Cardiovascular Disease

Dietary Fat Intake and Risk of Cardiovascular Disease and All-Cause Mortality in a Population at High Risk of Cardiovascular Disease

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Significance: Intakes of MUFAs and PUFAs were associated with a lower risk of CVD and death, whereas SFA and trans-fat intakes were associated with a higher risk of CVD.

The association between total fat intake and fat subtypes with the risk of cardiovascular disease (CVD) and cardiovascular and all-cause death was evaluated in 7038 participants at high CVD risk from the PREDIMED study. This study also examined the hypothetical effect of the isocaloric substitution of one macronutrient for another. At baseline and yearly thereafter, total and specific fat subtypes were repeatedly measured by using validated food-frequency questionnaires. After 6 y of follow-up, 336 CVD cases and 414 total deaths were documented. HRs (95% CIs) for CVD for those in the highest quintile of total fat, monounsaturated fatty acid (MUFA), and polyunsaturated fatty acid (PUFA) intake compared with those in the lowest quintile were 0.58 (0.39, 0.86), 0.50 (0.31, 0.81), and 0.68 (0.48, 0.96), respectively. In the comparison between extreme quintiles, higher saturated fatty acid (SFA) and trans-fat intakes were associated with 81% (HR: 1.81; 95% CI: 1.05, 3.13) and 67% (HR: 1.67; 95% CI: 1.09, 2.57) higher risk of CVD. Inverse associations with all-cause death were also observed for PUFA and MUFA intakes. Isocaloric replacements of SFAs with MUFAs and PUFAs or trans fat with MUFAs were associated with a lower risk of CVD. SFAs from pastries and processed foods were associated with a higher risk of CVD.

Lipids

Whole Soy Flour Incorporated Into a Muffin and Consumed at 2 Doses of Soy Protein Does Not Lower LDL Cholesterol in a Randomized, Double-Blind Controlled Trial of Hypercholesterolemic Adults


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Significance: Consuming 12.5 or 25 g protein from defatted soy flour incorporated into muffins does not reduce LDL-cholesterol or other coronary heart disease risk factors in hypercholesterolemic adults.
This study assessed the dose effect of whole soy flour incorporated into muffins on plasma LDL-cholesterol in 243 hypercholesterolemic (LDL-cholesterol \( \geq 3.0 \) and \( \leq 5.0 \) mmol/L) adults (aged 30-70 years). Subjects were stratified by LDL-cholesterol and randomly assigned to consume 2 soy muffins containing 25 g soy protein [high-dose soy (HDS)], 1 soy and 1 wheat muffin containing 12.5 g soy protein and 12.5 g whey protein [low-dose soy (LDS)], or 2 wheat muffins containing 25 g whey protein (control) daily for 6 wk while consuming a self-selected diet. 213 (87.6%) participants completed the trial; 83% Caucasian, 63% female (63%), with mean BMI 28.0 ± 4.6 kg/m² and systolic and diastolic blood pressures 122 ± 16 and 77 ± 11 mm Hg, respectively. Despite a dose-dependent increase in plasma isoflavones (P < 0.001), neither HDS nor LDS had a significant effect on LDL-cholesterol compared with control (mean ± SEM changes: control, −0.04 ± 0.05 mmol/L; HDS, 0.01 ± 0.05 mmol/L; and LDS, −0.04 ± 0.06 mmol/L). There were no significant treatment effects on total or HDL-cholesterol, triglycerides, CRP, homeostatic model assessment of insulin resistance, blood pressure, or the Framingham 10-y CHD risk score.

Vaccenic Acid and Trans Fatty Acid Isomers From Partially Hydrogenated Oil Both Adversely Affect LDL Cholesterol: A Double-Blind, Randomized Controlled Trial
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Link to full text: Click here

Significance: The results of this study are consistent with current nutrition labeling guidelines, with the requirement of vaccenic acid, but not cis-9,trans-11 conjugated linoleic acid, to be listed under trans fatty acid on the Nutrition Facts Panel.

The effects of vaccenic acid (VA) and cis-9,trans-11 conjugated linoleic acid (c9,t11-CLA), and industrially produced trans fatty acids (iTFAs), in the context of highly controlled diets (24 d each), on lipoprotein risk factors compared with a control diet were determined in this double-blind, randomized, crossover feeding trial in 106 healthy adults [mean ± SD age 47 ± 10.8 y; BMI 28.5 ± 4.0 kg/m²; and LDL-cholesterol 3.24 ± 0.63 mmol/L]. Diets were designed to have stearic acid replaced with the following trans fatty acids (TFAs) isomers (percentage of energy): 0.1% mixed isomers of TFA (control), ∼3% VA, ∼3% iTFA, or 1% c9,t11-CLA. Total dietary fat (34% of energy) and other macronutrients were matched. Total cholesterol (TC), LDL-cholesterol, triacylglycerol, lipoprotein(a), and apolipoprotein B were higher after VA than after iTFA; HDL-cholesterol and apolipoprotein A1 also were higher after VA. Compared with control, VA and iTFA both increased TC, LDL-cholesterol, ratio of TC to HDL-cholesterol, and apolipoprotein B (2–6% change; P < 0.05); VA also increased HDL-cholesterol, apolipoprotein A1, apolipoprotein B, and lipoprotein(a) (2–6% change; P < 0.05), whereas iTFA did not. c9,t11-CLA lowered triacylglycerol (P ≤ 0.01) and had no effect on other lipoprotein risk factors.

Effects of Tree Nuts on Blood Lipids, Apolipoproteins, and Blood Pressure: Systematic Review, Meta-Analysis, and Dose-Response of 61 Controlled Intervention Trials
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Link to full text: Click here
Significance: Tree nut intake lowers total cholesterol, LDL-cholesterol, ApoB, and triglycerides, and the major determinant of cholesterol lowering appears to be nut dose rather than nut type.

The effects of tree nuts (walnuts, pistachios, macadamia nuts, pecans, cashews, almonds, hazelnuts, and Brazil nuts) on blood lipids [total cholesterol, LDL-cholesterol, HDL-cholesterol, and triglycerides], lipoproteins [apolipoprotein A1, apolipoprotein B (ApoB), and apolipoprotein B100], blood pressure, and inflammation (C-reactive protein) in adults aged ≥18 y without prevalent CVD were examined in this systematic review and meta-analysis. Mean differences between nut intervention and control arms were calculated, dose-standardized to one 1-oz (28.4 g) serving/d, by using inverse-variance fixed-effects meta-analysis. Sixty-one trials met eligibility criteria (n=2582). Interventions ranged from 3 to 26 wk. Nut intake (per serving/d) lowered total cholesterol (−4.7 mg/dL; 95% CI: −5.3, −4.0 mg/dL), LDL-cholesterol (−4.8 mg/dL; 95% CI: −5.5, −4.2 mg/dL), ApoB (−3.7 mg/dL; 95% CI: −5.2, −2.3 mg/dL), and triglycerides (−2.2 mg/dL; 95% CI: −3.8, −0.5 mg/dL) with no statistically significant effects on other outcomes. The dose-response between nut intake and total cholesterol and LDL-cholesterol was nonlinear (P-nonlinearity < 0.001 each); stronger effects were observed for ≥60 g nuts/d. For ApoB, stronger effects were observed in populations with type 2 diabetes (−11.5 mg/dL; 95% CI: −16.2, −6.8 mg/dL) than in healthy populations (−2.5 mg/dL; 95% CI: −4.7, −0.3 mg/dL) (P-heterogeneity = 0.015).

Diabetes

Risk of Type 2 Diabetes Is Lower in US Adults Taking Chromium-Containing Supplements

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Significance: The odds of having type 2 diabetes were lower in those who, in the previous 30 days, had consumed supplements containing chromium.

This study examined the use and potential benefits of chromium supplementation in type 2 diabetes (T2D) by examining NHANES data. Data on all consumed dietary supplements from the NHANES database were analyzed, with the OR of having diabetes as the main outcome of interest based on chromium supplement use. The NHANES for the years 1999–2010 included information on 62,160 individuals. After filtering the database for the required covariates (gender, ethnicity, socioeconomic status, BMI, diabetes diagnosis, supplement usage, and laboratory glycated hemoglobin [HbA1c] values), and when restricted to adults, the study cohort included 28,539 people. A total of 58.3% of people reported consuming a dietary supplement in the previous 30 d, 28.8% reported consuming a dietary supplement that contained chromium, and 0.7% consumed supplements that had “chromium” in the title. Compared with nonusers, the odds of having T2D (HbA1c ≥6.5%) were lower in persons who consumed chromium-containing supplements within the previous 30 d than in those who did not (OR: 0.73; 95% CI: 0.62, 0.86). Supplement use alone (without chromium) did not influence the odds of having T2D (OR: 0.89; 95% CI: 0.77, 1.03).
Carbohydrate Quality and Quantity and Risk of Type 2 Diabetes in US Women


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Link to full text: Click here

**Significance:** Diets with high starch, low fiber, and a high starch-to-cereal fiber ratio were associated with a higher risk of type 2 diabetes.

This study prospectively examined the association between carbohydrates, starch, fibers, and different combinations of these nutrients and risk of type 2 diabetes (T2D) in 70,025 women free of cardiovascular disease, cancer, and diabetes at baseline from the Nurses’ Health Study (1984–2008). During 1,484,213 person-years of follow-up, 6934 incident T2D cases were determined. In multivariable analyses, when extreme quintiles were compared, higher carbohydrate intake was not associated with T2D (RR=0.98; 95% CI: 0.89, 1.08), whereas starch was associated with a higher risk (RR=1.23; 95% CI: 1.12, 1.35). Total fiber (RR=0.80; 95% CI: 0.72, 0.89), cereal fiber (RR=0.71, 95% CI: 0.65, 0.78), and fruit fiber (RR=0.79; 95% CI: 0.72, 0.85) were associated with a lower T2D risk. The ratio of carbohydrate to total fiber intake was marginally associated with a higher risk of T2D (RR=1.09; 95% CI: 1.00, 1.20). Positive associations were found between the ratios of carbohydrate to cereal fiber (RR=1.28; 95% CI: 1.17, 1.39), starch to total fiber (RR=1.12; 95% CI: 1.02, 1.23), and starch to cereal fiber (RR=1.39; 95% CI: 1.27, 1.53) and T2D.

Psyllium Fiber Improves Glycemic Control Proportional to Loss of Glycemic Control: A Meta-Analysis of Data in Euglycemic Subjects, Patients at Risk of Type 2 Diabetes Mellitus, and Patients Being Treated for Type 2 Diabetes Mellitus


doi: 10.3945/ajcn.115.106989

Link to full text: Click here

**Significance:** The degree of psyllium’s glycemic benefit was commensurate with the loss of glycemic control.

This meta-analysis examined the effects of psyllium on glycemic control in patients who were being treated for type 2 diabetes mellitus (T2DM) and in patients who were at risk of developing T2DM. A comprehensive search was performed of available published literature and clinical records stored by Procter & Gamble with the use of key search terms to identify clinical studies that assessed the glycemic effects of psyllium in nondiabetic, pre-T2DM, and T2DM patients. Thirty-five randomized, controlled, clinical studies were identified that spanned 3 decades and 3 continents; the data were assessed in 8 meta-analyses. In patients with T2DM, multiweek studies (psyllium dosed before meals) showed significant improvement in both the fasting blood glucose (FBG) concentration (−37.0 mg/dL; P < 0.001) and glycated hemoglobin (HbA1c) [−0.97% (−10.6 mmol/mol); P = 0.048]. Glycemic effects were proportional to baseline FBG; no significant glucose lowering was observed in euglycemic subjects, a modest improvement was observed in subjects with pre-T2DM, and the greatest improvement was observed in subjects who were being treated for T2DM.
Blood Pressure


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Significance: Low potassium intake was associated with an increased risk of hypertension.

This cross-sectional study evaluated the associations between blood pressure and dietary sodium and potassium intake in terms of the amount and ratio in Korean adults based on data from the fourth and fifth Korean National Health and Nutrition Examination Survey, 2007-2012. A total of 24,096 adults (aged ≥19 years) without history of antihypertensive medication use were selected. Subjects were categorized into four groups using median intakes of sodium and potassium, and defined the low sodium/high potassium intake group as the reference group. Sodium intake was positively associated with diastolic blood pressure, with an increase of 0.21 mm Hg per 1 mg/kcal increase in sodium (P<0.001). In contrast, potassium intake was negatively associated with systolic blood pressure, with a decrease of 1.01 mm Hg per 1 mg/kcal increase in potassium (P<0.001). After adjusting for confounders, the high sodium/low potassium (OR 1.21, 95% CI 1.02 to 1.44) and low sodium/low potassium intake groups (OR 1.19, 95% CI 1.01 to 1.40) were at higher risk of high blood pressure (HBP) than the reference group. The risk of HBP in the high sodium/high potassium group did not differ from that in the reference group.

Sugar-Sweetened Beverages

Regional Differences in Sugar-Sweetened Beverage Intake Among US Adults

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Link to full text:  Click here

Significance: Total frequency of sugar-sweetened beverage (SSB) consumption and types of SSB consumption differed by geographic region.

This cross-sectional study examined associations between living in specific census regions and frequency of sugar-sweetened beverage (SSB) consumption among US adults using 2010 National Health Interview Survey data (n=25,431). SSB consumption was defined as the consumption of four types of beverages (regular sugar-sweetened carbonated beverages, fruit drinks, sports/energy drinks, and sweetened coffee/tea drinks). The exposure variable was census region of residence (Northeast, Midwest, South, and West). Approximately 64% of adults consumed SSBs ≥1 time/day. The odds of drinking SSBs ≥1 time/day were significantly higher among adults living in the Northeast (aOR=1.13; 95% CI=1.01, 1.26) but lower among adults living in the Midwest (aOR=0.70; 95% CI=0.64, 0.78) or West...
(aOR=0.78; 95% CI=0.71, 0.87) compared with those living in the South. The odds of drinking regular soda ≥1 time/day were significantly lower among adults living in the Northeast (aOR=0.51; 95% CI=0.45, 0.57), Midwest (aOR=0.86; 95% CI=0.78, 0.96), or West (aOR=0.56; 95% CI=0.51, 0.62) than those living in the South. The odds of drinking sports/energy drinks ≥1 time/day were significantly lower among adults living in the West (aOR=0.77; 95% CI=0.64, 0.93) than those living in the South. The odds of drinking a sweetened coffee/tea drink ≥1 time/day were significantly higher among adults living in the Northeast (aOR=1.60; 95% CI=1.43, 1.78) but lower among adults living in the Midwest (aOR=0.70; 95% CI=0.62, 0.78) than those living in the South.

**No Difference in Ad Libitum Energy Intake in Healthy Men and Women Consuming Beverages Sweetened With Fructose, Glucose, or High-Fructose Corn Syrup: A Randomized Trial**


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

**Significance:** In healthy adults, total 8-d ad libitum energy intake was increased in individuals consuming sugar-sweetened beverages compared with aspartame-sweetened beverages.

Two randomized, controlled, double-blind crossover studies were conducted to determine whether the relative amounts of fructose and glucose in sugar-sweetened beverages (SSBs) modifies ad libitum energy intake over 8 d in healthy adults without fructose malabsorption. Subjects consumed 4 servings/d of a fructose-, glucose-, or aspartame-sweetened beverage (study A; n = 9) or a fructose-, glucose-, or high-fructose corn syrup (HFCS)–sweetened beverage (study B; n = 24) for 8 d. SSBs were provided at 25% of estimated energy requirement, or an equivalent volume of the aspartame-sweetened beverage, and consumption was mandatory. All solid foods were provided at 125% of estimated energy requirements and were consumed ad libitum. In study A, ad libitum energy intake was 120% ± 10%, 117% ± 12%, and 102% ± 15% of estimated energy requirements when subjects consumed the fructose-, glucose-, and aspartame-sweetened beverages, respectively. Energy intake was significantly higher in the fructose and glucose phases than in the aspartame phase (P < 0.003 for each), with no difference between the fructose and glucose phases (P = 0.462). In study B, total energy intake during the fructose, HFCS, and glucose phases was 116% ± 14%, 116% ± 16%, and 116% ± 16% of the subject’s estimated total energy requirements, respectively (P = 0.880).

**Beverage Intake**

**The Contribution of Beverages to Intakes of Energy and MyPlate Components by Current, Former, and Never Smokers in the United States**

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**Link to full text:** [Click here](#)
Significance: Not only do smokers consume a higher volume of beverages, but they also have a higher intake of energy provided by beverages, mainly empty calories from added sugars and alcohol.

This study compared beverage intakes and contributions of energy and MyPlate components by source (food alone, beverages alone, and food and beverages together) in diets of adult current, former, and never smokers. Dietary data from 4,823 men and 4,672 women aged ≥20 years who participated in What We Eat in America, NHANES 2005-2008, were analyzed. Results found that current smokers consumed more total beverages, coffee, and sugar-sweetened beverages than never and former smokers (P<0.001). Male current smokers drank more alcoholic beverages than never and former smokers, whereas female current and former smokers both consumed more alcoholic beverages than never smokers. Current smokers obtained more energy from beverages than their nonsmoking counterparts, although total energy intake did not differ. Intakes of added sugars, alcohol, and empty calories were higher for current than never smokers, and differences were accounted for by current smokers’ beverage choices.

Flavonoids

Safety and Efficacy of Cocoa Flavanol Intake in Healthy Adults: A Randomized, Controlled, Double-Masked Trial
J.I. Ottaviani, M. Balz, J. Kimball, J.L. Ensuna, R. Fong, T.Y. Momma, et al.
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Link to full text: Click here

Significance: The consumption of cocoa flavanols in amounts up to 2000 mg/d for 12 wk was well tolerated in healthy men and women.

This 2-part study investigated the effects of cocoa flavanol (CF) intake (amount and duration) on blood pressure, platelet function, metabolic variables, and potential adverse events (AEs) in healthy adults. Part 1 was an open-label, intake-amount escalation study, in which 34 healthy adults (aged 35–55 y) consumed escalating amounts of CFs, ranging from 1000 to 2000 mg/d over 6 wk. On the basis of the outcomes of study part 1, part 2 was a controlled, randomized, double-masked, 2-parallel-arm dietary intervention study in which healthy participants (aged 35–55 y) were asked to consume for 12 consecutive weeks up to 2000 mg CFs/d (n=46) or a CF-free control (n=28). Daily intake of up to 2000 mg CFs/d for 12 wk was not associated with significant changes in blood pressure or platelet function compared with CF-free controls in normotensive, healthy individuals who exhibited a very low risk of cardiovascular disease. There were no clinically relevant changes in the metabolic variables assessed in either of the groups. AEs reported were classified as mild in severity and did not significantly differ between study arms.

Metabolic Syndrome

Insulin Resistance Determines a Differential Response to Changes in Dietary Fat Modification on Metabolic Syndrome Risk Factors: The LIPGENE Study
doi: 10.3945/ajcn.115.111286
Link to full text: Click here
Significance: The metabolic phenotype of subjects clearly determines response to the quantity and quality of dietary fat on metabolic syndrome risk factors, which suggests that targeted and personalized dietary therapies may be of value for its different metabolic features.

This single-blind, parallel, controlled, dietary intervention study determined whether the degree of insulin resistance (IR) influences the effect of substituting high–saturated fatty acid (HSFA) diets by isoenergetic alterations in the quality and quantity of dietary fat on metabolic syndrome (MetS) risk factors. MetS subjects (n=472) from 8 European countries classified by different IR levels according to homeostasis model assessment of insulin resistance (HOMA-IR) were randomly assigned to 4 diets: an HSFA diet; a high–monounsaturated fatty acid (HMUFA) diet; a low-fat, high–complex carbohydrate (LFHCC) diet supplemented with long-chain n–3 polyunsaturated fatty acids (1.2 g/d); or an LFHCC diet supplemented with placebo for 12 wk (control). Insulin-resistant MetS subjects with the highest HOMA-IR improved IR, with reduced insulin and HOMA-IR concentrations after consumption of the HMUFA and LFHCC n–3 diets (P<0.05). In contrast, subjects with lower HOMA-IR showed reduced BMI and waist circumference after consumption of the LFHCC control and LFHCC n–3 diets and increased HDL-cholesterol concentrations after consumption of the HMUFA and HSFA diets (P<0.05). MetS subjects with a low to medium HOMA-IR exhibited reduced blood pressure, triglyceride, and LDL-cholesterol levels after the LFHCC n–3 diet and increased apolipoprotein A-I concentrations after consumption of the HMUFA and HSFA diets (all P<0.05).

Caffeine

Caffeine Intake in Pregnancy: Relationship Between Internal Intake and Effect on Birth Weight

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Significance: The reduction in birth weight was related to the AUC and peak concentration up to a dose of 250 mg caffeine.

We used a physiologically based kinetic model to simulate caffeine blood concentration-time profiles in non-pregnant and pregnant women. The model predicted concentration-time profile was in good accordance with experimental values. With 200 mg, the safe dose per occasion in non-pregnant women, AUC and peak concentration in pregnant women were nearly twice that of non-pregnant women. In order to derive a safe dose for the pregnant women, we estimated the dose in the pregnant women model taken at once which would not exceed AUC and peak concentration in the non-pregnant women of 200 mg as single dose. The resulting dose is 100 mg caffeine per occasion, which we recommend as safe. The caffeine dose of 200 mg per day is declared as safe for pregnant women with respect to the foetus by EFSA based on results on reduced birth weight in epidemiological studies. We modelled AUC and peak concentration for different caffeine doses to investigate the relationship between internal caffeine exposure and risk measures of reduced birth weight from epidemiological studies.