



ILSI

North America

Nutrition Briefs

September 2016

Cardiovascular Disease

Long-Term Immunomodulatory Effects of a Mediterranean Diet in Adults at High Risk of Cardiovascular Disease in the PREvencción con Dieta MEDiterránea (PREDIMED) Randomized Controlled Trial

R. Casas, E. Sacanella, M. Urpí-Sardà, D. Corella, O. Castañer, R-M. Lamuela-Raventos, et al.

Journal of Nutrition, Vol. 146, No. 9; pp.1684–1693

DOIs: 10.3945/jn.115.229476

Link to full text: [Click here](#)

Significance: The MedDiet participants had lower cellular and plasma concentrations of inflammatory markers related to atherosclerosis at 3 and 5 y.

This study assessed the long-term effects of the Mediterranean diet (MedDiet) on inflammatory markers related to atherogenesis in adults at high risk of cardiovascular disease (CVD) compared with the effects of a low-fat diet (LFD). High-risk subjects (n=165) were randomly assigned (50% men; mean age=66 y) without overt CVD to 1 of 3 diets: a MedDiet supplemented with extra-virgin olive oil, a MedDiet supplemented with nuts, or an LFD. Follow-up data were collected at 3 and 5 y. The 2 MedDiet groups achieved a high degree of adherence to the intervention, and the LFD group had reduced energy intake from fat by 13% by 5 y. Compared with baseline, at 3 and 5 y, both MedDiet groups had significant reductions of $\geq 16\%$ in plasma concentrations of high-sensitivity CRP, IL-6, TNF α , and monocyte chemoattractant protein 1, whereas there were no significant changes in the LFD group. The reductions in CD49d and CD40 expressions in T lymphocytes and monocytes at 3 y were $\geq 16\%$ greater in both MedDiet groups than were the changes in the LFD group ($P < 0.001$) at 3 y. Compared with baseline, at 3 y, the MedDiet groups had increased HDL-cholesterol ($\geq 8\%$) and decreased blood pressure ($>4\%$) and total cholesterol, LDL-cholesterol, and triglyceride ($\geq 8\%$) concentrations. At 5 y, concentrations of glucose (13%) and glycated hemoglobin (8%) had increased with the LFD.

Effects of Matched Weight Loss From Calorie Restriction, Exercise, or Both on Cardiovascular Disease Risk Factors: A Randomized Intervention Trial

E.P. Weiss, S.G. Albert, D.N. Reeds, K.S. Kress, J.L. McDaniel, S. Klein, et al.

American Journal of Clinical Nutrition, Vol. 104, No. 3; pp. 576–586

DOI: 10.3945/ajcn.116.131391

Link to full text: [Click here](#)

Significance: Matched weight losses from calorie restriction, exercise training, and calorie restriction and exercise combined have substantial beneficial effects on CVD risk factors.

Contact Us

ILSI North America
1156 15th Street, NW
Suite 200
Washington, DC 20005

Tel: 202.659.0074
Fax: 202.659.3859
ilsina@ilsa.org

ilsina.org



This study tested the hypothesis that weight loss from calorie restriction and exercise combined (CREX) improves cardiovascular disease (CVD) risk factors more than similar weight loss from calorie restriction (CR) or endurance exercise training (EX) alone. Overweight, sedentary men and women (n=52; aged 45–65 y) were randomly assigned to undergo 6–8% weight loss by using CR, EX, or CREX. Outcomes were measured before and after weight loss and included maximal oxygen consumption (VO_{2max}), resting blood pressure, fasting plasma lipids, glucose, CRP, and arterial stiffness. Reductions in body weight (~7%) were similar in all groups. VO_{2max} changed in proportion to the amount of exercise performed (CR, $-1\% \pm 3\%$; EX, $+22\% \pm 3\%$; and CREX, $+11\% \pm 3\%$). None of the changes in CVD risk factors differed between groups. For all groups combined, significant decreases were observed for systolic and diastolic blood pressure (-5 ± 1 and -4 ± 1 mm Hg, respectively); total cholesterol (-17 ± 4 mg/dL), non-HDL-cholesterol (-16 ± 3 mg/dL), triglycerides (-18 ± 8 mg/dL), and glucose (-3 ± 1 mg/dL). These changes would be expected to decrease the lifetime risk of CVD from 46% to 36%.

Mediterranean Diet Score and Left Ventricular Structure and Function: The Multi-Ethnic Study of Atherosclerosis

E.B. Levitan, A. Ahmed, D.K. Arnett, J.F. Polak, W.G. Hundley, D.A. Bluemke, et al.

American Journal of Clinical Nutrition, Vol. 104, No. 3; pp. 595–602

DOI: 10.3945/ajcn.115.128579

Link to full text: [Click here](#)



Significance: A higher Mediterranean diet score was cross-sectionally associated with a higher left ventricular (LV) mass, which is balanced by a higher LV volume as well as a higher ejection fraction and stroke volume.

Cross-sectional associations of a diet-score assessment of a Mediterranean dietary pattern were examined with left ventricular (LV) mass, volume, mass-to-volume ratio, stroke volume, and ejection fraction. LV variables were measured with the use of cardiac MRI in 4497 participants in the MESA study who were 45–84 years of age and without clinical CVD. A Mediterranean diet score was calculated from intakes of fruit, vegetables, nuts, legumes, whole grains, fish, red meat, the monounsaturated fat:saturated fat ratio, and alcohol that were self-reported with the use of a food-frequency questionnaire. The Mediterranean diet score had a slight U-shaped association with LV mass (adjusted means: 146, 145, 146, and 147 g across quartiles of diet score, respectively; P-quadratic trend = 0.04). The score was linearly associated with LV volume, stroke volume, and ejection fraction: for each +1-U difference in score, LV volume was 0.4 mL higher (95% CI: 0.0, 0.8 mL higher), the stroke volume was 0.5 mL higher (95% CI: 0.2, 0.8 mL higher), and the ejection fraction was 0.2 percentage points higher (95% CI: 0.1, 0.3 percentage points higher). The score was not associated with the mass-to-volume ratio.

Inflammatory Markers

Associations Between Nut Consumption and Inflammatory Biomarkers

Z. Yu, V.S. Malik, N. Keum, F.B. Hu, E.L. Giovannucci, M.J. Stampfer, et al.

American Journal of Clinical Nutrition, Vol. 104, No. 3; pp. 722–728

DOI: 10.3945/ajcn.116.134205

Link to full text: [Click here](#)

Significance: Frequent nut consumption was associated with a healthy profile of inflammatory biomarkers.

Habitual nut consumption in relation to inflammatory biomarkers was investigated in 2 large cohorts of US men and women. Cross-sectional data from 5013 participants in the Nurses' Health Study (NHS) and Health Professionals Follow-Up Study (HPFS) who were free of diabetes were investigated. Nut intake was estimated from food-frequency questionnaires, and cumulative averages from 1986 and 1990 in the NHS and from 1990 and 1994 in the HPFS were used. Plasma biomarkers were collected in 1989–1990 in the NHS and 1993–1995 in the HPFS. Multivariate linear regression was used to assess the associations of nut consumption with fasting plasma CRP (n=4941), IL-6 (n=2859), and tumor necrosis factor receptor 2 (TNFR2, n=2905). A greater intake of nuts was associated with lower amounts of a subset of inflammatory biomarkers, after adjusting for covariates. The relative concentrations (ratios) and 95% CIs comparing subjects with nut intake of ≥ 5 times/wk and those in the categories of never or almost never were as follows: CRP: 0.80 (0.69, 0.90), P-trend = 0.0003; and IL-6: 0.86 (0.77, 0.97), P-trend = 0.006. These associations remained significant after further adjustment for BMI. Substituting 3 servings of nuts/wk for 3 servings of red meat, processed meat, eggs, or refined grains/wk was associated with significantly lower CRP and IL-6.

Sleep

Effects of Diet on Sleep Quality

M-P. St-Onge, A. Mikic, C.E. Pietrolungo

Advances in Nutrition, Vol. 7, No. 5; pp. 938–949

DOI: 10.3945/an.116.012336

Link to full text: [Click here](#)

Significance: Studies provide some evidence for a role of certain dietary patterns and foods in the promotion of high-quality sleep

There is much emerging information surrounding the impact of sleep duration and quality on food choice and consumption in both children and adults. However, less attention has been paid to the effects of dietary patterns and specific foods on nighttime sleep. Early studies have shown that certain dietary patterns may affect not only daytime alertness but also nighttime sleep. This review describes the role of food consumption on sleep. Research has focused on the effects of mixed meal patterns, such as high-carbohydrate plus low-fat or low-carbohydrate diets, over the short term on sleep. Such studies highlight a potential effect of macronutrient intakes on sleep variables, particularly alterations in slow wave sleep and rapid eye movement sleep with changes in carbohydrate and fat intakes. Other studies examined the intake of specific foods (e.g., milk, fatty fish, tart cherry juice, and kiwifruit) consumed at a fixed time relative to sleep, on sleep architecture and quality.

Flavonoids

Habitual Intake of Anthocyanins and Flavanones and Risk of Cardiovascular Disease in Men

A. Cassidy, M. Bertola, S. Chiuve, A. Flint, J. Forman, E.B. Rimm

American Journal of Clinical Nutrition, Vol. 104, No. 3; pp. 587–594



DOI: 10.3945/ajcn.116.133132

Link to full text: [Click here](#)

Significance: Higher intakes of fruit-based flavonoids were associated with a lower risk of nonfatal myocardial infarction and ischemic stroke in men.

The relation between habitual anthocyanin and flavanone intake and coronary artery disease and stroke in the Health Professionals Follow-Up Study were examined. Healthy men (n=43,880) who had no prior diagnosed cardiovascular disease (CVD) or cancer were followed for 24 years and 4046 myocardial infarction (MI) and 1572 stroke cases were confirmed by medical records. Although higher anthocyanin intake was not associated with total or fatal MI risk, after multivariate adjustment an inverse association with nonfatal MI was observed (HR: 0.87; 95% CI: 0.75, 1.00; P = 0.04; P-trend = 0.098); this association was stronger in normotensive participants (HR: 0.81; 95% CI: 0.69, 0.96; P-interaction = 0.03). Anthocyanin intake was not associated with stroke risk. Although flavanone intake was not associated with MI or total stroke risk, higher intake was associated with a lower risk of ischemic stroke (HR: 0.78; 95% CI: 0.62, 0.97; P = 0.03, P-trend = 0.059), with the greatest magnitude in participants aged ≥ 65 y (P-interaction = 0.04).



Dietary Flavonoid Intake and Risk of Incident Depression in Midlife and Older Women

S-C. Chang, A. Cassidy, W.C. Willett, E.B. Rimm, E.J. O'Reilly, O.I. Okereke
American Journal of Clinical Nutrition, Vol. 104, No. 3; pp. 704–714

DOI: 10.3945/ajcn.115.124545

Link to full text: [Click here](#)

Significance: Higher flavonoid intakes may be associated with lower depression risk, particularly among older women.

This study prospectively examined associations between estimated habitual intakes of dietary flavonoids and depression risk in 82,643 women without a previous history of depression at baseline from the Nurses' Health Study [(NHS) aged 53–80 y] and the Nurses' Health Study II [(NHSII) aged 36–55 y]. Intakes of total flavonoids and subclasses (flavonols, flavones, flavanones, anthocyanins, flavan-3-ols, polymeric flavonoids, and proanthocyanidins) were calculated from validated food-frequency questionnaires collected every 2–4 y. A total of 10,752 incident depression cases occurred during a 10-y follow-up. Inverse associations between flavonol, flavone, and flavanone intakes and depression risk were observed. Pooled multivariable-adjusted HRs (95% CIs) were 0.93 (0.88, 0.99), 0.92 (0.86, 0.98), and 0.90 (0.85, 0.96) when comparing the highest (quintile 5) with the lowest (quintile 1) quintiles, respectively, with evidence of linear trends across quintiles (P-trend = 0.0004–0.08). In flavonoid-rich food-based analyses, the HR was 0.82 (95% CI: 0.74, 0.91) among participants who consumed ≥ 2 servings citrus fruit or juices/d compared with < 1 serving/wk. In the NHS only, total flavonoids, polymers, and proanthocyanidin intakes showed significantly (9–12%) lower depression risks. In analyses among late-life NHS participants (aged ≥ 65 y at baseline or during follow-up) higher intakes of all flavonoid subclasses except for flavan-3-ols were associated with significantly lower depression risk; flavones and proanthocyanidins showed the strongest associations (HR for both: 0.83; 95% CI: 0.77, 0.90).

Appetite

Epicatechin, Procyanidins, Cocoa, and Appetite: A Randomized Controlled Trial

J.A. Greenberg, R. O'Donnell, M. Shurpin, D. Kordunova

American Journal of Clinical Nutrition, Vol. 104, No. 3; pp. 613–619

DOI: 10.3945/ajcn.115.129783

Link to full text: [Click here](#)

Significance: The nonalkalized cocoa mixture was associated with an acute decrease in food intake only after being supplemented with epicatechin.

This study tested the hypotheses that, compared with placebo (an alkalized cocoa mixture containing essentially no epicatechin or procyanidins), the following beverages cause a decrease in appetite: 1) a nonalkalized cocoa mixture; 2) epicatechin plus placebo; and 3) procyanidins plus placebo. The concentrations of cocoa compounds were measured in all beverages. A 4-way randomized, crossover, placebo-controlled trial that was balanced for period and carryover effects was used in 28 healthy, young-adult men. A smaller ($n = 14$), parallel, secondary randomized trial was conducted in which the effects of higher doses of epicatechin and procyanidins were analyzed. The primary measure of appetite was ad libitum pizza intake 150 min after beverage ingestion. Intakes of beverages with the nonalkalized cocoa mixture that contained 0.6 mg epicatechin, 0.2 mg catechin, and 2.9 mg monomer-decamer procyanidins/kg body weight did not decrease pizza intake significantly compared with intake of the placebo. In the smaller secondary trial, a combination of epicatechin and the nonalkalized cocoa mixture that contained 1.6 mg epicatechin/kg body weight significantly decreased pizza intake by 18.7%.

Sugar-Sweetened Beverages

Sugar-Sweetened Beverage Consumption and Genetic Predisposition to Obesity in 2 Swedish Cohorts

L. Brunkwall, Y. Chen, G. Hindy, G. Rukh, U. Ericson, I. Barroso, et al.

American Journal of Clinical Nutrition, Vol. 104, No. 3; pp. 809–815

DOI: 10.3945/ajcn.115.126052

Link to full text: [Click here](#)

Significance: The relation of sugar-sweetened beverage intake and BMI is stronger in people genetically predisposed to obesity.

This study aimed to replicate the findings from 3 prospective cohorts from the U.S. and show that common genetic susceptibility to obesity modifies the association between sugar-sweetened beverage (SSB) intake and obesity risk. Data were available from healthy participants from 2 large Swedish cohorts: the Malmö Diet and Cancer study ($n=21,824$) and the Gene-Lifestyle Interactions and Complex Traits Involved in Elevated Disease Risk Study ($n=4902$). Self-reported SSB intake was categorized into 4 levels (seldom, low, medium, and high). Unweighted and weighted genetic risk scores (GRSs) were constructed based on 30 BMI (kg/m^2)-associated loci, and effect modification was assessed in linear regression equations by modeling the product and marginal effects of the GRS and SSB intake adjusted for age-, sex-, and cohort-specific covariates, with



BMI as the outcome. In an inverse variance-weighted fixed-effects meta-analysis, each SSB intake category increment was associated with a 0.18 higher BMI (SE=0.02; $P=1.7 \times 10^{-20}$; $n=26,726$). In the fully adjusted model, a nominal significant interaction between SSB intake category and the unweighted GRS was observed (P -interaction=0.03). Comparing the participants within the top and bottom quartiles of the GRS to each increment in SSB intake was associated with 0.24 (SE=0.04; $P=2.9 \times 10^{-8}$; $n=6766$) and 0.15 (SE=0.04; $P=1.3 \times 10^{-4}$; $n=6835$) higher BMIs, respectively.

Protein Quality

Protein Quality as Determined by the Digestible Indispensable Amino Acid Score: Evaluation of Factors Underlying the Calculation

R.R. Wolfe, S.M. Rutherford, I-Y. Kim, P.J. Moughan

Nutrition Reviews, Vol. 74, No. 9; pp. 584–599

DOI: 10.1093/nutrit/nuw022

Link to full text: [Click here](#)

Significance: This review outlines the rationale for including certain factors in the calculation of the DIAAS and describes associated potential errors.



The Food and Agriculture Organization of the United Nations recently recommended the adoption of a new and improved scoring system (Digestible Indispensable Amino Acid Score [DIAAS]) to quantify dietary protein quality. The DIAAS is based on the relative digestible content of the indispensable amino acids (IAAs) and the amino acid requirement pattern. Factors involved in calculation of the DIAAS include: use of the content and profile of IAAs as the basis for quality; methods for determination of the protein and amino acid content of the protein source; accuracy of individual requirement values for IAAs; normalization of IAA requirements by the estimated average requirement for protein; and basing the DIAAS on the true ileal digestibility of each IAA in the test protein.

Food Allergy

Timing of Allergenic Food Introduction to the Infant Diet and Risk of Allergic or Autoimmune Disease: A Systematic Review and Meta-Analysis

D. Ierodiakonou, V. Garcia-Larsen, A. Logan, A. Groome, S. Cunha, J. Chivinge, et al.

Journal of the American Medical Association, Vol. 316, No. 11; pp. 1181–1192

DOI: 10.1001/jama.2016.12623.

Link to full text: [Click here](#)

Significance: Timing of egg or peanut introduction was not associated with risk of allergy to other foods and timing of gluten introduction was not associated with celiac disease risk.

The purpose of this systematic review and meta-analysis was to determine whether timing of allergenic food introduction during infancy influences risk of allergic or autoimmune disease. Databases were searched between January 1946 and March 2016. Intervention trials and observational studies that evaluated timing of allergenic food introduction during the first year of life and reported allergic or autoimmune disease or allergic sensitization were included. Of 16,289 original

titles screened, data were extracted from 204 titles reporting 146 studies. There was moderate-certainty evidence from 5 trials (1915 participants) that early egg introduction at 4 to 6 months was associated with reduced egg allergy (RR=0.56; 95% CI, 0.36-0.87; I2 = 36%). Absolute risk reduction for a population with 5.4% incidence of egg allergy was 24 cases (95% CI, 7-35 cases) per 1000 population. There was moderate-certainty evidence from 2 trials (1550 participants) that early peanut introduction at 4 to 11 months was associated with reduced peanut allergy (RR=0.29; 95% CI, 0.11-0.74; I2 = 66%). Absolute risk reduction for a population with 2.5% incidence of peanut allergy was 18 cases (95% CI, 6-22 cases) per 1000 population. There was low- to very low-certainty evidence that early fish introduction was associated with reduced allergic sensitization and rhinitis. Timing of allergenic food introduction was not associated with other outcomes.

About Us

The North American branch of the International Life Sciences Institute (ILSI North America) is a public, non-profit scientific foundation that advances the understanding and application of science related to the nutritional quality and safety of the food supply.

ILSI North America carries out its mission by sponsoring research programs, professional and educational programs and workshops, seminars, and publications, as well as providing a neutral forum for government, academic, and industry scientists to discuss and resolve scientific issues of common concern for the well-being of the general public. ILSI North America's programs are supported primarily by its industry membership.



ILSI

North America

1156 15th Street, NW
Suite 200
Washington, DC 20005

Tel: 202.659.0074
Fax: 202.659.3859
ilsina@ilsil.org

ilsina.org

