

Cardiovascular Disease

CLA Does Not Impair Endothelial Function and Decreases Body Weight as Compared with Safflower Oil in Overweight and Obese Male Subjects

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Link to full text: <http://www.jacn.org/content/30/1/19.full>

Significance: Conjugated linoleic acid does not increase cardiovascular risk.

This study assessed the effect of conjugated linoleic acid (CLA) as compared with safflower oil on endothelial function and markers of cardiovascular risk in 85 overweight and obese men. Subjects were randomized to receive 4.5 g/d of the CLA isomeric mixture, safflower oil, heated safflower oil, or olive oil in a 4-week double-blind study. CLA as compared with safflower oil consumption did not impair fasting or postprandial peripheral arterial tonometry (PAT) index, which assessed endothelial function, but decreased body weight. CLA as compared with safflower oil did not change total-, LDL-, or HDL-cholesterol; triglycerides; insulin sensitivity indices; C-reactive protein; soluble adhesion molecules; oxidized LDL; lipoprotein a (Lp[a]); paraoxonase; or platelet-activating factor acetylhydrolase (PAF-AH) activity, but significantly reduced arylesterase activity and increased concentrations of the F₂-isoprostane 8-iso-prostaglandin F (PGF)_{2α}.

Consumption of High-Oleic Acid Ground Beef Increases HDL-Cholesterol Concentration but Both High- and Low-Oleic Acid Ground Beef Decrease HDL Particle Diameter in Normocholesterolemic Men

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Link to full text: <http://jn.nutrition.org/content/141/6/1188.full>

Significance: Dietary beef interventions have effects on risk factors for cardiovascular disease that are independent (insulin, HDL diameters) and dependent (HDL-C) on beef fatty acid composition.

This crossover dietary intervention study tested the hypothesis that ground beef high in monounsaturated fatty acid (MUFA) and low in saturated fatty acid (SFA) would increase HDL-cholesterol and LDL particle diameter in 27 free-living normocholesterolemic men. Subjects completed treatments in which five 114-g ground beef patties/wk were consumed for 5 wk with an intervening 4-wk washout period. Patties contained 24% total fat with a MUFA:SFA ratio of either 0.71 (low MUFA, from pasture-fed cattle) or 1.10 (high MUFA, from grain-fed cattle). High-MUFA ground beef provided 3.21 g more 18:1(n-9), 1.26 g less 18:0, 0.89 g less 16:0, and 0.36 g less 18:1(trans) fatty acids/patty than did the low-MUFA ground beef. Both ground beef interventions decreased plasma

insulin and HDL₂ and HDL₃ particle diameters and increased plasma 18:0 and 20:4(n-6) relative to baseline values. Only the high-MUFA ground beef intervention increased HDL-C from baseline (P=0.02). The plasma triglyceride concentration was positively correlated with the plasma insulin concentration (r = 0.40; P<0.001) and negatively correlated with HDL-C (r = -0.47; P<0.001) and plasma 18:0 (r = -0.24; P<0.01).

Egg Consumption and Risk of Cardiovascular Disease in the SUN Project

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European Journal of Clinical Nutrition, Vol. 65, No. 6; pp. 676-682, 2011

Link to full text: <http://www.nature.com/ejcn/journal/v65/n6/full/ejcn201130a.html>

Significance: No association between egg consumption and the incidence of cardiovascular disease was found in this Mediterranean cohort.

The association between egg consumption and incidence of cardiovascular disease (CVD) was examined in a prospective dynamic Mediterranean cohort of 14,185 university graduates. Baseline egg consumption was categorized into no consumption or <1 egg/week, 1 egg/week, 2–4 eggs/week and >4 eggs/week. During a median follow-up of 6.1 years, 91 new confirmed cases of CVD were observed. No association was found between egg consumption and the incidence of CVD (HR: 1.10, 95% CI: 0.46–2.63) for the highest versus the lowest category of egg consumption after adjusting for age, sex, total energy intake, adherence to the Mediterranean food pattern and other cardiovascular risk factors. Results were robust to different analytical scenarios.

Effect of Walnut-Enriched Meat on the Relationship between VCAM, ICAM, and LTB4 Levels and PON-1 Activity in ApoA4 360 and PON-1 Allele Carriers at Increased Cardiovascular Risk

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European Journal of Clinical Nutrition, Vol. 65, No. 6; pp. 703–710, 2011

Link to full text: <http://www.nature.com/ejcn/journal/v65/n6/full/ejcn201120a.html>

Significance: Walnut-enriched meat appears as a functional meat as consumed in the framework of a mixed diet lowered the concentration of some selected inflammatory chemo-attractant biomarkers.

This non-blinded, cross-over, placebo-controlled study compared the effects of consumption of walnut-enriched meat versus low-fat meat (LM) on selected soluble adhesion molecules and leukotrienes (LTB4) in 22 subjects at increased cardiovascular risk. Participants consumed walnut-enriched meat during one 5-week experimental period and LM during the other, separated by 4–6 week washout intervals. Diet characteristics, HDL-C, Apo A1, paraoxonase (PON-1), sVCAM-1, sICAM-1 and LTB4 were analysed. PON-1 55, PON-1 192 and apolipoprotein A4 (APOA4) 360 polymorphism effects were also assessed. Individuals consuming walnut-enriched meat displayed higher paraoxonase activity (P<0.001), lower levels of sICAM and aVCAM (P=0.046, P=0.012, respectively) and leukotriene B4 (P=0.044), and lower paraoxonase-1/HDLc and paraoxonase-1/Apo A1 ratios (both, P<0.001) than those consuming LM. Paraoxonase levels correlated negatively with those of sICAM (r=-0.471, P<0.01).

Significant decreases were observed in sICAM concentrations in PON-1 55LM+MM, PON-1 QQ192 and APOA4-2 carriers while decreases in sVCAM in QR+RR and APOA4-1 carriers were observed. Paraoxonase-1/HDLc and paraoxonase-1/Apo A1 ratios were significantly influenced by paraoxonase polymorphisms.

Type 2 Diabetes

Prolonged Leucine Supplementation Does Not Augment Muscle Mass or Affect Glycemic Control in Elderly Type 2 Diabetic Men

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Link to full text: <http://jn.nutrition.org/content/141/6/1070.full>

Significance: Prolonged leucine supplementation (7.5 g/d) does not modulate body composition, muscle mass, strength, glycemic control, and/or lipidemia in elderly, type 2 diabetes patients who habitually consume adequate dietary protein.

The clinical benefits of 6 mo of leucine supplementation in elderly, type 2 diabetes patients were assessed in 60 elderly males with type 2 diabetes. Subjects were administered 2.5 g L-leucine (n=30) or a placebo (n=30) with each main meal during 6 mo of nutritional intervention (7.5 g/d leucine or placebo). Lean tissue mass did not change or differ between groups, and at 0, 3, and 6 mo were 61.9±1.1, 62.2±1.1, and 62.0±1.0 kg, respectively in the leucine group and 62.2±1.3, 62.2±1.3, and 62.2±1.3 kg in the placebo group. There also were no changes in body fat percentage, muscle strength, and muscle fiber type characteristics. Glycosylated hemoglobin did not change or differ between groups and was 7.1±0.1% in the leucine group and 7.2±0.2% in the placebo group. Oral glucose insulin sensitivity and plasma lipid concentrations did not change or differ between groups.

The Dietary Approaches to Stop Hypertension Eating Plan Affects C-Reactive Protein, Coagulation Abnormalities, and Hepatic Function Tests among Type 2 Diabetic Patients

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Link to full text: <http://jn.nutrition.org/content/141/6/1083.full>

Significance: Among diabetic patients, the DASH diet can play an important role in reducing inflammation, plasma levels of fibrinogen, and liver aminotransferases.

The effects of the Dietary Approaches to Stop Hypertension (DASH) eating pattern was evaluated on C-reactive protein (CRP) level, coagulation abnormalities, and hepatic function tests in type 2 diabetic patients. In this randomized, crossover clinical trial, 31 type 2 diabetic patients consumed a control diet or the DASH diet for 8 wk, with a 4-wk washout between the 2 trial phases. The mean percent change for plasma CRP level was -26.9±3.5% after the DASH diet period and -5.1±3.8% after the control diet period (P=0.02). Decreases in both alanine aminotransferase and aspartate aminotransferase levels were greater after consuming the DASH diet compared with

the control diet ($-14.8 \pm 3.0\%$ vs. $-6.6 \pm 3.4\%$; $P=0.001$; $-29.4 \pm 3.7\%$ vs. $-5.9 \pm 1.4\%$; $P=0.001$, respectively). The decrease in the plasma fibrinogen level during the DASH diet period ($-11.4 \pm 3.6\%$) was greater than that during the control diet ($0.5 \pm 3.4\%$) ($P=0.03$).

A Low-Glycemic Index Diet and Exercise Intervention Reduces TNF α in Isolated Mononuclear Cells of Older, Obese Adults

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Link to full text: <http://jn.nutrition.org/content/141/6/1089.full>

Significance: A low-glycemic index diet has antiinflammatory and antidiabetogenic effects when combined with exercise in older obese prediabetics.

This randomized study examined the combined effect of a low-glycemic index diet and exercise on inflammation and glucose metabolism. Twenty-eight insulin-resistant older, obese adults were randomized to a 12-wk, low- (LGI=40) or high- (HGI=80) glycemic index diet plus aerobic exercise ($5 \text{ d} \cdot \text{wk}^{-1}$, $60 \text{ min} \cdot \text{d}^{-1}$, 80–85% heart rate_{max}) intervention. Both interventions decreased BMI ($P<0.001$), fasting plasma glucose ($P=0.01$), and insulin ($P=0.02$). The glycemic response was reduced only in the LGI group ($P=0.04$). Plasma and mononuclear cells (MNC)-derived TNF α secretion were reduced in the LGI group ($P=0.02$) but increased in the HGI group ($P=0.02$). Secretion of IL-6 from MNC and plasma IL-6 and MCP-1 concentrations were reduced in the LGI group. The change in MNC-derived TNF α ($r=0.43$; $P=0.04$) and plasma monocyte chemoattractant protein 1 (MCP-1) ($r=0.44$; $P=0.04$) correlated with decreases in the glycemic response. These data highlight the importance of diet composition in the treatment and prevention of inflammation and hyperglycemia.

Sugar-Sweetened and Artificially Sweetened Beverage Consumption and Risk of Type 2 Diabetes in Men

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Link to full text: <http://www.ajcn.org/content/93/6/1321.full>

Significance: Sugar-sweetened beverage consumption is associated with an elevated risk of type 2 diabetes, whereas the association between artificially sweetened beverages and type 2 diabetes was largely explained by health status, pre-enrollment weight change, dieting, and BMI.

This study examined the association of sugar-sweetened (sodas, fruit punches, lemonades, fruit drinks) and artificially sweetened (diet sodas, diet drinks) beverages with incident type 2 diabetes in 40,389 men from the Health Professionals Follow-Up Study. There were 2680 cases of type 2 diabetes over 20 y of follow-up. After age adjustment, the hazard ratio (HR) for the comparison of the top with the bottom quartile of sugar-sweetened beverage intake was 1.25 (95% CI: 1.11, 1.39; P for trend <0.01). After adjustment for confounders, the HR was 1.24 (95% CI: 1.09, 1.40; P for trend <0.01). Intake of artificially sweetened beverages was significantly associated

with type 2 diabetes in the age-adjusted analysis (HR: 1.91; 95% CI: 1.72, 2.11; P for trend <0.01) but not in the multivariate-adjusted analysis (HR: 1.09; 95% CI: 0.98, 1.21; P for trend = 0.13). The replacement of one serving of sugar-sweetened beverage with 1 cup (\approx 237 mL) of coffee was associated with a risk reduction of 17%.

Carbohydrates

Are the Glycemic and Insulinemic Index Values of Carbohydrate Foods Similar in Healthy Control, Hyperinsulinemic and Type 2 Diabetic Patients?

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European Journal of Clinical Nutrition, Vol. 65, No. 6; pp. 727-734, 2011

Link to full text: <http://www.nature.com/ejcn/journal/v65/n6/full/ejcn201128a.html>

Significance: The glycemic index is a valid property of foods because its value is similar in healthy control, hyperinsulinemic and diabetics, and is independent of subjects' metabolic status.

The purpose of this study was to compare the glycemic index (GI) and insulinemic index (II) (the insulin response of foods) values in non-diabetic subjects with fasting-serum-insulin (FSI) $<40 \mu\text{mol/l}$ (healthy control) or with FSI $\geq 40 \mu\text{mol/l}$ (hyper[I]) and subjects with type 2 diabetes (T2DM), and to see whether GI and II were related to the serum-glucose concentrations, insulin sensitivity, β -cell function and hepatic insulin extraction (HIE) of the subjects. Serum glucose, insulin and C-peptide responses after 50 g available-carbohydrate portions of glucose, sucrose, instant mashed potato, white bread, polished rice and pearled barley were measured in healthy control (n=9), hyper[I] (n=12) and T2DM (n=10) subjects. Food GI values did not differ significantly among the three subject groups, whereas II values were higher in T2DM (100 ± 7) than healthy controls (78 ± 5) and hyper[I] subjects (70 ± 5) (P=0.05). II was inversely associated with insulin sensitivity ($r = -0.66$, P<0.0001) and positively related to fasting- and postprandial-glucose (both $r = 0.68$, P<0.0001) and HIE ($r = 0.62$, P=0.0002).

Biomarkers

Association of $\delta^{13}\text{C}$ in Fingertick Blood with Added-Sugar and Sugar-Sweetened Beverage Intake

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Link to full text: [http://www.adajournal.org/article/S0002-8223\(11\)00282-3/fulltext](http://www.adajournal.org/article/S0002-8223(11)00282-3/fulltext)

Significance: The $\delta^{13}\text{C}$ value of fingertick blood shows promise as a noninvasive biomarker of added-sugar and sugar-sweetened beverage intake.

This investigation determined whether the $\delta^{13}\text{C}$ value of fingertick blood is a potential biomarker of added-sugar and sugar-sweetened beverage intake. Sixty adults were recruited to participate. The initial visit included assessment of height, weight, and dietary intake (sequence one: beverage intake questionnaire, sequence two: 4-day

food intake record). Sequence one participants completed a food intake record at visit two, and nonfasting blood samples were obtained via routine fingersticks at visits one and three. Sequence two participants completed a beverage intake questionnaire at visit two, and provided fingerstick blood samples at visits two and three. Samples were analyzed for $\delta^{13}\text{C}$ value using natural abundance stable isotope mass spectrometry. Reported mean added-sugar consumption was 66 ± 5 g/day, and sugar-sweetened beverage consumption was 330 ± 53 g/day and 134 ± 25 kcal/day. Mean fingerstick $\delta^{13}\text{C}$ value was $-19.94\text{‰}\pm 0.10\text{‰}$, which differed by BMI status. $\delta^{13}\text{C}$ value was associated (all $P<0.05$) with intake of total added sugars (g, $r=0.37$; kcal, $r=0.37$), soft drinks (g, $r=0.26$; kcal, $r=0.27$), and total sugar-sweetened beverage (g, $r=0.28$; kcal, $r=0.35$). The $\delta^{13}\text{C}$ value in the lowest and the highest added-sugar intake tertiles were significantly different (mean difference= -0.48‰ ; $P=0.028$).

Flavonoids

Dietary Intake of 337 Polyphenols in French Adults

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American Journal of Clinical Nutrition, Vol. 93, No. 6; pp. 1220-1228, 2011

Significance: The current study provides intake data for all individual polyphenols known to be present in the diet of a cohort.

Link to full text: <http://www.ajcn.org/content/93/6/1220.full>

Intakes of all known individual polyphenols in the French cohort SUPplémentation en Vitamines et Minéraux AntioXydants (SU.VI.MAX) were estimated by using the recently developed database Phenol-Explorer, which contains content values for 502 polyphenols in 452 foods. A total of 4942 adults who had completed at least six 24-h dietary records, participated in this study. A total of 337 polyphenols were consumed by SU.VI.MAX subjects, including 258 polyphenols consumed by at least one-half of the population and 98 polyphenols consumed in an amount >1 mg/d. Mean total polyphenol intake was estimated at 1193 ± 510 mg/d (or 820 ± 335 mg/d when expressed as aglycone equivalents), with hydroxycinnamic acid esters and proanthocyanidins being the most largely consumed polyphenols. These values may have been underestimated because of insufficient data or lack of accurate data on the content in foods for proanthocyanidins and thearubigins. Nonalcoholic beverages and fruit were the most important contributors to polyphenol intakes.

Health Outcomes

Television Viewing and Risk of Type 2 Diabetes, Cardiovascular Disease, and All-Cause Mortality: A Meta-analysis

A. Grøntved, F.B. Hu

Journal of the American Medical Association, Vol. 305, No. 23; pp. 2448-2455, 2011

Link to full text: <http://jama.ama-assn.org/content/305/23/2448.full>

Significance: Prolonged TV viewing was associated with increased risk of type 2 diabetes, cardiovascular disease, and all-cause mortality.

A meta-analysis of prospective cohort studies was performed to determine the association between television (TV) viewing and risk of type 2 diabetes, fatal or nonfatal cardiovascular disease (CVD), and all-cause mortality. Studies were identified by searches of MEDLINE and EMBASE databases from 1970 to March 2011 and by reviewing reference lists from retrieved articles. Of the 8 studies included, 4 reported results on type 2 diabetes, 4 reported on fatal or nonfatal CVD, and 3 reported on all-cause mortality. The pooled RR/2 hours of TV viewing/day were 1.20 (95% CI, 1.14-1.27) for type 2 diabetes, 1.15 (95% CI, 1.06-1.23) for fatal or nonfatal CVD, and 1.13 (95% CI, 1.07-1.18) for all-cause mortality. While the associations between time spent viewing TV and risk of type 2 diabetes and CVD were linear, the risk of all-cause mortality appeared to increase with TV viewing duration of >3 hours/day. The estimated absolute risk differences/2 hours of TV viewing/day were 176 cases of type 2 diabetes per 100,000 individuals/year, 38 cases of fatal CVD/100,000 individuals/year, and 104 deaths for all-cause mortality/100,000 individuals/year.

Sleep

Acute Sleep Deprivation Reduces Energy Expenditure in Healthy Men

C. Benedict, M. Hallschmid, A. Lassen, C. Mahnke, B. Schultes, H.B. Schiöth, et al.

American Journal of Clinical Nutrition, Vol. 93, No. 6; pp. 1229-1236, 2011

Link to full text: <http://www.ajcn.org/content/93/6/1229.full>

Significance: The current study provides intake data for all individual polyphenols known to be present in the diet of a cohort.

The influence of a single night of total sleep deprivation on morning energy expenditures and food intakes in healthy humans was examined. According to a balanced crossover design, 14 normal-weight male subjects were examined on 2 occasions during a regular 24-h sleep-wake cycle (including 8 h of nocturnal sleep) and a 24-h period of continuous wakefulness. In comparison with normal sleep, resting and postprandial energy expenditures assessed on the subsequent morning were significantly reduced after sleep deprivation by $\approx 5\%$ and 20% , respectively ($P < 0.05$ and $P < 0.0001$). Nocturnal wakefulness increased morning plasma ghrelin concentrations ($P < 0.02$) and nocturnal and daytime circulating concentrations of thyrotropin, cortisol, and norepinephrine ($P < 0.05$) as well as morning postprandial plasma glucose concentrations ($P < 0.05$). Changes in food intakes were variable, and no differences between wake and sleep conditions were detected.

Hypertension

Habitual Coffee Consumption and Risk of Hypertension: A Systematic Review and Meta-analysis of Prospective Observational Studies

Z. Zhang, G. Hu, B. Caballero, L. Appel, L. Chen

American Journal of Clinical Nutrition, Vol. 93, No. 6; pp. 1212-1219, 2011

Link to full text: <http://www.ajcn.org/content/93/6/1212.full>

Significance: Habitual coffee consumption of >3 cups/d was not associated with an increased risk of hypertension compared with <1 cup/d; however, a slightly elevated risk appeared to be associated with light-to-moderate consumption of 1 to 3 cups/d.

A systematic review and meta-analyses of long-term prospective studies that examined the association of habitual coffee consumption with risk of hypertension or blood pressure were conducted. MEDLINE, EMBASE, Agricola, and Cochrane Library were searched through August 2009 with the use of a standardized protocol. From 6 prospective cohort studies, a total of 172,567 participants and 37,135 incident hypertension cases were included. Mean follow-up ranged from 6.4 to 33.0 y. Compared with the lowest consumption [<1 cup (\approx 237 mL)/d], the pooled relative risks (RRs) for hypertension were 1.09 (95% CI: 1.01, 1.18) for the next higher category (1–3 cups/d), 1.07 (95% CI: 0.96, 1.20) for the second highest category (3–5 cups/d), and 1.08 (95% CI: 0.96, 1.21) for the highest category (>5 cups/d). A dose-response meta-analysis showed an inverse “J-shaped” curve (P for quadratic term <0.001) with hypertension risk increasing up to 3 cups/d (RR for comparison of 3 with 0 cups/d: 1.07; 95% CI: 0.97, 1.20) and decreasing with higher intakes (RR for comparison of 6 with 0 cups/d: 0.99; 95% CI: 0.89, 1.10).