone clinics in the Geriatric Unit of St. James Hospital, Dublin Ireland. Biomarkers of vitamin B12 status included total serum B12, HoloTC (Active B12), plasma homocysteine (tHcy) and methylmalonic acid (MMA: available on 1515 participants). Estimated glomerular filtration rate [eGFR)] was calculated using the Cockcroft–Gault equation.Cut-offs of <30 pmol/l (HoloTC), <148 pmol/l (Total B12), >0.36 µmol/l (MMA) and >15µmol/l (tHcy) were used to denote B12 deficiency. 4.9% (n 242) of participants had deficient B12 status defined by both total B12 and HoloTC. With increasing age, renal function (eGFR) significantly decreased and both tHcy and MMA increased ($P<0.05$). HoloTC concentrations, but not serum B12, decreased significantly with age, with the oldest participants (>80yrs) having a higher proportion of B12 deficiency based on Holo TC (15.1%) compared to serum B12 (13.6%). The decline in holoTC remained significant after adjustment for BMI and eGFR ($P<0.05$). Older age was associated with lower B12 status independent of BMI & GFR. Furthermore, declining renal function was associated with significant changes in the concentrations of MMA, tHCY and serum B12 but not holoTC. Contrary to published data, this suggests that holoTC might be the most reliable biomarker of B12 status in the very old and in those with renal impairment.

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26. Perception of Picky Eating Status among Infants and Toddlers in 8 Cities of China (Category: Clinical and Community Nutrition)

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Picky eating has been considered to have adverse effects on children's dietary and development, and it started at an early age. But there are few studies focused on young children currently, especially in China. The objective of this study was to give an overall description of the picky eating status among children aged 4 to 36 months in 8 cities of China, including the frequency, starting time, differences of dietary intake, morbidity and physical development between picky and non-picky eaters, as well as parents' reaction to this problem. 1663 4 to 36 months chileren who were given non-dairy complementary food were recruited in 8 Chinese cities use stratified cluster random sampling combined with convenience sampling. Caregivers were investigated using self-designed questionnaire for demographic information, picky eating status and food intakes. Children's physical information was measured. Frequency and starting time were described in different age groups. T tests, non-parametric tests and chi-square tests were used to determine whether there was a significant difference between picky and non-picky groups. The reported percentage of picky eaters increased from 7.4% in 4-6 months to 36.1% in 25-36 months. 42.8% picky children aged 25-36 month started to be picky eaters in 7-12 month. The food category avoided by most picky eaters was milk for infants and vegetable for toddlers. There were several statistically significant differences on dietary intakes of energy and nutrients between picky and non-picky eaters, and also between those avoided specific food category and non-picky eaters. The total morbidity and morbidity of respiratory diseases were higher in picky eaters. No statistically significant correlation was found between picky eater status and physical development. When new food was introduced, 73.0% of the caregivers reported less than 5 trials before judging their children dislike it. Parents of picky eaters were more likely to misjudge their children's body weight, and anxious about their children's health and nutrition status. The reported picky eating prevalence was 21.6%. Children started to be picky eaters early. Statistically significant difference was found in energy and nutrients intake, morbidity and parents' reaction between picky and non-picky eaters.

Funding: Nestlé Nutrition Institute and Nestlé Research Center Beijing

27. Effects of Milk with Inulin on Elderly People with Lactose Intolerance (Category: Vitamins, Minerals, and Bioactives)

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Additional Authors: Hua Jiang,Department of Social Medicine and Health Education, School of Public Health, Peking University; Zhe Yi, COFCO Nutrition and Health Institute; and Ai Zhao, Department of Social Medicine and Health Education, School of Public Health, Peking University.

The elderly are at high risk of osteoporosis, but lactose intolerance prevents some of them to take in calcium from diary foods, which were considered as the best source of calcium. The objective of this study was to determine the effect of milk with inulin on improving breath-hydrogen, gastrointestinal symptoms, bone mass and intestinal flora of elderly people with lactose intolerance. 63 people older than 50 diagnosed as lactose intolerance in breath-hydrogen tests were recruited and assigned to three groups randomly: a) milk with inulin (150mg/100g) and extra calcium, Vitamin D and Casein Phosphopeptides. b) milk with inulin (150mg/100g) c) low lactose milk as control group. They took 250 milliliter of milk per day for 42 days. Breath-hydrogen tests, distal radium bone mass (SOS, speed of sound) examination, Margaret MC tests, Rome tests, 24 hour dietary

recall and food frequency questionnaire were performed and urine was collected to test calcium and ALP (alkaline phosphatase) at baseline and the end. At both time, 6 samples of feaces were collected in each group for flora culture. One way ANOVA and Kruskal-Wallis tests were used to compare results among groups. Paired t-tests and Wilcoxon signed-rank tests were used to compare result at baseline and after intervention.

Breath-hydrogen decreased in all three groups, but only showed statistically significant decrease in group A. There was no significant change in the scores of Margaret MC and Rome , but at the end of the sixth week, Rome scores of group A were lower than group B. Bone mass significantly increased in group A (from 4003.38 m/s to 4124.33 m/s) and B (from 4079.38 m/s to 4208.52 m/s). Density of calcium in urine did not change, but density of ALP decreased in group B. Lactobacillus increased in group A and B, but Bifidobacterium decreased in group B. No change in dietary intake was observed except diary intake increased. Taking milk with inulin for a short period (42 days) might change intestinal flora by increasing lactobacillus and decreasing bifidobacterium. Decreasing of breath-hydrogen indicates mitigation of lactose intolerance, but no significant change in symptom was observed. Bone mass increased significantly after taking milk with inulin.

Funding: COFCO Nutrition and Health Institute

28. Development of an index of processed food intake and associations with dietary factors in adults and adolescents in the National Health and Nutrition Examination Survey (NHANES, 2005 -2008) (Category: Clinical and Community Nutrition)

Presenting Author: Leah Lipsky, Eunice Kennedy Shriver National Institute of Child Health and Human Development
Additional Authors: Tonja Nanse and Virginia Quick, Eunice Kennedy Shriver National Institute of Child Health and Human Development

To examine associations of processed food intake with overall energy density, nutrient density and primary food groups. Data from two 24-hour diet recalls were examined for US adolescents (12y to <18y) and adults (>=18y) in NHANES (2005-2008). An index of processed food intake (PFI) was developed using the mean of the standardized (mean=0, standard deviation=1), energy-adjusted (per 1000 kcal) intakes of non-whole grains, processed meat, discretionary oils, discretionary solid fat, added sugar and sodium. Separately for adolescents and adults, we examined associations of PFI with energy density (kcal/g), nutrient density (Nutrient Rich Foods Index 9.3, NRF), and primary food groups (whole grains, total vegetables, dark green vegetables, orange/red vegetables, whole fruit, milk, yogurt, meat, poultry, fish, nuts/seeds, legumes). Linear regressions predicted energy density, nutrient density, and intake of commonly consumed foods (total vegetables, milk, cheese); logistic regressions estimated likelihood of consuming the remaining, more sparsely consumed, food groups. Covariates included energy intake, age, sex, income, supplement use, smoking (adults) and education (adults). PFI was associated positively with energy density and inversely with nutrient density in both age groups. PFI was inversely related to intake of milk and cheese in both age groups, and to total vegetable intake in adults only. In adults, PFI was inversely associated with odds of consuming remaining food groups except meat. In adolescents, similar associations were observed for odds of consuming whole grains, orange/red vegetables, whole fruit, poultry and nuts/seeds. Findings suggest intake of components characteristic of processed foods is adversely associated with energy density, nutrient density, and intake of more nutrient-rich food groups. The positive association observed with cheese intake is likely due to the food's high solid fat content, or to the use of cheese as a common ingredient in processed food products. Differential associations by age group indicate the need to understand age-specific determinants of dietary intake.

Funding: Research was supported by the intramural research program of the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

29. Food categories contributing the most to sodium intake from birth to 24 months, United States, 2007-2010 (Category: Vitamins, Minerals, and Bioactives)

Presenting Author: Joyce Maalouf, Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention
Additional Authors: Keming Yuan, and Janelle Gunn, Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention; and Carrie Martin, US Department of Agriculture

Sodium intake is positively related to blood pressure. Salt taste preference is established early and average sodium intake is high among preschool children, but data are limited on the sources of sodium intake, especially from birth to age 24 months. The objective of this research is to identify the food categories contributing most to sodium intake from birth to 24 months. Population proportions of sodium consumed from USDA What We Eat in America Food Categories were estimated among 372 participants aged 0-5 months, 428 participants aged 6-11 months, and 591 aged one year in the National Health and Nutrition Examination Survey, 2007-2010. The top food categories contributing to dietary sodium intake among infants aged 0-5 months were breast milk and formula (94.2%), fluid replacement/electrolyte solution (1.8%) and commercial baby foods (vegetables, meat and dinners, and cereals) (1.7%) and among infants 6-11 months were breast milk and formula (30.0%), soups (5.9%), pasta mixed dishes excludes macaroni and cheese (4.7%), whole milk (3.1%), and commercial baby meat and dinners (2.9%), cheese (2.7%), eggs and omelets (2.6%), meat mixed dishes (2.4%), and yeast breads (2.1%). Among children aged one year, the top 10 food categories were whole milk (10%), pasta mixed dishes (5.4%), soups (4.9%), cheese (4.8%), chicken patties, nuggets, and tenders (4.3%), macaroni and cheese (3.7%), frankfurters (3.6%), eggs and omelets (3.5%), yeast breads (3.3.%), and reduced fat milk (2.8%). Across these age groups, most of the sodium consumed (83%-90%) came from foods obtained from a store (e.g. supermarket or convenience store). Among children aged one year, 10% of sodium consumed came from foods obtained at restaurants and 3% from childcare centers. Aside from infant formula and breast milk, among infants 0-5

months, commercial baby foods are a top source of sodium intake. After 5 months, the majority of sodium consumed comes from food categories other than infant formula, breast milk, and other milk suggesting reducing the sodium content in foods would reduce sodium intake among the youngest consumers. Although the majority of sodium consumed from birth to 24 months comes from foods obtained from stores, at age one year, food from restaurants and childcare centers also contribute to intake.

Funding: The project was supported by the Centers for Disease Control and Prevention.

30. Benefits of corn oil compared to extra-virgin olive oil consumption on the plasma lipid profile in men and women with elevated cholesterol: results from a controlled feeding trial (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Kevin Maki, Biofortis Clinical Research
Additional Authors: Andrea L. Lawless, Kathleen M. Kelley, Valerie N. Kaden, and Mary R. Dicklin, Biofortis Clinical Research

Corn oil (CO) contains high levels of phytosterols (132 mg/T vs. olive oil 30 mg/T), which reduce cholesterol absorption, and is rich in polyunsaturated fatty acids (PUFA). This trial compared the effects of CO vs. extra-virgin olive oil (EVOO) on lipoprotein lipids in 54 healthy men and women [65% female; 76% non-Hispanic white; mean (standard error) age 53.8 (1.3) y and body mass index 28.2 (0.5) kg/m2] with fasting low-density lipoprotein cholesterol (LDL-C) ≥130 mg/dL and <200 mg/dL. In this randomized, double-blind, crossover trial, 4 T/d (~54 g) of CO (528 mg phytosterols, 29.7 g PUFA) or EVOO (120 mg phytosterols, 5.6 g PUFA) were provided in 3 servings of study product/d (muffin, dinner roll, yogurt), as part of a weight-maintenance diet (~35% of energy from fat, <10% from saturated fat, <300 mg cholesterol) consumed for 21 d, with a 21 d washout between treatments. Breakfast was administered at the clinic on weekdays, and subjects were provided lunch, dinner and a snack for consumption away from the clinic. Weekend meals were dispensed on Friday. Fasting lipid profiles were measured twice on separate days at baseline and the end of each 21 d treatment period. Baseline mean (standard error) lipid values in mg/dL were: LDL-C 153.3 (3.5), total-C 225.7 (3.9), non-high-density lipoprotein (HDL)-C 178.3 (3.7), HDL-C 47.4 (1.7), total-C/HDL-C 5.0 (0.2), and triglycerides 124.8 (7.2). CO resulted in significantly larger least squares mean % changes (all $p < 0.001$ vs. EVOO) from baseline, respectively, in LDL-C -10.9 vs. -3.5, total-C -8.2 vs. -1.8, non-HDL-C -9.3 vs. -1.6, and total-C/HDL-C -4.4 vs. 0.5. Triglycerides rose to a smaller extent with CO feeding, 3.5 vs. 13.0% with EVOO ($p < 0.007$) and the HDL-C responses were not significantly different between conditions (-3.4 vs. -1.7%). Consumption of CO, as part of a weight-maintenance, low saturated fat and cholesterol diet, by men and women with hypercholesterolemia, resulted in more favorable changes in LDL-C and other atherogenic lipids compared with EVOO. Potential factors contributing to these effects include the phytosterol and fatty acid profiles of CO vs. EVOO.

Funding: ACH Food Companies, Inc. and PepsiCo, Inc.

31. Survey of Attitudes & Knowledge In an Incoming Class of First Year Medical Students (Category: Policy and Nutrition)

Presenting Author: Mariana Markell, SUNY Downstate Medical School

Lack of nutrition knowledge is a reported problem for many practicing physicians. We gathered data regarding attitudes towards and knowledge of nutrition in an incoming class of First Year Medical Students. The data is being used to design a nutrition curriculum at our Medical School to address perceived deficits and the class will be reassessed as Fourth Year Students. A survey was designed based on existing surveys, as well as general survey technique. It consisted of 11 general questions including 7 demographic questions, 5 knowledge subquestions that addressed general aspects of nutrition knowledge and 3 attitudinal questions. It was distributed to the students prior to the first nutrition lecture. 169 students attended the lecture. All surveys were returned. 80 questionnaires were analyzed to date, 26 (33%) had taken a prior nutrition course,Taking a prior nutrition course correlated with feeling more confident in writing a diet prescription ($r=0.036$, $p<0.001$), as did # of knowledge questions answered correctly ($r=0.23$, $p<0.05$). Mean # right was 2.6+/-0.12. (50%). 71% strongly agreed that nutrition knowledge is important for a physician and for therapy of medical diseases. #right also correlated with confidence in diet prescription ($r=0.23$, $p=0.042$). Prior coursework did not correlate with knowledge or attitude.64% felt unprepared to write a diet prescription, and 42% felt unprepared to counsel an obese patient. Incoming First Year Medical Students recognize the importance of nutrition for their future as a physician in the treatment of disease. Despite a third of the sample having taken a nutrition course previously, for the majority, their knowledge is weak and affects their confidence in counseling patients, especally as regards diet therapies for obesity. A nutrition thread that will address these issues is being designed and the students will be reassessed in three years.

32. Nutritional Deficiencies Following Bariatric Surgery (Category: Vitamins, Minerals, and Bioactives)

Presenting Author: John Morton, Stanford University
Additional Authors: Ulysses Rosas and Daniel Rogan, Stanford University

Nutritional abnormalities are common in morbidly obese patients and can be worsened following laparoscopic Roux-en-Y Gastric Bypass (RYGB), Laparoscopic Sleeve Gastrectomy (SG), and Laparoscopic Adjustable Gastric Banding (LAGB). The aim of this study is determine the prevalence of these deficiencies. At a single academic institution (2003–2013), nutrient profiles were measured prospectively in 1792 consecutive bariatric patients. Of those, 1,362 underwent Roux-en-y-gastric bypass 265 underwent sleeve gastrectomy, and 165 underwent adjustable gastric band. Differences between the three procedures was performed with ANOVA with $p<.05$ as significant. Patients undergoing RYGB had greater BMI prior to surgery than LAGB and SG (46.84 vs. 43.64 vs. 44.07 kg/m2, $p= 0.0005$). At 12 months post surgery, RYGB patients had a significantly higher 12-month postoperative excess weight loss than SG and LAGB patients (75.18% vs. 57.7% vs. 43.54%

respectively, p<0.0001). Preoperatively, RYGB patients had lower levels of serum iron (67.87 vs. 72.61 vs. 72.45 µg /dL, p=0.0188), folate (21.8 vs. 21.85 vs. 41.24 ng/mL, p=0.0038), and plasma thiamine (5.64 vs. 6.69 vs. 10.55 nmol/L, p<0.0001) compared to LAGB and SG. At 6 months postop, a greater proportion of RYGB patients showed deficiencies in plasma thiamine (16.79% vs. 12.82% vs. 7.02%, p=0.0311), compared to LAGB and SG. At 12 months post surgery, patients who had undergone LAGB had significantly lower levels of vitamin B12 (630.52vs. 795.85 vs. 797.47 pg/mL, p=0.012) and blood thiamine levels (115.59 vs. 129.19 vs. 142.94 nmol/L, p=0.0474), compared to RYGB and SG patients respectively. RYGB patients showed significantly lower levels of glucose (93.15 vs. 105.25 vs. 101.31 mg/dL, p=0.0024), and creatinine (0.78 vs. 0.84 vs. 0.86 mg/dL, p=0.0534) at 12 months compared to LAGB and SG.
While rare, nutritional deficiencies can occur after any weight loss procedure and surveillance for these deficiencies is important.

33. Energy restricted ketogenic diet (ERKD) treatment for advanced glioblastoma multiforme (GBM): Case report (Category: Disease Prevention, Progression and Treatment)
Presenting Author: Michele Nikolai, Sparrow Hospital
Additional Authors: Mary Noel, Kenneth Schwartz, Peter Kurniali, Howard Chang and L. Carl Olson, Michigan State University

The objective of this study was to evaluate a 12 week ERKD protocol for advanced GBM. A 55 year old white male with progressive GBM was hospitalized to establish ketosis and initiate ERKD . A therapeutic range was established for serum betahydroxybutyrate (BHB) of 3-6 mmol/L and serum glucose of 50-70 mg/dl. Feeding began when patient achieved BHB of >3 mmol/L. While he was on ERKD his BHB and glucose were measured twice daily as fasting morning (AM) and two hours post-prandial in the evening (PM). Initial diet consisted of Ketocal® 3:1 formula, 20-25 kcals/kg. The 3:1 fat: protein + carbohydrate ratio met protein needs of 0.6-0.8 grams protein/kg. The patient and wife received instructions from a dietitian on ketogenic meal preparation. The BHB and glucose were in therapeutic range initially. As feedings advanced, AM BHB levels decreased to < 3 mmol/L and glucose > 80 mg/dl. Ketosis deepened daily and PM measurements > 3 mmol/L. BHB and glucose levels did not always correlate. Patient found Ketocal® unpalatable and changed to a food only ketogenic diet. Diet manipulation alleviated his hunger and increased AM BHB. Any further dietary manipulations were resisted by the patient and his caregiver. His weight decreased by 6%. Patient withdrew from the study when GBM progressed.

Implications. The use of stringent diet interventions for potentially life threatening diseases has many pragmatic patient and caregiver implications that need to be considered in the use of clinical trial diet protocols. ERKD protocols can be administered with a trained team to adults with GBM, but the multiple adherence issues must be addressed. Study is needed to determine the optimal diet to maintain therapeutic glucose and ketones.

Funding: Supported by Michigan State University Clinical and Translational Sciences Institute

34. The Effect of Avocados Compared to Saturated Fat-Rich Foods on Endothelial Function and Other Biomarkers of Cardiovascular Disease Risk (Category: Disease Prevention, Progression and Treatment)
Presenting Author: Janet Novotny, USDA Beltsville Human Nutrition Research Center
Additional Authors: David Baer, Sarah Gebauer, USDA Beltsville Human Nutrition Research Center

A high fat meal, and moreover a high saturated fat meal, has been implicated in contributing to endothelial dysfunction. However, data on the comparative effects of different fats have been conflicting. The objective of this study was to compare the effects of monounsaturated fat (MUFA) rich foods vs. saturated fat (SFA) rich foods on cardiovascular disease (CVD) risk. A randomized clinical trial was conducted to determine if replacing foods high in SFA with ½ to 1 avocado (high in MUFA) per day would change markers associated with risk for CVD. The study was a 5-wk randomized parallel arm study with 2 controlled diet treatments: 1) an American diet containing avocado (8% En SFA and 8.5% En MUFA), and 2) the same diet containing SFA-rich foods (10.5% En SFA and 5.5% En MUFA) in isoenergetic replacement of avocado. Subjects were fed at weight maintenance, so avocado (0.5 avocado/1800 kcal) and SFA treatment foods were scaled according to energy need. Subjects (n = 58; mean age 55 yr, BMI 30 kg/m^2, LDL-C 137 mg/dL, blood pressure 130/76 mm Hg) were stratified by LDL-C and sex and randomly assigned to the avocado group (AVO) or the high saturated fat group (SAT). Outcome measures were assessed in the fasting state at the beginning (day 1) and end (day 35) of the treatment period. Peripheral arterial tonometry assessment of endothelial function was also measured in the fed state, after subjects consumed a meal containing avocado or high SFA replacement foods.

After 5 wk, there were no differences in fasting values for HDL-C, LDL-C, or endothelial function between the AVO and SAT groups. TNF-alpha was higher in the AVO group compared to the SAT group (5.8 vs 5.2 ± 0.1 pg/mL, p<0.0007). Reactive hyperemia index was lower 3 h after consumption of the avocado containing meal (2.13 ± 0.08) compared to the control meal (2.38 ± 0.08) (p=0.038); however, all subjects remained in the healthy range. There was a trend toward lower systolic and diastolic blood pressure in the AVO group compared to the SAT group, though these differences did not reach statistical significance (p≤0.15). These results demonstrate the comparative effects of avocado, a MUFA-rich food, vs. SFA-rich foods on endothelial function and other biomarkers of CVD, when incorporated at moderately low levels into a controlled diet.

Funding: Funded by the Hass Avocado Board & USDA.

35. Effects of Dietary Vitamin B12 Intake on Multiple Sclerosis Specific Quality of Life (Category: Disease Prevention, Progression and Treatment)
Presenting Author: Kevin Pietro, MS, RD, LDN, Illinois State University
Additional Authors: Bill Anderson, PhD, Julie Schumacher EdD, RD, LDN and Alexander Jensen, Illinois State University

Current literature fails to provide individuals with multiple sclerosis (MS) specific dietary recommendations to improve quality of life (QOL). Due to the important structural and functional roles of vitamin B12 in the nervous system, this research investigated the possible relationship of dietary vitamin B12 intake and self-reported QOL of individuals diagnosed with MS. The National MS Society and MS Foundation were used to recruit volunteers age 18 and older with a clinical diagnosis of MS. After the initial response (n=89), 46 participants completed an online demographic questionnaire and the MS Quality of Life-54 (MSQOL) (Vickrey et al., 1995). Additionally, participants (n=23), completed a 3-day food record utilizing MyPyramid Tracker. Increased consumption of vitamin B12 (M=4.63 µg, SD=3.44 µg) was positively correlated to the MSQOL subscales, Emotional well-being, r (21) =0.523, p =.030, Health perceptions, r (21)= 0.444, p= .034, Health Distress, r (21)= 0.453, p= .030, and Overall QOL, r (21)= 0.470, p= .024, as well as to the QOL composite summary score for Mental Health, r (21)= 0.465, p= .025. Individuals who consumed 5.0 µg or more exhibited significantly higher QOL scores for eight of the twelve subscales, including Pain and Overall QOL ($p<0.01$). Additional, both the QOL composite summary scores (Physical and Mental Health), were significantly higher ($p<0.01$).

Dietary intake studies could assist in producing dietary guidelines for individuals with MS, which are absent from the Nutrition Care Manual. Since MS currently has no known cure, efforts of healthcare professionals could focus on improving QOL through specific micronutrient intake recommendations, especially vitamin B12. Due to possible increases in vitamin B12 utilization for repair and remyelination, coupled with the results of this study, increased vitamin B12 requirements may be needed for individuals with MS to achieve improved QOL.

Supporting Sources:
Najafi MR. et al. Vitamin B12 deficiency and Multiple Sclerosis; Is there any association? Int J Prev Med 2012;4:286-9.
Miller, A. et al. "Vitamin B12, Demyelination, Remyelination and Repair in Multiple Sclerosis." J Neurol Sci 233.1-2 (2005):93-97.

36. Parental perceptions of children's weight management (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Jaime L. Pula, PhD, RD, St. Joseph's Regional Medical Center
Additional Authors: Michael Lamacchia, MD, St. Joseph's Regional Medical Center

According to the Pediatric Nutrition Surveillance System, 1 out of 3 children are overweight or obese before their 5th birthday. Children in the inner-city are faced with many challenges including less access to healthy food choices and opportunities for physical activities. The childhood obesity epidemic may be fueled by parents failing to recognize the risk to their children, which may lead to a negative perception of children's weight management concerns. The purpose of this study was to examine parental perceptions regarding obese and non-obese school-aged children. This was a prospective, observational, cohort study, which included the parents of 75 children (36 obese; and 39 non-obese), ranging from 9 yrs to 14 yrs of age. The criterion for obesity was ≥85% Body Mass Index (BMI) for age based on gender. The parents were administered the Brief Illness Perception Questionnaire (Brief-IPQ) and a questionnaire eliciting basic demographic information. The protocol was approved by the IRB of St. Joseph's Healthcare System. Statistical analyses were conducted using commercially available software on a personal computer platform. Global sum scores, which assess overall differences in parental perceptions of children's weight were statistically significant for parents of male and female students combined ($P = 0.042$). This difference was reflected primarily in the parents of female children ($P = 0.024$); we did not detect a difference in perceptions of parents of male children ($P = 0.244$). This trend continued with strongly significant differences in 7 of the 9 individual items of the Brief-IPQ for parents of females, while only 3 items were significant in the case of parents of male children. These data suggest, in general, parents of female children may be more aware of the impact of childhood obesity.

Funding: St. Joseph's Regional Medical Center

37. School-based, wellness programs may benefit females with weight management concerns (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Jaime L. Pula, PhD, RD, St. Joseph's Regional Medical Center
Additional Authors: Michael Lamacchia, MD; St. Joseph's Regional Medical Center

According to the Pediatric Nutrition Surveillance System, 1 out of 3 children are overweight or obese before their 5th birthday. Children in the inner-city are faced with many challenges including less access to healthy food choices and opportunities for physical activities. The childhood obesity epidemic may be fueled by only about half of school-aged children engaging in the evidence-based guideline of 60 minutes of physical activity per day, according to the Institute of Medicine. The U.S. Department of Education emphasizes that additional opportunities for physical activity such as school-based, wellness programs should exist. The purpose of this study was to examine physical outcomes (such as aerobic and anaerobic capacities as well as prognostic markers) before-and-after a 12-week, school-based, wellness program (including diet and exercise instruction as well as behavior modification techniques).

This was a prospective, case-control, before-and-after, interventional study, which included 79 children {39 females (19 case, 20 control); and 40 males (18 case, 22 control)}, ranging from 9 yrs to 14 yrs of age. The physical outcomes were measured by administration of the three-minute step test (using estimated VO2 max) and vertical jump test, both before-and-after a 12-week, school-based, wellness program. In addition, the parents of the child participants were administered a questionnaire eliciting basic demographic information. The protocol was approved by the IRB of St. Joseph's Healthcare System. Statistical analyses were conducted using commercially available software on a personal computer platform. Pre- and post- three-minute step test scores, which assess overall differences in aerobic capacities of school-aged children were statistically significant for female students ($P = 0.0011$). This trend

continued for female students, with significant differences in pre- and post- vertical jump scores (P = 0.0437), which assess overall anaerobic capacities. Additionally, pre- and post-resting heart rates were statistically significant for female students (P = 0.0008), which is used as a prognostic marker in both primary and secondary intervention. These data suggest, female students may benefit from a weight management intervention such as a 12-week school-based, wellness program by developing stronger muscles, and, in general, a more efficient cardiovascular system.

Funding: St. Joseph's Regional Medical Center

38. Foods and beverages adolescents eat (or don't eat) in America (Category: Policy and Nutrition)

Presenting Author: Donna G Rhodes, USDA, ARS, Beltsville Human Nutrition Research Center
Additional Authors: Meghan E Adler, John C Clemens and Alanna J Moshfegh, USDA, ARS, Beltsville Human Nutrition Research Center

Adolescents are a nutritionally vulnerable group due to rapid growth and changing lifestyles. Both the inadequate and excessive nutrient intakes shown in this group are indicators of under- or over-consumption of certain food groups; however current research is limited in the area of food intake. This research analyzes dietary intakes of U.S. adolescents and presents results on food and beverage consumption. The study sample included nationally representative data from 12-19 year old male (n=1279) and female (n=1142) adolescents participating in What We Eat in America (WWEIA), NHANES 2007-2008 and 2009-2010. Dietary intake data were obtained from an in-person 24-hour recall, collected using the interviewer-administered 5-step USDA Automated Multiple-Pass Method. The WWEIA Food Categories were used to define food and beverage groups for calculating the percentage of adolescents who consumed a specific group at least once in a day. Estimates were based on foods as consumed. The percentage of adolescents eating fruit was low. On any given day 33 ± 2.4% and 37 ± 2.0% of male and female adolescents, respectively, consumed fruit. Percentages eating vegetables was higher: 52 ± 2.7% for males and 57 ± 2.5% for females. French fires were the most commonly eaten vegetable. Overall, 44 ± 1.8% of adolescents consumed chips, popcorn or pretzels and 42 ± 1.8% consumed cookies, cakes, or pastries on any day. Sweetened beverages were consumed by 71 ± 1.8% of male and 63 ± 2.0% of female adolescents; soft drinks were the most common type of sweetened beverage. More female (13 ± 1.6%) than male (8 ± 1.5%) adolescents consumed a diet beverage. On a given day, 54 ± 2.2% of male and 46 ± 1.7% of female adolescents consumed milk; the most commonly consumed type was 2% milk. Flavored milk was consumed by 12% of male and 9% of female adolescents. Adolescents make food choices that do not meet the characteristics of healthy dietary patterns. Understanding the food and beverage consumption patterns of this age group can provide context for dietary guidance that focuses on this stage of life.

Funding: USDA

39. Effect of exercise training on eNOS expression, NO production, Oxygen metabolism and Placental efficiency in Pregnant Latina Women (Category: Disease Prevention, Progression and Treatment)

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In recent years, evidence has accumulated to support the popular belief that physical activity is associated with better psychological health during pregnancy. The American College of Obstetricians and Gynecologists (ACOG) recommend regular exercise for pregnant women, including those who are sedentary, for its overall benefits on physical and psychological health. Physical activity during pregnancy appears to be beneficial to the maternal-foetal unit and may prevent the occurrence of maternal disorders, such as preeclampsia, hypertension and gestational diabetes. Other studies have demonstrated that either beginning or continuing regular weight-bearing exercise throughout pregnancy improves placental growth. Bergmann et al. reported that regular weight-bearing forms of exercise influence placental growth and anatomic indices of functional capacity. Our previous work, showing that 12 weeks of exercise enhances endothelium-dependent brachial artery dilation in pregnant women suggested that exercise-induced increases both blood flow and eNOS expression. The exact mechanism for this remains unclear, but it is proposed that the exercise-induced intermittent fluctuations in substrate and oxygen delivery produce a recurrent stimulus which evokes an overall growth response. It is currently unknown, however if exercise produces these effects in human placenta. The aim of this study was to determine the effects of exercise training during the second half of pregnancy effect on endothelial NOS expression (eNOS), nitric oxide (NO) production, oxygen metabolism and Placental efficiency in Pregnant Latina Women. The study included 20 nulliparous in gestational week 16–20, attending prenatal care at three tertiary hospitals in Colombia who were randomly assigned into one of two groups: The exercise group (n=10) took part in an exercise session three times a week for 12 weeks which consisted of: aerobic exercise at an intensity of 55–75% of their maximum heart rate for 60 min and 25 mins. Resistance exercise included 5 exercise groups circuit training (50 repetitions of each) using barbells (1-3 kg/exercise) and low-to-medium resistance bands. The control group (n=10) undertook their usual physical activity. Mitochondrial and cytosol fractions were isolated from human placental tissue by differential centrifugation. A spectrophotometric assay was used to measure NO production in cytosolic samples from placental tissue and Western Blot technique to determine eNOS expression. Mitochondrial superoxide levels and hydrogen peroxide were measured to determine oxygen metabolism. Combined aerobic and resistance exercise training during pregnancy leads to a 2-fold increase in eNOS expression and

4-fold increase in NO production in placental cytosol (p=0.05). Mitochondrial superoxide levels and hydrogen peroxide production rate were decreased by 8% and 37% respectively in the placental mitochondria of exercising women (p=0.05). Fetal weight (3013.2 ± 493.8 vs. 3133.3 ± 406.5 g) was not altered in the exercise trained compared to the non-exercise group. In contrast, placental (p<0.05) weight decreased in the exercise trained compared to the non-exercised. Furthermore, placental efficiency was increased (p<0.05) in the exercise trained. There was no difference in the number of cotyledons (12.5 ± 0.5 vs. 12 ± 1.0) between the exercise and non-exercise groups. Regular exercise training during the second half of pregnancy increases eNOS expression, NO production and placental efficiency and decreases reactive oxygen species generation in human placenta. Collectively, these data demonstrate that chronic exercise increases eNOS/NO production, presumably by increasing endothelial shear stress. This adaptation may contribute to the beneficial effects of exercise on the vascular and antioxidant system and in turn reduce the risk of preeclampsia, diabetes or hypertension during pregnancy.

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40. Labeled composition of dietary supplements (DS) with "energy" in the product name in the Dietary Supplement Label Database (DSLD) (Category: Policy and Nutrition)

Presenting Author: Presenting Author: Leila G Saldanha, Office of Dietary Supplements, NIH
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Energy products (include beverages and DS) have been of concern lately, as many contain substantially higher levels of caffeine than those found in cola-type beverages. However, not all DS that claim to provide energy are caffeinated. They also contain other ingredients to boost energy. OBJECTIVE: Use DSLD to identify DS sold as energy products. METHODS: Released in 2013, DSLD contains complete label information on DS sold in the US. DSLD currently contains >20,000 labels, with 1000 labels being entered monthly. Using its "Quick Search" option we identified DS with "energy" and "caffeine" anywhere on the label. RESULTS: Of the >20,000 products in DSLD, 157 DS had "energy" in the product name, 106 dietary ingredients (DI) had "energy" in the DI name, and1539 products had "energy" anywhere on the label. The values for "caffeine" were 13, 60, and 554 respectively. With respect to the labeled composition of the 157 DS that had "energy" in the product name; of these 126 were in non-liquid forms (mainly pills) and 31in liquid form (serving size >1 fl oz). Of the non-liquid forms 52 of 126 (41%) declared caffeine on the label and 43 of 52 (83%) provided the amount of caffeine. Of the liquid forms 30 of the 31 (97%) and 9 of the 30 (30%) respectively did so. 65 of the 157 (41 %) products contained high levels of B-vitamins. Caffeine sources include synthetic caffeine, guaraná, green tea, yerba maté, and kola nut. Claimed bioactives in the non-caffeinated products include botanicals, amino acids, bee pollen, and enzymes. CONCLUSIONS: Few products report amounts of caffeine, taurine, glucuronic acid, and L-carnitine even though they are of interest to researchers, clinicians and consumers. Labeling amounts of these DI is optional if a component of a blend, as these DI do not have labeling daily values (DV). Estimating exposure to these DI from the label information is challenging.

Funding: Office of Dietary Supplements, NIH

41. Levels of serum 25(OH)D are associated with single nucleotide polymorphisms of the vitamin D receptor genes (TaqI and BsmI) and lifestyle in healthy women in Indonesia (Category: Vitamins, Minerals, and Bioactives)

Presenting Author: Dina Keumala Sari, Sumatera Utara University

Previous studies have shown that low 25(OH)D serum levels may increase mortality and morbidity, especially in obese women. To assess 25(OH)D serum levels in women and determine factors that can influence these levels. This cross-sectional study was conducted on 156 healthy Indonesian women during the dry season, measured serum 25(OH)D levels, examined two single nucleotide polymorphisms in the vitamin D receptor (TaqI and BsmI), and assessed lifestyle factors by using questionnaire.

The mean serum 25(OH)D level was 18.8 ± 7.0 ng/mL, 148 subjects categorized as either deficient and insufficient, and eight were categorized as sufficient. However, there was no significant difference in serum 25(OH)D levels between obese (OG) and non-obese groups (NG). All participants were heterozygous (T>C for TaqI and A>G for BsmI). There were associations between vitamin D deficiency-insufficiency with indoors occupation (p=0.001), less than 1 hour sun exposure (p=0.007), moderate physical activity (p=0.014, OR: 6.25, CI95% 1.26-32.12), prediction factors were vitamin D intake (p=0.012, OR: 5.435, CI95% 1.268-23.29), and body fat percentage (p=0.003, OR: 14.14, CI95% 1.69-118.19). The results showed that vitamin D deficiency may occur in healthy obese and non-obese women. All participants were heterozygous (T>C for TaqI and A>G for BsmI), both polymorphisms were present in all women studied, showed micro-evolution in this gene. Factors that can predict vitamin D deficiency were vitamin D intake and body fat percentage. It is important to asses the risk of vitamin D deficiency using genetic examination and mini-questionnaire.

Funding: Sumatera utara University Funding Research

42. Nutritional quality of Arabic Bread made with Psyllium husk as a Dietary Fiber Source (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Jiwan Sidhu, Kuwait University
Additional Authors: Ebtihal Al-Salem, Head, Laboratories, Kuwait Flour Mills & Bakeries Co. Kuwait

Kuwaiti population mainly consumes white Arabic bread, white pan bread and highly polished rice; this evidently

results in lower intake of dietary fiber.Psyllium husk, an excellent source of natural soluble fiber, contains more than eight times of soluble fiber than the oat bran, but it is difficult to incorporate the required amounts of psyllium into a single serving of a food product, because of its' considerable gelling and water-absorbing capacity. Adequate intake of soluble fiber is associated with favorable effects on the human health and psyllium has been found to significantly lower total cholesterol and low density cholesterol in humans.So the use of psyllium husk has been investigated for producing Arabic flat bread (pita bread) with improved nutritional quality but without adversely affecting the eating quality. Whole wheat flour (WWF) and straight-grade white flour (WF) were collected from the Kuwait Flour Mills & Bakeries Co., Shuwaikh. Psyllium (PS) husk was procured from India through a local importer. These samples were analyzed for moisture, protein, fat, total dietary fiber (TDF), soluble dietary fiber (SDF), insoluble dietary fiber (IDF), and ash contents, according to standard AACC methods (AACC, 1990). Arabic bread was made by using the methods as reported by Al-Hooti at al (2004). The objective color of bread samples was measured with a Macbeth Color Checker (model 545, Kollmorgen Instruments Corp., United Kingdom (UK)) Portable Spectrophotometer as CIE L*, a*, and b* values. The water activity of Arabic bread samples was estimated using a hand-held digital water activity probe (Vaisala make, Model HMI 31, Finland). Instrumental texture of pita bread was measured using a Stable Micro Systems TAXT2 Texture Analyzer (UK).All the chemical analyses are reported on a 14% moisture basis. All the experimental data obtained were analyzed statistically for analysis of variance, for statistical significance ($p = 0.05$) using Duncan's New Multiple Range Test (SAS Program Windows Version 6.08). All the results of this study will be presented in details in five tables. Addition of psyllium significantly enhanced the TDF of control white flour and whole wheat flour pita breads from original value of 3.2% to 7.56%, and from 11.78 % to 16.13%, respectively. The SDF contents of WF (from 1.31 % to 4.15%) and WWF (from 1.81% to 4.66%) pita breads also increased significantly. Psyllium addition significantly affected the final moisture content of baked pita breads (28.4% in control and 39.2% in test samples), without adversely affecting their water activities (0.69 to 0.70). Pita breads made with psyllium gave significantly lower compression values (280.9g) than control samples (588.2g), indicating softer crumb texture. Significantly higher sensory evaluation scores were obtained for test samples (8.3) than the control sample(6.2), thus indicating better consumer acceptability of these test samples.

These research findings indicate that psyllium husk, when used either in WF or WWF can produce high-fiber pita bread, which is not only lighter in crumb color and softer in texture, but was also equally acceptable to the consumers. The successful production of optimized formulations of these baked products on a pilot scale in a commercial bakery and their acceptance among the consumers strongly support the possibility of commercial production of these products using psyllium for improving the soluble dietary fiber intake among the consumers.

Funding: The financial assistance from Kuwait Fundation for Advancement of Sciences for this work is duly acknowledged.

43. Taste Test Interventions Spark Elementary-School Children's Interests and Appetites (Category: Policy and Nutrition)

Presenting Author: Stephanie Sunderlin, American University
Additional Authors: Michelle Kalicki, Anastasia Snelling, American University; Constance Newman, Joanne Guthrie, Lisa Mancino, United States Department of Agriculture Economic Research Service

The Healthy Hunger-Free Kid's Act of 2010 requires integration of the United States Department of Agriculture's Dietary Guidelines for Americans with the National School Lunch Program, improving the nutrient quality of foods served to school children across the country. However, school officials and staff find that much of the new healthier foods, and especially vegetables, are ending up in the garbage can rather than being consumed by students. There is a substantial need for better insight and effective approaches that encourage students to eat healthier foods they are now receiving for school lunch and reduce plate waste. Pre- and post-test data was collected in four demographically similar elementary schools (approximately 650 students in total) for two vegetables: sweet potatoes and collard greens. The student demographics consisted of primarily African American students from low-income neighborhoods with about 99% receiving free and reduced price meals. Two schools received the experiment and two were control schools. The study design involved a simple taste-test model in which a vegetable was prepared three different ways and offered as a tasting to elementary-school students during the school-lunch period. After students tried the three options, they were asked to vote on their favorite preparation style with the knowledge that the winning recipe would then be served as part of the school meal in the future. A difference-in-difference analysis showed a significant increase of sweet potato consumption in the treatment schools (from a baseline of 8% consumption increased to an average of 30%) compared to control schools (from a baseline of 16% consumption increased to an average of 22%). Consumption of collard greens did not increase significantly in treatment schools compared to control schools, but student consumption did increase overall from a baseline of 36% to an average of 42.5% in treatment schools and from a baseline of 53% to an average of 63.5% in control schools. Taste tests show strong potential as a low-cost intervention in the school setting that can help increase vegetable consumption among elementary-school aged children. Further research is needed to better understand the relationship of student engagement on increased vegetable consumption patterns. Ongoing work will expand to four additional schools with demographics that include multiple ethnicities based in a middle class neighborhood. Broadening the study will improve understanding, create comparisons, and determine generalizability of findings.

Funding: United States Department of Agriculture Economic Research Service

44. Determination of glucagon-like-peptide 1 (GLP-1) in human saliva (Category: Energy and Nutrient Metabolism)

Presenting Author: Allison Sylvetsky, Section on Pediatric Diabetes & Metabolism, NIDDK, NIH

Additional Authors: Allison C. Sylvetsky, Alexandra L. Gardner, Jenny E. Blau, Kristina I. Rother,
Section on Pediatric Diabetes & Metabolism, NIDDK, NIH

Saliva consists of thousands of proteins which include hormones involved in regulating satiety and energy balance, typically found in the gastrointestinal tract. We aimed to determine the presence and regulation of salivary glucagon-like peptide 1 (GLP-1) and compare the results with systemic GLP-1 concentrations. In this ongoing project (recruitment goal: n=60), healthy, adult volunteers undergo oral glucose tolerance tests (OGTTs) preceded by varying preloads (carbonated water vs. diet soda vs. sucralose and acesulfame-potassium dissolved in water) of equal volume (360 ml). Plasma and saliva samples were collected simultaneously at -10 (preload), 0 (glucose load), 10, 20, 30, 60, 90, and 120 minutes. Total GLP-1 was measured by radioimmunoassay (Millipore, Billerica MA, USA).

Contrary to prior reports, salivary GLP-1 was present in all participants (n=8) with baseline salivary concentrations at ~37% of plasma concentrations (1.8 ng/ml vs. 4.9 ng/ml). OGTT stimulated plasma GLP-1 peaks are typically 150% higher than baseline, while salivary GLP-1 rose by 50% before returning to baseline at 120 minutes. Determination of GLP-1 in saliva further confirms the recently described overlap in taste signaling pathways between the oral cavity and the intestinal epithelium and supports the potential importance of GLP-1 in modulating taste sensation. While the origin of salivary GLP-1 remains to be determined, the presence of GLP-1 in saliva may have important implications for the regulation of taste preferences and food intake. Furthermore, detection of GLP-1 in saliva may offer a practical and minimally-invasive approach to estimate circulating concentrations.

Funding: This work was supported by the Intramural Research Program of the National Institute of Diabetes and Digestive and Kidney Diseases.

45. Feasibility of collecting 24-hour urine in the National Health and Nutrition Examination Survey: results from a pilot study (Category: Policy and Nutrition)

Presenting Author: Ana Terry, Centers for Disease Control and Prevention, National Center for Health Statistics
Additional Authors: Mary E Cogswell, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; Xinli Zhang, Centers for Disease Control and Prevention, National Center for Health Statistics; Catherine M Loria, NIH.

Excess dietary sodium intake increases the risk for cardiovascular disease. Baseline data on sodium intake prior to sodium reduction in the food supply, and the monitoring of national trends in intake will inform policy makers of the success of those efforts. To obtain the most accurate data regarding mean population sodium intake, measuring 24-hour (h) urinary sodium excretion is recommended. A study was conducted in 2013 to assess the feasibility of implementing a 24-h urine collection as part of the National Health and Nutrition Examination Survey (NHANES). A half sample of non-pregnant adults aged 20-69 years, examined in three NHANES locations, was randomly selected for the study. Participants received verbal instructions, started the urine collection at a mobile examination center (MEC) with an initial void, collected urine for 24 hours, and returned to the MEC to end participation with a final void. Upon return, a questionnaire was administered. Completeness was defined as collection time >22 h, total urine volume >500 mL, missing no more than "a few drops" of urine, and for women, no-menstruation during collection. Among those with a complete sample, a random half were asked to collect a second 24-h urine. Laboratory tests were performed on urine sodium, potassium, chloride, and creatinine. Of the 282 individuals selected for the study, 75% (n=212) successfully completed a 24-h urine collection. Of those, 85% (n=92) successfully completed a second 24-h urine collection. More males (81%) collected a complete initial sample compared to females (70%) (P=0.04, Chi-square test). There were no other significant differences in percent complete across categories of age, race, education, or employment status for the initial or second collection. Mean (±SD) 24-h urine volume and sodium excretion were 1,956±1,245 mL and 3,629±2,001 mg for the first 24-hr urine collection and 2,036±1,289 mL and 3,759±1,884 mg for the second collection, respectively. Given the high response rate, a 24-h urine collection by a random half sample of adults 20-69 years and a second 24-h urine collection on a subsample of those with a complete first collection are planned for NHANES 2014 to assess population mean and excess sodium intake.

Funding: Centers for Disease Control and Prevention, National Institutes of Health

46. Current Trends in the Treatment of Patients with Polycystic Ovary Syndrome (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Wendy Thompson, West Virginia University
Additional Authors: Pamela J. Murray, MD, MHP, West Virginia University School of Medicine Department of Pediatrics, Adolescent Medicine; Melanie J. Clemmer, PhD, West Virginia University School of Medicine, Department of OB/GYN, Melissa D. Olfert, DrPH, MS, RD, LD, West Virginia University

To assess the current trends in treatment of polycystic ovary syndrome (PCOS) and to describe ideas about multidisciplinary PCOS clinics. Practitioners who work with PCOS were invited to complete an internet survey (Qualtrics, Provo, UT). An announcement was sent out asking for their participation in the survey to four list serves, LinkedIn Groups, and individuals who were identified by their research in the field. The survey consisted of 30 questions targeting information on their current treatment facility and approach, and perspectives about multidisciplinary clinics. Of the survey respondents (N = 261), 66% were physicians and 22% were dietitians/nutritionists. Most (64%) worked in the United States and 36% were from other countries. Sixty-six percent of practitioners treated PCOS in a hospital or clinic, a private office (45%) or research facility (8%). Fifty-nine percent of the respondents treated PCOS in a multidisciplinary setting, defined as using at least two health care providers from different specialties, and 79% stated their facility treated PCOS comprehensively instead of with

just one approach. When asked to identify the top area that their facility could improve upon, the most common answer was more integration and multidisciplinary involvement from different providers. The second most common answer was to have an improved weight management program incorporating more nutrition and exercise counseling. The top three barriers for future multidisciplinary clinics included money/resources, insurance coverage/reimbursement, and difference of opinions between providers. PCOS is a complex condition that requires the expertise of multiple provider types to treat the syndrome in its entirety. Most providers agree that a multidisciplinary clinic would provider greater convenience, access to care, and ultimately lead to a better prognosis for patients with PCOS. The perceived barriers that prevent clinics from becoming multidisciplinary would need to be conquered, but providers indicate enthusiasm for the opportunity to implement a multidisciplinary approach.

Funding: WVU Agriculture Experimental Station Hatch Project (Olfert)

47. Design and Implementation of a Peer Educator Program Focused on Childhood Obesity Prevention (Category: Clinical and Community Nutrition)

Presenting Author: Linda Thompson, Howard University

Childhood overweight/obesity affects more than half (51.9%) of poor children in the District of Columbia (D.C.), as stated in a 2007 report by the Trust for American's Health. Communities in D.C. that are predominately African American and low-income have been impacted the most by childhood obesity. A Peer to Peer Educator Program was developed by Summit Health Institute for Research and Education, Inc. (SHIRE), to address childhood obesity prevention in a low income community (Ward 8) in the District of Columbia. Peer educators have been shown to effectively reach African-American and other minority populations with important nutrition/health information. Aside from common cultural values, norms, and language, peer educators have similar issues as those of their target audiences. This commonality gives peer educators an advantage over health professionals.

Program Objectives
• Develop a childhood obesity prevention curriculum for the training of adult peer educators.
• Recruit and train 10 committed community members to present information on childhood obesity to their peers.
• Peer educators to conduct at least 30 community based childhood obesity prevention presentations by the end of the program period.

Program creation began by conducting focus groups within the target population to determine residents' concerns and suggestions about unhealthy behaviors and food accessibility and affordability. Peer educator outreach and recruitment was conducted over a two week period prior to the start of the Peer Educator Program. From June 8 – 22, 2009 fliers were posted and distributed in local gathering places throughout Ward 8 (grocery stores, libraries, recreation centers). Local residents were recruited on the spot by asking an initial round of questions to ascertain interest and to determine if they met initial criteria for participation. Once interested persons were identified, the next phase of selection involved telephone interviews with specific criteria which included: a sincere interest in promoting healthy eating and active living in their community, ability to attend all trainings, ability to read on a 5th grade level, and be able to travel to training sites and presentations on their own. During the training phase, participants attended sessions over a 4-week period which focused on nutrition education (including factors contributing to childhood obesity), and communication, presentation, food preparation and organizational skill building. After training was completed, community presentations were conducted in group settings with a minimum of five participants. Presentations were delivered in a short 20 minute time frame and were designed to impart information but also included questions to encourage audience reflection and participation. In order to ensure the effectiveness of these presentations, each peer educator was given a tool kit with various items to enhance the learning of community residents. Tool kits included tangible items like a 1lb fat replica, junk food products, and an obesity poster allowing participants to see the effects of a poor diet. Peer educators reached approximately 403 community members. Post-presentation survey feedback from community presentation audiences (353 completed surveys) was very positive, as 71% of respondents rated the presentations a 10 (highest rating) on a scale of 1-10, 13% rated it a 9, and 16% rated it an 8. In addition, at least 95% of respondents affirmed that after listening to the presentation there were additional things they could do to help prevent or reduce obesity and make better nutritional choices for themselves and their family.

SHIRE's peer education model's success was reflected not only in the response from presentation participants, but also in the attitude of the peer educators. As a result of the program, the peer educators became permanent advocates and natural stakeholders in reducing childhood obesity in their community. Consideration should be made to incorporate peer educators in community-based nutrition/health interventions in low income communities.

Funding: Office of Minority Health's Community Partnerships to Eliminate Health Disparities Demonstration Grant

48. Should statin users still eat a healthy diet? Evidence from the National Health and Nutrition Examination Survey (NHANES) 2003-2008 (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Huifen Wang, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University
Additional Authors: Alice H. Lichtenstein, Stefania Lamon-Fava and Paul F. Jacques, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University

Cardiovascular disease (CVD) is the leading cause of death globally. Non-high density lipoprotein cholesterol (non-HDL-C) concentrations are positively associated with CVD risk. Both use of statins and a 'heart-healthy diet' lower CVD risk, in part by improving plasma lipid profiles. Statin therapy is increasingly used. Little is known about the potential additive effects of statins and diet quality. We aimed to assess this interaction in relation to serum lipid profiles among U.S. adults. Cross-sectional data from the NHANES 2003-2008

cycles were used, including 7600 adults age≥45 years with valid dietary data. Participants' intake was estimated from one 24-hour diet recall using the MyPyramid Equivalents Database. Diet quality was assessed using the Healthy Eating Index (HEI), based on the 2010 Dietary Guidelines for Americans (maximum HEI=100). Lower and higher diet quality were defined as HEI<50 and HEI ≥50, respectively. Participants self-reported statin use. Plasma total cholesterol (TC) and HDL-C were measured in all participants; non-HDL-C concentrations and TC/HDL-C ratio were calculated. The interaction between statin use and diet quality (i.e. departure from an additive relationship) was tested by including a product term of dichotomized HEI and statin use in linear regression models.

The mean HEI score was 58.5; and 24.3% of the cohort reported using statins. Statin users had a higher diet quality than non-users (difference in HEI=0.7, P-difference<0.001). After adjustment for covariates, there was no significant interaction between statin use and diet quality in relation to non-HDL-C concentrations and TC/HDL-C ratio (P-interaction=0.5 and 0.4, respectively), suggesting that the benefits from statin use and higher diet quality are additive and independent. The mean TC/HDL-C ratio was 4.3 among adults who did not use statins and had lower diet quality. Compared to that, the mean TC/HDL-C ratio was 0.2 lower among statin non-users with higher diet quality, 0.4 lower among statin users with lower diet quality, and 0.6 lower among statin users with higher diet quality (all P-difference <0.01). Higher versus lower diet quality was associated with 0.2 lower mean TC/HDL-C ratio (P-association<0.001) regardless of statin use. A similar pattern was also evident for non-HDL-C concentrations. In adults who used statins, higher diet quality is independently associated with better serum lipid profiles.

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49. Future Research Needs (FRNs) -- Sugars and Health Outcomes(FRNs) Assessment of-- Sugars and Health Outcomes (Category: Policy and Nutrition)

Presenting Author: Ding Ding Wang, Department of Public Health and Community Medicine, School of Medicine, Tufts University
Additional Authors: Author: Mei Chung, PhD, MPH, Department of Public Health and Community Medicine, School of Medicine, Tufts University

To implement a novel FRN process using evidence mapping to inform and engage stakeholders to prioritize FRNs relating sugar intake to health outcomes. Evidence mapping is a new method that systematically characterizes the range of research activity in broad topic areas. We created an evidence map (EM) on sugars and health outcomes using an iterative process. A diverse and balanced stakeholder panel was established utilizing existing networks. Stakeholders were engaged early and throughout the entire FRN process using various techniques, including emails, periodic webinars, survey monkey, and one in-person meeting (October 2013). We surveyed stakeholders' input to refine EM eligibility criteria and to prioritize a list of research topics. A private web discussion forum was also set up for topic generations and discussions. As the EM data collection process continued, the web forum was updated weekly with new evidence gaps and research questions stimulate discussions. Our literature search yielded 13,008 citations. Populations, Interventions/ Exposures, Comparators, and Outcomes (PIECO) information from 708 abstracts was extracted to create evidence map. We included 213 studies based on stakeholders' input on prioritizations and extracted more detailed information on PIECO and study design characteristics to construct the final EM database, which covers 88% of the topics in the published literature. Twenty stakeholders were approached and fourteen were recruited. The final stakeholder panel consisted of two lay audiences, two health providers (a dietician and a physician), one research funder, two policy makers, one evidence-based methodologist, five researchers with different expertise, and one retired personnel from the industry. By closely communicating and guiding stakeholders, we were able to keep them interested and engaged throughout the EM process with an overall participation rate above 90%. Stakeholders are now informed and ready to discuss and prioritize the top 10 FRN topics in the upcoming In-person meeting. Through close private-academic partnership, we were successful in recruiting and engaging academic and policy stakeholders. However, recruiting and engaging lay stakeholders remained difficult. Overall, evidence mapping appears to be a cost-effective method to generate evidence-based information to inform and facilitate FRN process.

Funding: International Life Science Institute North America

50. What the Label Doesn't Tell You: Fatty Acid Composition, Biomarkers and Their Clinical Significance (Category: Energy and Nutrient Metabolism)

Presenting Author: Venus Welch-White, Tuskegee University
Additional Authors: Norma Dawkins and Thomas Graham, Tuskegee University

The types of dietary fat consumed significantly impacts metabolic processes and overall health. Fatty acid composition varies significantly within saturated and unsaturated fats and metabolize differently because of these variations. Research shows that the fatty acid composition of dietary fats in TGs mainly affects the development of obesity, diabetes and hyperlipidemia. Excessive saturated fat (SFA) consumption promotes lipid storage and inflammation, while polyunsaturated fatty acids (PUFAs) play a protective role by controlling the synthesis and oxidation of SFA. Furthermore, unsaturated fatty acids lower hepatic fat content, and improve blood lipid profiles associated with risk of cardiovascular disease. Additionally, dietary fat has also been associated with endocrine and metabolic changes. The accumulation of adipose tissue increases the risk of metabolic syndrome. Evidence exist that adipose tissue is influenced in the hypo- or hyperthyroid state. The thyroid hormones play a critical role in regulating fat, glucose and energy metabolism. There is limited literature which adequately addresses the conversion and deposition of adipose tissue in the altered thyroid and/ or the impact of fatty acid composition.

We hypothesize that selective biomarkers (body weight, cholesterol, adipose deposition and conversion) will be negatively impacted by thyroid status and high dietary fats. The objective of this research evaluated dietary fat and altered thyroid function on biomarkers. Adult male Sprague Dawley rats (n=100) were exposed to a control (12% fat) or one of four test diets; 25% (saturated or unsaturated) or 37% (saturated or unsaturated) for period of 8 weeks. Each diet group had ten normal and ten altered thyroid animals. A chemically reduced thyroid state was obtained through the addition of .05% propylthioracil (PTU) in drinking water. The results revealed euthyroid rats had increased body weights compared to thyroid altered rats ($p< 0.05$). The lipid profile revealed a trend of higher total cholesterol among euthyroid rats compared to thyroid altered animals who consumed unsaturated fat diets. Findings revealed an increase in brown adipose tissue (BAT) to white adipose tissue (WAT) conversion, and the increased presence of hepatic stellate (ito) cells and vacuoles in the livers of thyroid altered rats who consumed the saturated fats diets. In conclusion an altered thyroid status and the high fatty acid intake negatively influenced biomarkers. Additionally, the fatty acid profile plays an important clinical role in both optimal and reduced health subjects. This study provides a foundation for future studies to evaluate the impact of fatty acid composition on clinical biomarkers which may influence future nutrition policy initiatives.

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51. Growth and development in preschoolers with picky eating behavior: a cross-sectional study (Category: Clinical and Community Nutrition)

Presenting Author: Yong Xue, Department of Nutrition and Food Hygiene, School of Public Health, Peking University
Additional Authors: Yumei Zhang, and Peiyu Wang, Department of Nutrition and Food Hygiene, School of Public Health, Peking University

To predict the proportion of preschoolers' picky eating behavior in China, to investigate possible links between picky eating behavior and preschoolers' growth and development with adjustment of major covariates. By multi-stage stratified cluster sampling method, 973 healthy preschoolers aged 4-7 years old participated in our study, children and their mother's socio-demographics information, and children's anthropometry and nutrients dietary intakes from 24-hour dietary intake record, were collected. Multiple linear regression models were used to verify the functional relation between picky eating and children' growth and development. Up to 45.73% participants were defined as picky eaters, and pick eating behavior was associated with a 1.031cm reduction in height (95% CI: -1.969, -0.094; p=0.031), a 0.675kg reduction in weight (95% CI: -1.150, -0.200; p=0.031), a 0.672cm reduction in waist circumference (95% CI: -1.301, -0.043; p=0.036), and a 0.789cm reduction in hip circumference (95% CI: -1.407, -0.017; p=0.012), and the reductions had become more and more significant as the duration of pick eating behavior. Those picky eaters who disliked meat, meat, eggs, milk and milk products, and soybean and soybean products had significant impact on their growth and development, and picky eaters confirmed by five times try or above also had significant impact on growth. Picky eaters had lower dietary intakes of energy, protein, carbohydrate, dietary fiber, thiamin, magnesium, iron, and zinc than no picky eaters ($p<0.004$~0.042). Picky eating behavior was very prevalent in preschoolers, which had hurt their growth and development, especially for weight, height, waist circumference and hip circumference. Those picky eaters who disliked meat, meat, eggs, milk and milk products, and soybean and soybean products and those confirmed as picky eaters by five times try or above should be paid more attention. Nutritional guidance and strategies should be provided for parents to promote children' acceptance of a variety of foods and dietary supplement to prevent the harmful effect on their growth and development.

Funding: Mengniu Nutrition Foundation

52. Effect of nutrition support on clinical outcome and cost-effectiveness ratio in patients at nutritional risk by NRS 2002 tool: a prospective cohort study (Category: Policy and Nutrition)

Presenting Author: Hui Zhang, Guizhou Provincial People's Hospital,Guiyang,China
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There were studies have been reported the impact of nutrition support on clinical outcome in patients at nutritional risk. However, few outcome data combined with a cost-effectiveness analysis were published in the US or China. The aims were 1) to examine the impact of nutrition support on clinical outcome for gastrointestinal patients at nutritional risk identified by Nutritional Risk Screening 2002 and, 2) to compare the cost- effectiveness ratio of a nutrition support cohort with that of a no support cohort. It was a prospective cohort observational study. Patients consecutively admitted to the gastrointestinal wards with inclusion diagnoses were all enrolled. Information regarding nutrition support, treatment, complications and length of stay were recorded. All actual hospital costs were obtained from the statement of accounts. The rate of "infectious complication-free" patients was regarded as the index of effectiveness. There were 440 cases fulfilled all inclusion criteria in the final analysis. The patients with nutrition support had a lower incidence of infectious complications than without nutrition support (9.1% versus18.1%, P=0.0067). The adjusted total cost was USD 4707/patient and 4721/patient in the nutrition support and no support cohorts, respectively. The adjusted effectiveness was 95.8% and 86.6% in the nutrition support and the no support cohorts, respectively. Cost- effectiveness ratios was USD 4914 and 5451, respectively. The incremental cost effectiveness was USD -147. The economic benefit was almost negligible, but nutrition support decreased the incidence of infections without additional cost in this study.

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53. Dietary mineral intakes of Chinese lactating women: insufficient intake of calcium and potassium while excessive intake of sodium and phosphorus (Category: Clinical and Community Nutrition)

Presenting Author: Yumei Zhang, School of Public Health, Peking University Health Science Center
Additional Authors: Ai Zhao, Peiyu Wang, and Li Cai, Department of Social Medicine and Health Education, School of Public Health, Peking University Health Science Center, Beijing; Yumei Zhang, Junkuan Li, Wenjun Li, Kai Yu, and Liqiang Qin

Objectives of this study were 1) to investigate the mineral intake by Chinese lactating mothers, 2) to explore the diet sources of minerals, and 3) the ratios between different dietary minerals. A total of 459 lactating mothers in 5-180days postpartum from three cities of China (Beijing, Suzhou and Guangzhou) participated in this study. Food intakes were measured using one cycle of 24-hour dietary record and nutrients from food were calculated based on the Chinese Food Composition Table 2004. Chinese lactating women exhibited inappropriate food intake patterns during lactation. The daily milk intake of 84.9 % of women was less than 300g, while 76.1% of women had salt intake over 6g per day. For mineral intake, the dietary iron met the adequate intake requirement, with 25.8% of iron from animal-based food. However, insufficient intakes of dietary minerals were found for calcium and potassium, and excessive intakes for sodium and phosphorus. The calcium-to-phosphorus ratio was 0.49/1 and the sodium-to-potassium ratio was 2.96/1. Considering the food sources of nutrients, 60% of calcium was plant-based and only 2.8% from nutrient supplement. The majority of dietary phosphorus was in its inorganic form, with the phosphorus-to-protein ratio as 0.014/1. Chinese lactating women had an inappropriate food intake during lactation. The insufficient intake of calcium and potassium while the excessive intake of sodium and phosphorus were the most serious nutrition problem regarding mineral intake. An appropriate combination of interventions (including encourage women to daily drink adequate amount of milk; add adequate amount of calcium supplements and restrict the salt used in cooking) is recommended to improve the nutrition for Chinese lactating women.

Funding: This study is funded by Nestle China Limited and Nestle Research Center, and is part of the Maternal Infant Nutrition and Growth Study (MING Study, DNUT-101546).

54. Prevalence of malnutrition and its risk factors among lactating mothers in Burma (Category: Clinical and Community Nutrition)

Presenting Author: Ai Zhao, School of Public Health, Peking University Health Science Center
Additional Authors: Ai Zhao1 and Peiyu Wang, Department of Social Medicine and Health Education, School of Public Health, Peking University Health Science Center, Beijing, China; Yumei Zhang, Department of Nutrition & Food Hygiene; Ying Peng, Bo Li, Jiayin Li, and Ze Haung.

Burma is geographically the largest country in mainland Southeast Asia and 60% of the population consists of mothers and children, who are the most vulnerable group to malnutrition. The nutrition status of lactating women in this country were still unknown. Objectives of this study are:1) to determine the malnutrition status of lactating women and 2) to find out the risk factors associated with malnutrition. Convenience sampling was used to select three villages in two different regions (Kachin and Shan) in Burma. Hemoglobin and anthropometric indicators were measured for 733 lactating women. Logistic regression analyses were used to determine factors associated with malnutrition.

In this study, 11.9% of the women were underweight (Body Mass Index <18.5kg/m2) and 28.3% of the women were indicated as malnutrition (Mid-upper arm circumference <22.5cm). The overall anemia prevalence in studied population was 60.3%, with 20.3% were severe anemia. According to the self-reported health-related symptoms, 18.7% of the women reported that they had experienced certain symptoms of night blindness or poor dark adaptation in the past year, and 23.6% of the women described a recurrent oral ulcer history. Approximately 14.9% and 13.2% of the women reported to have a fever of unknown origin and an unidentified diarrhea respectively. A total of 57.8%, 62.6% and 66.7% of the women never or less than one time per week had eggs, meat and milk respectively. Factors of self-reported symptoms of night blindness or poor dark adaptation, without primary education experience, low family annual capita income(<800 MMK, equals to 120 US dollar), drinking spring or river water and drinking unboiled water were associated with malnutrition. The nutritional status of lactating women in Burma is quite poor. To promote the nutrition status, humanitarians and governments should launch comprehensive interventions.

Funding: This study is funded by Health Unlimited Organization.

55. Hypolipidemic and renal protective effect of seeds mixture rich in omega-3 and omega-6 fatty acids in rats (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Eman Fadlalla, Ain Shams University
Additional Authors: fadlAlla , Eman aly, Gala, Shahr Mosy, Department of Biochemistry & Nutrition Women's College –Ain –Shams University; Ewiss , Nahla Ahmed, College of Home Economics, Helwan University Seddik, Aymen Aly, Department of Internal Medicine Facu

Assessing the In vivo Hypolipidemic and renal protective activities of seeds mixture rich in omega-3 and omega-6 fatty acids in rats 64 male albino rats were divided into 8 groups: control group, hypercholesterolemic rats, fed the balanced diet supplemented with cholesterol at a dose level of 2 g/100 g diet; the other 6 groups of animals fed the same previous hypercholesterolemic diet supplemented with either mixture of Flax / pumpkin (FP) , Flax/Sesame (FS) , Flax/Peanut (FA), purslane / pumpkin (PP) , purslane / Sesame (PS) and purslane /Peanut (P A) to ascertain the claim of its utilisation against diseases. The seeds mixture rich in unsaturated fatty acids were prepared at ratio of (5/1) (ω-3 and ω-6) and were orally administered ad libitum to rats diet for 30 days. High cholesterol fed diet rats (2%) showed a significant increase in total cholesterol, total lipids, and triacylglycerol in both serum

and liver. Serum phospholipids, LDL-C, and atherogenic index also significantly increased compared to control group. On the other hand , High cholesterol fed diet rats showed a significant decrease in high-density lipoproteins (HDL) . Cholesterol-enriched diet also significantly increased serum urea, creatinine, sodium and potassium levels compared to healthy control. Consumption of seeds mixture rich in omega-3 and omega-6 fatty acids by hypercholesterolemic rats resulted in a significantly decrement in lipid parameters and improvement in renal function as compared with hypercholesterolemic rats. Seeds mixtures had anti-atherogenic hypolipidemic effect which were probably mediated by unsaturated fatty acids present in seed mixture.

Funding: Ain Shams University

56. Association of Elevated Serum Ferritin Level and the Risk of Gestation Diabetes Mellitus (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Isabelle Hininger-Favier, Laboratoire de bioénergétique fondamentale et appliquée LBFA / INSERM 1055 – Université Joseph Fourrier – Grenoble – France
Additional Authors: Salam ZEIN,Samar RACHIDI, Sanaa AWADA, Amal AL-HAJJE, Pascale SALAMEH
Laboratoire de Recherche Clinique et Epidémiologique – Faculté de Pharmacie – Université Libanaise – Beyrouth – Liban

Gestational diabetes mellitus (GDM) is among the most common complications of pregnancy with an incidence of 3-14% depending on the population studied. Emerging data from an array of epidemiological studies support the significant association between body iron status and GDM. Moreover, pregnancy dietary patterns may affect women's risk of developing GDM; mechanisms linking high iron status with abnormal glucose metabolism have been proposed, possibly mediated through oxidative stress. The objective of the present study is to examine the relationship between high serum ferritin level at the first trimester and occurrence of GDM in non-anemic Lebanese women. This prospective, monocentric, pilot study involved 79 non-anemic pregnant women recruited between December 2012 and July 2013, and the study is still on going until to include150 participants. Participants were divided into 2 groups based on the 50th percentile value for ferritin (21.1 ng/dL) at the booking visit and GDM was diagnosed at 24 to 28 weeks of gestation. The oral glucose tolerance test was performed with 75g glucose load. Statistical analysis. Continuous variables were expressed as means ± standard deviation. Categorials variables were compared using Chi-square test.

GDM was reported in 3.8% of women, all having their ferritin level in the higher group according to the American Congress of Obstetricians and Gynecologists criteria for GDM diagnosis (ACOG, 2013). The prevalence of GDM was increased to 15.2% when diagnostic recommendations of the Americain Diabetes Association (ADA, 2013) were adopted. Interestingly, 67% of women diagnosed with GDM had their initial ferritin level at the higher group and 33% in the low ferritin group. However, the incidence of GDM on these preliminary data did not reach significative difference between the groups .

High iron stores early in pregnancy may be a risk factor for developing GDM. Exploitation of iron diet intake are on course. Studies on patterns nutrition and iron status during early pregnancy may be one of the important issues for preventing the risk of gestational diabetes.

Funding: This work was funded by Lebanese National Council for Scientific research

57. Understanding weight loss through crowd sourcing: implications for future research. (Category: Disease Prevention, Progression and Treatment)

Presenting Author: Larry Istrail
Additional Authors: none

A largely untapped tool in the line of medical research is the Internet. If study subjects could reliably input their medical data into an online research database, such a model would dramatically lower costs, expand the study subject population to the entire developed world, and enable one researcher to study thousands or even millions of subjects at once. The Ancestral Weight Loss Registry (awlr.org) is an online registry that tests this research methodology and studies diet, health, and weight loss by asking those who consume carbohydrate-restricted diets to fill out a questionnaire regarding their medical history, eating behaviors and outcomes. The resulting data is aggregated and analyzed, retrospectively looking for trends, side effects and improvements that emerge from the crowd-sourced data.

Funding: No funding to declare

TABLE 1

American Society for Nutrition

9650 Rockville Pike
Bethesda, MD 20814
301.634.7050
www.nutrition.org

Established in 1928, ASN represents more than 5,000 researchers, medical professionals, clinical nutritionists, and policy makers around the world who work in academia, practice, government and industry. The authoritative voice on nutrition, ASN publishes *The American Journal of Clinical Nutrition*, *The Journal of Nutrition* and *Advances in Nutrition*. Members benefit from savings on meetings, continuing education credits, and journals as well as vital resources and networking opportunities. Stop by our booth to learn how ASN membership can benefit you!

TABLE 2

HHS/Office of Disease Prevention and Health Promotion

1101 Wootton Parkway
Tower Oaks Bldg, Suite LL100
Rockville, MD 20852
240.453.8267
www.DietaryGuidelines.gov

The US Department of Health and Human Service's Office of Disease Prevention and Health Promotion will feature health promotion and disease prevention activities related to the Dietary Guidelines and Physical Activity Guidelines, Healthy People objectives, and health literacy goals. Learn about the 2015 Dietary Guidelines Advisory Committee scientific review process.

TABLE 3

USDA Center for Nutrition Policy & Promotion

3101 Park Center Drive, 10th Floor
Alexandria, VA 22302
703.305.7600
www.choosemyplate.gov

The mission of the USDA Center for Nutrition Policy and Promotion is to improve the health of Americans by developing and promoting dietary guidance that links scientific research to the nutrition needs of consumers. CNPP's core projects include the Dietary Guidelines for Americans, MyPlate, SuperTracker, and the Healthy Eating Index.

TABLE 4

American Beverage Association

1101 16th Street NW
Washington, D.C. 20036
202.463.6703
www.ameribev.org

The American Beverage Association is the leading policy and public education advocate for the non-alcoholic beverage industry. The industry has a longstanding commitment to being part of the solution to childhood obesity, demonstrated through innovative voluntary initiatives including the national School Beverage Guidelines, Clear on Calories front-of-pack labeling initiative and the Calories Count™ Beverage Vending Program.

TABLE 5

American Institute for Cancer Research

1759 R Street NW
Washington, D.C. 20009
202.328.7744
www.aicr.org

The American Institute for Cancer Research (AICR) is the cancer charity that fosters research on the relationship of diet, nutrition, physical activity and weight management to cancer risk, interprets the scientific literature and educates the public about the results.

TABLE 6

California Walnut Commission

101 Parkshore Drive Suite 250
Folsom, Ca 95630
916.932.7070
www.walnuts.org

The California Walnut Commission has demonstrated a 20-year commitment to exploring and understanding the health benefits of walnuts with 120 publications in peer reviewed journals to date. For more information on walnuts, our health research program or the California Walnut Commission please visit walnuts.org.

TABLE 7

Egg Nutrition Center

PO Box 738
1460 Renaissance Drive
Park Ridge, IL 60068
224.563.3720
www.EggNutritionCenter.org

Egg Nutrition Center (ENC) is the research and health professional center affiliated with the American Egg Board. ENC develops nutrition education materials and tool kits for health professionals and administers an annual research grant and student fellowship program. Deadline for grant submissions is 1/1/14. Additional information is posted at www.eggnutritioncenter.org.

TABLE 8

FDA/CFSAN

5100 Paint Branch Parkway
College Park, MD 20740
240.402.1907
www.fda.gov

FDA's Center for Food Safety and Applied Nutrition, in conjunction with the Agency's field staff, is responsible for promoting and protecting public health by ensuring that the nation's food supply is safe, sanitary, wholesome, and honestly labeled, and that cosmetic products are safe and properly labeled. In addition, a primary mission of the Center is to provide consumer information through all available media about safe use of dietary supplements and cosmetics; safe handling and preparation of food; and sound nutrition practices.

TABLE 9

DuPont Nutrition & Health

4200 Duncan Avenue
St. Louis, MO 63110
www.solae.com
www.food.dupont.com

DuPont Nutrition & Health addresses the world's challenges in food by offering a wide range of sustainable, bio-based ingredients and advanced molecular diagnostic solutions to provide safer, healthier and more nutritious food. Through close collaboration with customers, DuPont combines knowledge and experience with a passion for innovation to deliver unparalleled customer value to the marketplace.

TABLE 10

National Confectioners Association

1101 30th Street NW, Suite 200
Washington, D.C. 20007
202.534.1440
www.CandyUSA.com

The National Confectioners Association is the major association representing the entire confectionery industry, offering education and leadership in manufacturing, technical research, public relations, retailing practices, government relations, and statistical analyses. Currently the association is engaging industry members in the adoption of Front-of-Pack labeling so consumers are better informed about what is in confectionery products. NCA is also dedicated to researching how candy is consumed and informing consumers how to "treat right" by encouraging mindful moderate candy consumption.

TABLE 11

NIH Office of Dietary Supplements

6100 Executive Boulevard, Room 3B01
Bethesda, MD: 20892
304-435-2920
www.ods.od.nih.gov

The NIH Office of Dietary Supplements' (ODS) mission is to strengthen knowledge and understanding of dietary supplements. Visit our booth to learn about our free mobile app, MyDS, now available in Spanish, the new features on our Web site, http://ods.od.nih.gov, our current programs, and to receive our educational materials.

TABLE 12

Ocean Spray and Ocean Spray Cranberries, Inc.

One Ocean Spray Drive
Lakeville-Middleboro, MA 02349
617.520.7217
www.OceanSpray.com

Ocean Spray is a vibrant agricultural cooperative owned by more than 700 cranberry and grapefruit growers who have helped preserve the family farming way of life for generations. Ocean Spray is the world's leading producer of cranberry juices, juice drinks and dried cranberries, and is the best-selling brand in the bottled juice category.

TABLE 13

Sigma Tau Pharmaceuticals

9841 Washingtonian Blvd, Suite 500
Gaithersburg, MD 20878
301.948.1041
www.SigmaTau.com

Sigma-Tau Pharmaceuticals, Inc. is a rare corporation dedicated to creating novel medicines for the unmet needs of patients with rare diseases. Truly unique in its field, Sigma-Tau places its considerable scientific resources behind the discovery of compounds that benefit the few. Simply because it's the right thing to do.