ILSI North America

Nutrition Briefs

May 2015

Cardiovascular Disease

Effects of the Pure Flavonoids Epicatechin and Quercetin on Vascular Function and Cardiometabolic Health: A Randomized, Double-Blind, Placebo-Controlled, Crossover Trial

J.I. Dower, J.M. Geleijnse, L. Gijsbers, P.L. Zock, D. Kromhout, P.C.H. Hollman

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Link to full text: Click here

Significance: Epicatechin may in part contribute to the cardioprotective effects of cocoa and tea by improving insulin resistance, but it is unlikely that quercetin plays an important role in the cardioprotective effects of tea.

This randomized, double-blind, placebo-controlled, crossover trial investigated the effects of supplementation of pure epicatechin and quercetin on vascular function and cardiometabolic health in 37 apparently healthy adults aged 40–80 y with a systolic blood pressure (BP) between 125 and 160 mm Hg at screening. Participants received (−)-epicatechin (100 mg/d), quercetin-3-glucoside (160 mg/d), or placebo capsules for 4 wk in random order. The primary outcome was the change in flow-mediated dilation from pre- to post-intervention. Results showed that epicatechin supplementation did not change flow-mediated dilation significantly (1.1% absolute; 95% CI: −0.1%, 2.3%; P = 0.07). Epicatechin supplementation improved fasting plasma insulin (Δ insulin: −1.46 mU/L; 95% CI: −2.74, −0.18 mU/L; P = 0.03) and insulin resistance (Δ homeostasis model assessment of insulin resistance: −0.38; 95% CI: −0.74, −0.01; P = 0.04) and had no effect on fasting plasma glucose. Epicatechin did not change BP, arterial stiffness, nitric oxide, endothelin 1, or blood lipid profile. Quercetin-3-glucoside supplementation had no effect on flow-mediated dilation, insulin resistance, or other CVD risk factors.

How Effective Are Current Dietary Guidelines for Cardiovascular Disease Prevention in Healthy Middle-Aged and Older Men and Women? A Randomized Controlled Trial

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Significance: Selecting a diet consistent with current dietary guidelines lowers blood pressure and lipids, which would be expected to reduce the risk of CVD by one-third in healthy middle-aged and older men and women.

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This parallel-designed randomized controlled trial compared effects on vascular and lipid cardiovascular disease (CVD) risk factors of following the United Kingdom dietary guidelines (treatment) with a traditional British diet (control). In 165 healthy nonsmoking men and women (aged 40–70 y), ambulatory blood pressure (BP), vascular function, and CVD risk factors were measured at baseline and during 12 wk after random assignment to treatment. In the treatment group (n=80) compared with control (n=82), daytime systolic BP was 4.2 mm Hg lower (95% CI: 1.7, 6.6 mm Hg; P<0.001), the total cholesterol:HDL cholesterol ratio was 0.13 lower (95% CI: 0, 0.26; P=0.044), pulse wave velocity was 0.29 m/s lower (95% CI: 0.07, 0.52 m/s; P=0.011), high-sensitivity C-reactive protein was 36% lower (95% CI: 7%, 48%; P=0.017), and body weight was 1.9 kg lower (95% CI: 1.3, 2.5 kg; P<0.001). Treatment effect on flow-mediated dilation and Revised Quantitative Insulin Sensitivity Check Index was not significant. Causal mediated effects analysis based on urinary sodium excretion indicated that sodium reduction explained 2.4 mm Hg (95% CI: 1.0, 3.9 mm Hg) of the fall in blood pressure.

Orange Juice–Derived Flavanone and Phenolic Metabolites Do Not Acutely Affect Cardiovascular Risk Biomarkers: A Randomized, Placebo-Controlled, Crossover Trial in Men at Moderate Risk of Cardiovascular Disease

M.Y. Schär, P.J. Curtis, S. Hazim, L.M. Ostertag, C.D. Kay, J.F. Potter, et al.

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Link to full text: Click here

Significance: After single-dose flavanone intake within orange juice, circulating flavanone and phenolic metabolites collectively reached a concentration of 15.20 ± 2.15 μmol/L, but no effects were observed on cardiovascular risk biomarkers.

In an acute, randomized, placebo-controlled crossover trial, the effects of orange juice (OJ) or a dose-matched hesperidin supplement on plasma concentrations of established and novel flavanone metabolites and their effects on cardiovascular risk biomarkers were examined in 16 men (aged 51–69 y) at moderate CVD risk. Subjects received OJ or a hesperidin supplement (both providing 320 mg hesperidin) or control (all matched for sugar and vitamin C content). Before each intervention, a diet low in flavonoids, nitrate/nitrite, alcohol, and caffeine was followed, and a standardized low-flavonoid evening meal was consumed. Results showed that OJ intake significantly increased (mean ± SEM) plasma concentrations of 8 flavanone (1.75 ± 0.35 μmol/L, P<0.0001) and 15 phenolic (13.27 ± 2.22 μmol/L, P<0.0001) metabolites compared with control at 5 h postconsumption. Despite increased plasma flavanone and phenolic metabolite concentrations, cardiovascular risk biomarkers were unaltered. After hesperidin supplement intake, flavanone metabolites were not different from the control, suggesting altered absorption/metabolism compared with the OJ matrix.

Diabetes

Partial Meal Replacement Plan and Quality of the Diet at 1 Year: Action for Health in Diabetes (Look AHEAD) Trial

H.A. Raynor, A.M. Anderson, G.D. Miller, R. Reeves, L.M. Delahanty, M.Z. Vitolins, et al.

Journal of the Academy of Nutrition and Dietetics, Vol. 115, No. 5; pp. 731–742, 2015

doi: 10.1016/j.jand.2014.11.003

Link to full text: Click here

Significance: The partial meal replacement plan consumed by Intensive Lifestyle Intervention participants was related to superior diet quality.

This randomized controlled trial compared dietary intake and percent meeting fat-related and food group dietary recommendations in Intensive Lifestyle Intervention (ILI) and Diabetes Support and Education (DSE) groups at 0 and 12 months from 16 U.S. sites. Participants were aged 45-76 years, overweight or obese, with type 2 diabetes. Complete 0- and 12-month dietary assessments (collected between 2001 and 2004) were available for 2,397 participants (1,186 randomized to DSE group and 1,211 randomized to ILI group). Results showed that at 12 months, ILI participants had a significantly lower fat and cholesterol intake and greater fiber intake than DSE participants. ILI participants consumed more servings per day of fruits; vegetables; and milk, yogurt, and cheese; and fewer servings per day of fats, oils, and sweets than DSE participants. A greater percentage of ILI participants than DSE participants met fat-related and most food group recommendations. Within ILI, a greater percentage of participants consuming two or more meal replacements per day than participants consuming less than one meal replacement per day met most fat-related and food group recommendations.

Substitution of Red Meat With Legumes in the Therapeutic Lifestyle Change Diet Based on Dietary Advice Improves Cardiometabolic Risk Factors in Overweight Type 2 Diabetes Patients: A Cross-Over Randomized Clinical Trial

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European Journal of Clinical Nutrition, Vol. 69, No. 5; pp. 592–597, 2015

doi:10.1038/ejcn.2014.228

Link to full text: Click here

Significance: Dietary advice given for substituting red meat with legumes within a TLC diet, improved lipid profiles and glycemic control among diabetes patients.

This randomized, controlled, cross-over trial determined the effects of substituting red meat with legumes in the Therapeutic Lifestyle Change (TLC) diet on cardiometabolic risk factors in 31 type 2 diabetes patients (age: 58.1±6.0 years) based on dietary education. Subjects were randomly assigned to consume a control diet (legume-free TLC diet) and legume-based TLC diet (intervention diet) for 8 weeks. The legume-based TLC group was advised to replace two servings of red meat with legumes, 3 days/week. After the interventional period, a washout period was conducted for 4 weeks. The groups were then advised to follow the alternate treatment for 8 weeks. Compared with the control diet, the intervention diet significantly decreased fasting blood glucose (P=0.04), fasting insulin (P=0.04), triglyceride concentrations (P=0.04) and LDL-cholesterol (P=0.02). Total cholesterol concentrations decreased after consumption of both TLC diet and legume TLC diet; however, the data did not differ significantly between the two diets.

Egg Consumption and Risk of Incident Type 2 Diabetes in Men: The Kuopio Ischaemic Heart Disease Risk Factor Study

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American Journal of Clinical Nutrition, Vol. 101, No. 5; pp. 1088–1096, 2015

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Link to full text: Click here

Significance: Higher egg intake was associated with a lower risk of type 2 diabetes in this cohort of middle-aged and older men.

The association between egg consumption and risk of incident type 2 diabetes (T2D) was investigated in 2332 men (42–60 y) in the prospective, population-based Kuopio Ischaemic Heart Disease Risk Factor Study. Dietary intakes were assessed with 4-d food records at baseline. During an average follow-up of 19.3 y, 432 men developed T2D. After adjustment for potential confounders, those in the highest compared with the lowest egg intake quartile had a 38% (95% CI: 18%, 53%; P-trend across quartiles <0.001) lower risk of incident T2D. Analyses with metabolic risk markers also suggested an inverse association with fasting plasma glucose and serum C-reactive protein but not with serum insulin. The associations between cholesterol intake and risk of T2D, plasma glucose, serum insulin, and C-reactive protein were mainly nonsignificant, especially after accounting for egg consumption.

Increased Protein Intake Is Associated With Uncontrolled Blood Pressure by 24-Hour Ambulatory Blood Pressure Monitoring in Patients With Type 2 Diabetes.

C.B. Mattos, L.V. Viana, T.P. Paula, R.A. Sarmento, J.C. Almeida, J.L. Gross, et al.

Journal of the American College of Nutrition, Vol. 34, No. 3; pp. 232–239, 2015

doi: 10.1080/07315724.2014.926155

Link to full text: Click here

Significance: High protein intake and meat consumption were associated with high daytime ambulatory blood pressure monitoring values in patients with type 2 diabetes.

This cross-sectional study analyzed possible associations of dietary components, especially protein intake, with blood pressure (BP) during ambulatory BP monitoring (ABPM) in 121 patients (aged 62.3 years; 54.5% women) with type 2 diabetes. Patients were divided into 2 groups according to their daytime ABPM: uncontrolled BP (systolic BP ≥ 135 mmHg or diastolic BP ≥ 85 mmHg) and controlled BP (systolic BP < 135 mmHg and diastolic BP < 85 mmHg). The uncontrolled BP group had higher glycated hemoglobin (HbA1C) values (8.4 ± 2.0 vs 7.6 ± 1.3%; p=0.04) and consumed more protein (20.0 ± 3.8 vs 18.2 ± 3.6% of energy; p=0.01) and meat, (2.6 [1.45, 2.95] vs 2.0 [1.49, 2.90] g/kg weight; p=0.04) than the controlled BP group. In a multivariate analysis, protein intake (% of energy) increased the chance for uncontrolled BP (odds ratio [OR] = 1.16; 95% CI, 1.02, 1.30; p=0.02), adjusted for BMI, HbA1C, LDL-cholesterol, number of antihypertensive medications, and ethnicity. Meat consumption higher than 3.08 g/kg weight/day more than doubled the chance for uncontrolled BP (OR = 2.53; 95% CI, 1.01, 7.60; p=0.03).

Caffeine

Trends in Intake and Sources of Caffeine in the Diets of US Adults: 2001–2010

V.L. Fulgoni, D.R. Keast, H.R. Lieberman

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Link to full text: Click here

Significance: Although new caffeine-containing products were introduced into the U.S. food supply, total per capita intake was stable from 2001 to 2010.

This study obtained an up-to-date, nationally representative estimate of caffeine consumption in adults. Dietary intake data from NHANES from 2001 to 2010 for adults ≥19 y of age were used (n=24,808). Acute and usual intake of caffeine was estimated from all caffeine-containing foods and beverages. Trends in consumption and changes in sources of caffeine were also examined. Eighty-nine percent of the adult US population consumed caffeine, with equal prevalence in men and women. Usual mean ± SE per capita caffeine consumption when nonusers were included was 186 ± 4 mg/d, with men consuming more than women (211 ± 5 vs. 161 ± 3 mg/d, P<0.05). Usual intake in consumers was 211 ± 3 mg/d, with 240 ± 4 mg/d in men and 183 ± 3 mg/d in women (P<0.05); 46% was consumed in a single consumption event. In consumers, acute 90th and 99th percentiles of intake were 436 and 1066 mg/d, respectively. Consumption was highest in men aged 31–50 y and lowest in women aged 19–30 y. Beverages provided 98% of caffeine consumed, with coffee (~64%), tea (~16%), and soft drinks (~18%) predominant sources; energy drinks provided <1%, but their consumption increased substantially from 2001 to 2010.

Blood Pressure

The Effect of Tree Nut, Peanut, and Soy Nut Consumption on Blood Pressure: A Systematic Review and Meta-Analysis of Randomized Controlled Clinical Trials

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American Journal of Clinical Nutrition, Vol. 101, No. 5; pp. 966–982, 2015

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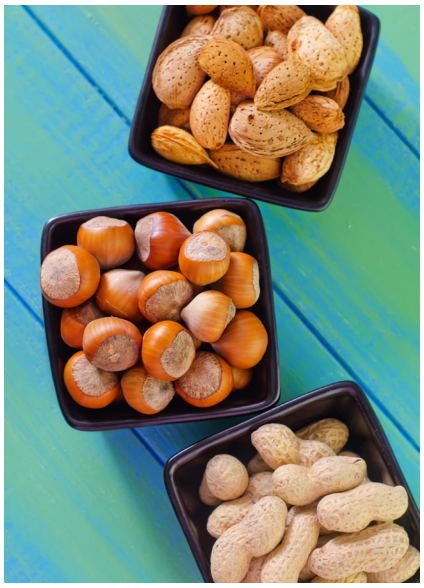

Significance: Total nut consumption lowered systolic blood pressure in participants without type 2 diabetes; however, pistachios seemed to have the strongest effect on reducing blood pressure.

This systematic review and meta-analysis of published randomized controlled trials (RCTs) estimated the effect of nut consumption (tree nuts, peanuts, and soy nuts) on blood pressure (BP). MEDLINE, SCOPUS, ISI Web of Science, and Google Scholar were searched for RCTs carried out between 1958 and October 2013 that reported the effect of consuming single or mixed nuts (including walnuts, almonds, pistachios, cashews, hazelnuts, macadamia nuts, pecans, peanuts, and soy nuts) on systolic BP (SBP) or diastolic BP (DBP) as primary or secondary outcomes in adults. Studies that evaluated the effects for <2 wk or in which the control group ingested different healthy oils were excluded. Twenty-one RCTs met the inclusion criteria. Nut consumption leads to a significant reduction in SBP in participants without type 2 diabetes [mean difference (MD): −1.29; 95% CI: −2.35, −0.22; P=0.02] but not in the total population. Pistachios, but not other nuts, significantly reduce SBP (MD: −1.82; 95% CI: −2.97, −0.67; P = 0.002). Our study suggests that pistachios (MD: −0.80; 95% CI: −1.43, −0.17; P = 0.01) and mixed nuts (MD: −1.19; 95% CI: −2.35, −0.03; P = 0.04) have a significant reducing effect on DBP.

Flavonoids

Flavonoid Intake and All-Cause Mortality

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Link to full text: Click here

Significance: High consumption of flavonoids is associated with reduced risk of mortality in older women.

The association between flavonoid intake and risk of 5-y mortality from all causes was explored using 2 comprehensive food composition databases to assess flavonoid intake. The study population included 1063 randomly selected women aged >75 y. All-cause, cancer, and cardiovascular mortalities were assessed over 5 y of follow-up. Two estimates of flavonoid intake (total flavonoid$_{USDA}$ and total flavonoid$_{PE}$) were determined by using food composition data from the USDA and the Phenol-Explorer (PE) databases, respectively. During follow-up, 129 (12%) deaths were documented. Participants with high total flavonoid intake were at lower risk [multivariate-adjusted HR (95% CI)] of 5-y all-cause mortality than those with low total flavonoid consumption [total flavonoid$_{USDA}$: 0.37 (0.22, 0.58); total flavonoid$_{PE}$: 0.36 (0.22, 0.60)]. Similar beneficial relations were observed for both CVD mortality [total flavonoid$_{USDA}$: 0.34 (0.17, 0.69); flavonoid$_{PE}$: 0.32 (0.16, 0.61)] and cancer mortality [total flavonoid$_{USDA}$: 0.25 (0.10, 0.62); flavonoid$_{PE}$: 0.26 (0.11, 0.62)].

Food Allergy

Sublingual Immunotherapy for Peanut Allergy: Long-Term Follow-Up of a Randomized Multicenter Trial

A.W. Burks, R.A. Wood, S.M. Jones, S.H. Sicherer, D.M. Fleischer, A.M. Scurlock, et al. for the Consortium of Food Allergy Research (CoFAR)

Journal of Allergy and Clinical Immunology, Vol. 135, No. 5; pp. 1240–1248.e3, 2015

doi: dx.doi.org/10.1016/j.jaci.2014.12.1917

Link to full text: Click here

Significance: Peanut sublingual immunotherapy induced a modest level of desensitization, decreased immunologic activity over 3 years in responders, and had an excellent long-term safety profile.

This study sought to provide long-term (3-year) clinical and immunologic outcomes for the peanut sublingual immunotherapy (SLIT) trial. Key end points were (1) percentage of responders at 2 years (ie, could consume 5 g of peanut powder or a 10-fold increase from baseline), (2) percentage reaching desensitization at 3 years, (3) percentage attaining sustained unresponsiveness after 3 years, (4) immunologic end points, and (5) assessment of safety parameters. Response to treatment was evaluated in 40 subjects aged 12-40 years by performing a 10-g peanut powder oral food challenge after 2 and 3 years of daily peanut SLIT therapy. At 3 years, SLIT was discontinued for 8 weeks, followed by another 10-g oral food challenge and an open feeding of peanut butter to assess sustained unresponsiveness. Approximately 98% of the 18,165 doses were tolerated without adverse reactions beyond the oropharynx, with no severe symptoms or uses of epinephrine. A high rate (>50%) discontinued therapy. By study's

end, 4 (10.8%) of 37 SLIT-treated participants were fully desensitized to 10 g of peanut powder, and all 4 achieved sustained unresponsiveness. Responders at 2 years showed a significant decrease in peanut-specific basophil activation and skin prick test titration compared with nonresponders.

Natural History of Peanut Allergy and Predictors of Resolution in the First 4 Years of Life: A Population-Based Assessment

R.L. Peters, K.J. Allen, S.C. Dharmage, J.J. Koplin, T. Dang, K.P. Tilbrook, et al. for the HealthNuts Study

Journal of Allergy and Clinical Immunology, Vol. 135, No. 5; pp. 1257–1266.e2, 2015

doi: dx.doi.org/10.1016/j.jaci.2015.01.002

Link to full text: Click here

Significance: In this study, thresholds for SPT and sIgE levels were generated in which all participants underwent oral food challenges at both diagnosis and follow-up, irrespective of SPT and sIgE results.

This study sought to describe the natural history of peanut allergy between 1 and 4 years of age and develop thresholds for skin prick test (SPT) results and specific IgE (sIgE) levels measured at age 1 and 4 years that have 95% positive predictive value (PPV) or negative predictive value for the persistence or resolution of peanut allergy. One-year-old infants with challenge-confirmed peanut allergy (n=156) were followed up at 4 years of age with repeat oral food challenges, SPTs, and sIgE measurements (n=103). Peanut allergy resolved in 22% (95% CI, 14% to 31%) of children by age 4 years. Decreasing wheal size predicted tolerance, and increasing wheal size was associated with persistence. Thresholds for SPT responses and sIgE levels at age 1 year with a 95% PPV for persistent peanut allergy are an SPT-induced response of ≥13 mm and an sIgE level of ≥5.0 kU/L. Thresholds for SPT and sIgE results at age 4 years with a 95% PPV for persistent peanut allergy are an SPT response of ≥8 mm and an sIgE level of ≥2.1 kU/L. Ara h 2, tree nut, and house dust mite sensitization; coexisting food allergies; eczema; and asthma were not predictive of persistent peanut allergy.

A Randomized, Double-Blind, Placebo-Controlled Pilot Study of Sublingual Versus Oral Immunotherapy for the Treatment of Peanut Allergy

S.D. Narisety, P.A. Frischmeyer-Guerrerio, C.A. Keet, M. Gorelik, J. Schroeder, R.G. Hamilton, et al.

Journal of Allergy and Clinical Immunology, Vol. 135, No. 5; pp. 1275–1282.e6, 2015

doi: dx.doi.org/10.1016/j.jaci.2014.11.005

Link to full text: Click here

Significance: Oral immunotherapy appeared far more effective than sublingual immunotherapy for the treatment of peanut allergy, but was also associated with significantly more adverse reactions and early study withdrawal.

This double-blind study compared the safety, efficacy, and mechanistic correlates of peanut oral immunotherapy (OIT) and sublingual immunotherapy (SLIT) in children with peanut allergy (PA). Twenty-one subjects (7 to 13 years) were randomized to receive active SLIT/placebo OIT or active OIT/placebo SLIT. Doses were escalated to 3.7 mg/d (SLIT) or 2000 mg/d (OIT), and subjects were rechallenged after 6 and 12 months of maintenance. After unblinding, therapy

was modified per protocol to offer an additional 6 months of therapy. Subjects who passed challenges at 12 or 18 months were taken off treatment for 4 weeks and rechallenged. Five subjects discontinued therapy; of the remaining 16, all had a >10-fold increase in challenge threshold after 12 months. The increased threshold was significantly greater in the active OIT group (141- vs 22-fold, P=.01). Significant within-group changes in skin test results and peanut-specific IgE and IgG4 levels were found, with overall greater effects with OIT. Adverse reactions were generally mild but more common with OIT (P<.001), including moderate reactions and doses requiring medication. Four subjects had sustained unresponsiveness at study completion.

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