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North America

Nutrition Briefs

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Cardiovascular Disease

A Randomized Trial on the Effects of 2010 Dietary Guidelines for Americans and Korean Diet Patterns on Cardiovascular Risk Factors in Overweight and Obese Adults

N. Schroeder, Y-H. Park, M-S. Kang, Y. Kim, G.K. Ha, H-R. Kim, et al.

Journal of the Academy of Nutrition and Dietetics, Vol. 115, No. 7; pp. 1083–1092, 2015

DOI: 10.1016/j.jand.2015.03.023

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

Significance: After a 4-week feeding period, Korean and Dietary Guidelines for Americans diet patterns resulted in positive changes in cardiovascular disease risk factors.

This three-period randomized, crossover, controlled-feeding study assessed the effects of a Korean diet, the 2010 Dietary Guidelines for Americans (DGA), and a typical American diet on cardiometabolic risk factors in 31 overweight, non-Asian individuals in the U.S. with elevated LDL-cholesterol. Subjects were randomly allocated to one of six possible sequential orders for consuming the three diets for 4 weeks, each separated by a 10-day break. Data analysis included 27 subjects on the Korean diet periods and 29 in the DGA and typical American diet periods. Results showed that total cholesterol and LDL-cholesterol significantly decreased on Korean and DGA diets, but not on the typical American diet. Although an unfavorable outcome, HDL-cholesterol significantly decreased on all three diets. No diet had a significant effect on serum triglycerides, but a slight increase in triglycerides in the Korean and decrease in the DGA resulted in a significant difference between these two diets. All three diets caused modest decreases in systolic and diastolic blood pressure, which reached statistical significance for DGA only. No diet had significant effect on fasting insulin, whereas fasting glucose decreased significantly on the Korean and typical American diets only. Urinary sodium output decreased significantly on DGA.

Supplementation of the Pure Flavonoids Epicatechin and Quercetin Affects Some Biomarkers of Endothelial Dysfunction and Inflammation in (Pre)Hypertensive Adults: A Randomized Double-Blind, Placebo-Controlled, Crossover Trial

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Journal of Nutrition, Vol. 145, No. 7; pp. 1459–1463, 2015

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

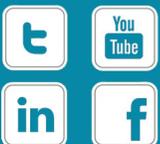
Significance: In (pre)hypertensive men and women, epicatechin may contribute to the cardioprotective effects of cocoa and tea through improvements in endothelial function.

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The effects of supplementation of pure epicatechin and quercetin on biomarkers of endothelial dysfunction and inflammation were examined in 37 apparently healthy (pre)hypertensive men and women (40–80 y) who participated in a randomized, double-blind, placebo-controlled crossover trial. Participants ingested (-)-epicatechin (100 mg/d), quercetin-3-glucoside (160 mg/d), or placebo capsules for a period of 4 wk, in random order. Results showed that epicatechin changed Δ epicatechin – Δ placebo for soluble endothelial selectin (sE-selectin) by -7.7 ng/mL (95% CI: -14.5 , -0.83 ; $P = 0.03$) but did not significantly change this difference (-0.30 ; 95% CI: -0.61 , 0.01 ; $P = 0.06$) for the z score for endothelial dysfunction. Quercetin changed Δ quercetin – Δ placebo for sE-selectin by -7.4 ng/mL (95% CI: -14.3 , -0.56 ; $P = 0.03$), that for IL-1 β by -0.23 pg/mL (95% CI: -0.40 , -0.06 ; $P = 0.009$), and that for the z score for inflammation by -0.33 (95% CI: -0.60 , -0.05 ; $P = 0.02$).

Increasing Fruit and Vegetable Intake Has No Dose-Response Effect on Conventional Cardiovascular Risk Factors in Overweight Adults at High Risk of Developing Cardiovascular Disease

C.T. McEvoy, I.R. Wallace, L.L. Hamill, S.J. Hunter, C.E. Neville, C.C. Patterson, et al.

Journal of Nutrition, Vol. 145, No. 7; pp. 1464–1471, 2015

DOI: 10.3945/jn.115.213090

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

Significance: There was no evidence of a dose-response effect of fruit and vegetable intake on conventional CVD risk factors measured in overweight adults at high CVD risk.



This randomized controlled parallel group study examined the dose-response effect of fruit and vegetable (FV) intake on cardiovascular risk factors in overweight adults at high cardiovascular disease (CVD) risk (estimated $\geq 20\%$ over 10 y) and with a habitually low FV intake (≤ 160 g/d). After a 4-wk run-in period where FV intake was limited to < 2 portions/d (< 160 g/d), 92 eligible participants were randomly assigned to 1 of 3 groups: to consume either 2, 4, or 7 portions (equivalent to 160 g, 320 g, or 560 g, respectively) of FVs daily for 12 consecutive weeks. Fasting venous blood samples were collected at baseline (week 4) and post-intervention (week 16) for analysis of lipid fractions and high-sensitivity C-reactive protein (hsCRP) concentrations. A total of 89 participants completed the study and body composition remained stable throughout the intervention period. Despite good compliance with the intervention, no significant difference was found between the FV groups for change in measures of ambulatory blood pressure, plasma lipids, or hsCRP concentrations.

Replacement of Saturated With Unsaturated Fats Had No Impact on Vascular Function But Beneficial Effects on Lipid Biomarkers, E-Selectin, and Blood Pressure: Results From the Randomized, Controlled Dietary Intervention and Vascular Function (DIVAS) Study

K. Vafeiadou, M. Weech, H. Altowajiri, S. Todd, P. Yaqoob, K.G. Jackson, et al.

American Journal of Clinical Nutrition, Vol. 102, No. 1; pp. 40–48, 2015

DOI: 10.3945/ajcn.114.097089

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

Significance: Substitution of 9.5–9.6% total energy dietary saturated fatty acids with either MUFAs or n-6 PUFAs did not significantly affect the percentage of flow-mediated dilatation or other measures of vascular function.

This randomized, controlled, single-blind, parallel-group dietary intervention investigated the substitution of 9.5–9.6% total energy (%TE) dietary saturated fatty acids (SFAs) with either monounsaturated fatty acids (MUFAs) or n–6 (ω -6) polyunsaturated fatty acids (PUFAs) on vascular function and other CVD risk factors. Subjects (n=195) aged 21–60 y with moderate CVD risk ($\geq 50\%$ above the population mean) followed one of three 16-wk isoenergetic diets (%TE target compositions, total fat:SFA:MUFAn–6 PUFA) that were rich in SFAs (36:17:11:4, n = 65), MUFAs (36:9:19:4, n = 64), or n–6 PUFAs (36:9:13:10, n = 66). Results showed that replacing SFAs with MUFAs or n–6 PUFAs did not affect the percentage of flow-mediated dilatation (primary endpoint) or other measures of vascular reactivity. Of the secondary outcome measures, substitution of SFAs with MUFAs attenuated the increase in night systolic blood pressure (-4.9 mm Hg, $P = 0.019$) and reduced E-selectin (-7.8% , $P = 0.012$). Replacement with MUFAs or n–6 PUFAs lowered fasting serum total cholesterol (-8.4% and -9.2% , respectively), LDL-cholesterol (-11.3% and -13.6%), and total cholesterol to HDL-cholesterol ratio (-5.6% and -8.5%) ($P \leq 0.001$). These changes in LDL-cholesterol equate to an estimated 17–20% reduction in CVD mortality.

Diabetes

Effects of Calcium Plus Vitamin D Supplementation on Anthropometric Measurements and Blood Pressure in Vitamin D Insufficient People with Type 2 Diabetes: A Randomized Controlled Clinical Trial

M. Tabesh, L. Azadbakht, E. Faghihimani, M. Tabesh, A. Esmailzadeh

Journal of the American College of Nutrition, Vol. 34, No 4; pp. 281–289, 2015

DOI:10.1080/07315724.2014.905761

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

Significance: Calcium–vitamin D3 cosupplementation can have beneficial effect on BMI, hip circumference, and systolic blood pressure in vitamin D–insufficient type 2 diabetics.

This randomized placebo-controlled clinical trial was performed to assess the effects of vitamin D3 and calcium supplementation on anthropometric measurements and blood pressure in 118 vitamin D insufficient people with type 2 diabetes. Subjects were randomly assigned into 4 groups receiving (1) 50,000 IU/wk vitamin D3 plus (equal to 7143 IU/d) calcium placebo; (2) 1000 mg/d calcium plus vitamin D3 placebo; (3) 50,000 IU/wk vitamin D3 (equal to 7143 IU/d) plus 1000 mg/d calcium; or (4) vitamin D3 placebo plus calcium placebo for 8 weeks. A greater reduction in BMI was observed in calcium plus vitamin D group than other groups ($p = 0.03$). Comparison of changes in waist circumference among 4 groups revealed no significant difference in crude model ($p = 0.21$) and when the effect of confounders was taken into account ($p = 0.08$). Calcium supplementation resulted in a significant reduction in hip circumference compared to other groups ($p < 0.001$). Systolic blood pressure significantly decreased in the calcium plus vitamin D group compared to placebo (-7.3 ± 8.7 mmHg vs 0.5 ± 8.2 mmHg; $p = 0.001$).

Flavonoids

Flavanones Protect From Arterial Stiffness in Postmenopausal Women Consuming Grapefruit Juice for 6 Mo: A Randomized, Controlled, Crossover Trial

V. Habauzit, M-A. Verny, D. Milenkovic, N. Barber-Chamoux, A. Mazur, C. Dubray, et al.



American Journal of Clinical Nutrition, Vol. 102, No. 1; pp. 66–74, 2015

DOI: 10.3945/ajcn.114.104646

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

Significance: Regular grapefruit juice consumption by middle-aged, healthy postmenopausal women is beneficial for arterial stiffness, which may be related to flavanones present in grapefruit.

This double-blind, randomized, controlled, crossover trial examined the role of flavanones in the long-term effects induced by grapefruit juice (GFJ) consumption on vascular function in 48 healthy postmenopausal women aged 50–65 y; BMI 19–30 kg/m²; and waist size >88 cm. Subjects were randomly assigned to consume 340 mL GFJ/d, providing 210 mg naringenin glycosides, or a matched control drink without flavanones for 6 mo each, with a 2-mo washout between beverages. The mean \pm SD carotid-femoral pulse wave velocity, which reflects central aortic stiffness, was statistically significantly lower after consumption of GFJ (7.36 ± 1.15 m/s) than after consumption of the matched control drink without flavanones (7.70 ± 1.36 m/s), with a P value of 0.019 for the treatment effect. Endothelial function in macro- and micro-circulation, blood pressure, anthropometric measures, glucose metabolism, and biomarkers of inflammation and oxidative stress were not affected by the intervention.

Chronic Diseases

Supplementation with a Blend of Krill and Salmon Oil Is Associated with Increased Metabolic Risk in Overweight Men

B.B. Albert, J.G.B. Derraik, C.M. Brennan, J.B. Biggs, M.L. Garg, D. Cameron-Smith, et al.

American Journal of Clinical Nutrition, Vol. 102, No. 1; pp. 49–57, 2015

DOI: 10.3945/ajcn.114.103028

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

Significance: Supplementation with a blend of krill and salmon oil is associated with decreased insulin sensitivity, thereby exacerbating the risk of diabetes and cardiovascular disease in overweight adults.

This randomized, double-blind, controlled crossover trial assessed whether supplementation with a blend of krill and salmon (KS) oil [which is rich in eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA)] affects insulin sensitivity in 47 overweight men (BMI 25 to 30 kg/m²; mean age \pm SD 46.5 \pm 5.1 y). Subjects received 5 1-g capsules of KS oil or a control (canola oil) for 8 wk and crossed over to another treatment after an 8-wk washout period. Results showed that unexpectedly, insulin sensitivity (per the Matsuda index) was 14% lower with the KS oil than with the control oil (P = 0.049). A mediation analysis showed that, after controlling for the likely positive effects of blood EPA and DHA (i.e., the omega-3 index), the reduction in insulin sensitivity after KS-oil supplementation was more marked [27% lower than with the control oil (P = 0.009)].

Higher Dietary Anthocyanin and Flavonol Intakes Are Associated with Anti-Inflammatory Effects in a Population of US Adults

A. Cassidy, G. Rogers, J.J. Peterson, J.T. Dwyer, H. Lin, P.F. Jacques

American Journal of Clinical Nutrition, Vol. 102, No. 1; pp. 172–181, 2015

DOI: 10.3945/ajcn.115.108555



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

Significance: An anti-inflammatory effect may be a key component underlying the reduction in risk of certain chronic diseases associated with higher intakes of anthocyanins and flavonols.

An inflammation score (IS) that integrated 12 individual inflammatory biomarkers for the examination of associations with intakes of different flavonoid classes was used in this cross-sectional analysis of 2375 Framingham Heart Study Offspring Cohort participants. Intakes of total flavonoids and their classes (anthocyanins, flavonols, flavanones, flavan-3-ols, polymers, and flavones) were calculated from validated food-frequency questionnaires. In multivariate analyses, an inverse association between higher anthocyanin and flavonol intakes and IS was observed with a mean \pm SE difference between quintile categories 5 and 1 of -1.48 ± 0.32 (P -trend ≤ 0.001) and -0.72 ± 0.33 (P -trend = 0.01), respectively. Results remained significant after additional adjustment for physical activity and vitamin C and fruit and vegetable intakes. Higher anthocyanin intake was inversely associated with all biomarker subgroups, whereas higher flavonol intake was associated only with lower cytokine and oxidative stress biomarker concentrations. In food-based analyses, higher intakes of apples and pears, red wine, and strawberries were associated with a lower IS with differences between quintiles 5 and 1 of -1.02 ± 0.43 ($P = 0.006$), -1.73 ± 0.39 ($P < 0.001$), and -0.44 ± 0.88 ($P = 0.02$), respectively. Although intakes of other classes were not associated with a reduction in overall IS, higher intakes of flavan-3-ols and their polymers were associated with a significant reduction in oxidative stress biomarkers.

Hydration

Hydration Status over 24-h Is Not Affected by Ingested Beverage Composition

M.A. Tucker, M.S. Ganio, J.D. Adams, L.A. Brown, C.B. Ridings, J.M. Burchfield, et al.

Journal of the American College of Nutrition, Vol. 34, No. 4; pp. 318–327, 2015

DOI:10.1080/07315724.2014.933684

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

Significance: Regardless of the beverage combination consumed, there were no differences in providing adequate hydration over a 24-h period in free-living, healthy adult males.

This study investigated the 24-h hydration status of 34 healthy, free-living, adult males when given various combinations of different beverage types. Subjects participated in a randomized, repeated-measures design in which they consumed: water only (treatment A), water+cola (treatment B), water+diet cola (treatment C), or water+cola+diet cola+orange juice (treatment D) over a sedentary 24-h period across four weeks of testing. Volumes of fluid were split evenly between beverages within each treatment, and when accounting for food moisture content and metabolic water production, total fluid intake from all sources was equal to 35 ± 1 ml/kg body mass. Results showed that 24-h hydration status was not different between treatments A, B, C, and D when assessed via urine osmolality (590 ± 179 ; 616 ± 242 ; 559 ± 196 ; 633 ± 222 mOsm/kg, respectively) and urine volume (1549 ± 594 ; 1443 ± 576 ; 1690 ± 668 ; 1440 ± 566 ml) (all $p > 0.05$). A -difference in 24-h urine specific gravity was observed between treatments A vs.



D (1.016 ± 0.005 vs. 1.018 ± 0.007 ; $p=0.049$). There were no differences between treatments at the end of the 24-h with regard to serum osmolality (291 ± 4 ; 293 ± 5 ; 292 ± 5 ; 293 ± 5 mOsm/kg, respectively) and total body water (43.9 ± 5.9 ; 43.8 ± 6.0 ; 43.7 ± 6.1 ; 43.8 ± 6.0 kg) (all $p > 0.05$).

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