Type 2 Diabetes

A Diet Based on High-Heat-Treated Foods Promotes Risk factors for Diabetes Mellitus and Cardiovascular Diseases

I. Birlouez-Aragon, G. Saavedra, F.J. Tessier, A. Galinier, L. Ait-Ameur, F. Lacoste, et al.

American Journal of Clinical Nutrition, Vol. 91, No. 5; pp. 1220-1226, 2010

Significance: A diet that is based on high-heat-treated foods increases markers associated with an enhanced risk of type 2 diabetes and cardiovascular diseases in healthy people.

This randomized, crossover, diet-controlled intervention trial aimed to determine whether high-heat-treated foods pose a risk for 62 healthy subjects. This study compared the potential metabolic effects of 2 diets (mild steam cooking and high-temperature cooking) based on the contents of Maillard reaction products (MRPs). MRPs were assessed in the diet and in subjects' feces, blood, and urine samples, with N^{ε}-carboxymethyllysine as an indicator of MRPs. In comparison with the steamed diet, 1 mo of consuming the high-heat-treated diet induced significantly lower insulin sensitivity and plasma concentrations of long-chain omega-3 fatty acids and vitamins C and E [–17% (P<0.002), –13% (P<0.0001), and –8% (P<0.01), respectively]. Concentrations of plasma cholesterol and triglycerides increased [+5% (P<0.01) and +9% (P<0.01), respectively].

Effects of Soy Protein and Isoflavones on Glycemic Control and Insulin Sensitivity: a 6-mo Double-Blind, Randomized, Placebo-Controlled Trial in Postmenopausal Chinese Women with Prediabetes or Untreated Early Diabetes

Z. Liu, Y. Chen, S.C. Ho, Y.P. Ho, J. Woo

American Journal of Clinical Nutrition, Vol. 91, No. 5; pp. 1394-1401, 2010

Significance: Soy protein with or without isoflavone supplementation did not have favorable effects on glycemic control and insulin sensitivity among postmenopausal Chinese women.

This randomized, double-blind, placebo-controlled trial investigated whether soy protein with isoflavones and soy isoflavone extracts could improve glycemic control and insulin sensitivity in 180 postmenopausal women with early hyperglycemia. Participants were randomly assigned to 1 of 3 arms to receive 15 g soy protein and 100 mg isoflavones, 15 g milk protein and 100 mg isoflavones, or 15 g milk protein on a daily basis for 6 mo. Results showed that 3- or 6-mo treatments with soy protein with or without isoflavone supplementation did not result in favorable changes in the descriptors for glycemic control and insulin resistance, namely fasting and 2-h postload

glucose, fasting and postload insulin, glycated serum protein, and homeostasis model assessment for insulin resistance and β-cell function.

Cardiovascular Disease

The Effect of Home-Delivered Dietary Approach to Stop Hypertension (DASH) Meals on the Diets of Older Adults with Cardiovascular Disease

J.L. Troyer, E.F. Racine, G.W. Ngugi, W.J. McAuley

American Journal of Clinical Nutrition, Vol. 91, No. 5; pp. 1204-1212, 2010

Significance: Delivery of 7 DASH meals/week was found to increase compliance with dietary recommendations among noncompliant older adults with cardiovascular disease.

This 1-y randomized controlled trial determined the degree to which dietary change is influenced by providing 7 home-delivered therapeutic meals/week to 298 adults aged ≥60 yrs with hyperlipidemia or hypertension. Fifty percent of participants received 7 therapeutic meals/week for 12 mo. Those in need of dietary change at baseline (n=210) were examined. Changes in intermediate Dietary Approach to Stop Hypertension (DASH) accordance, DASH accordance, and the nutrients that make up the DASH diet were measured by using 24-h food recalls at baseline, 6 mo, and 12 mo. Participants who received meals were 20% (P=0.001) more likely to reach intermediate DASH accordance at 6 mo and were 18% (P=0.007) more likely to meet saturated fat accordance at 12 mo than were those who did not receive meals. When stratified by race and income, gains were marginally larger for whites and higher-income individuals.

Intake of Fish and Marine n–3 Fatty Acids in Relation to Coronary Calcification: The Rotterdam Study

R.C. Heine-Bröring, I.A. Brouwer, R.V. Proença, F.J.A. van Rooij, A. Hofman, M. Oudkerk, et al.

American Journal of Clinical Nutrition, Vol. 91, No. 5; pp. 1317-1323, 2010

Significance: A weak inverse association between fish intake and coronary calcification was found in older subjects.

The association of fish and eicosapentaenoic acid (EPA) plus docosahexaenoic acid (DHA) intakes with coronary calcification in a general older population were examined. Coronary calcification was assessed ≈7 y later by electron-beam computed tomography in 1570 asymptomatic cardiac subjects with complete dietary data. Calcium scores were divided into ≤10 (no/minimal coronary calcification), 11–400 (mild/moderate calcification), and >400 (severe calcification). Prevalence ratios (PRs) for mild/moderate and severe calcification were obtained in categories of fish and EPA plus DHA intake. Subjects with a fish intake >19 g/d had a significantly lower prevalence of mild/moderate calcification (PR: 0.87; 95% CI: 0.78, 0.98; full model) than did subjects who consumed no fish. Subjects with a high fish intake also had a lower prevalence of severe calcification (PR: 0.88; 95% CI: 0.74, 1.04),

which was borderline statistically significant. EPA plus DHA intake showed no significant associations (PR: 0.93 and 0.97, respectively; $P>0.05$).

Acute Effects of Coffee on Endothelial Function in Healthy Subjects

S. Buscemi, S. Verga, J.A. Batsis, M. Donatelli, M.R. Tranchina, S. Belmonte, et al.

European Journal of Clinical Nutrition, Vol. 64, No. 5; pp. 483–489, 2010

Significance: Caffeinated coffee acutely induced unfavorable cardiovascular effects, especially on endothelial function.

This double-blind crossover study investigated the acute effects of coffee on endothelial function measured by brachial artery flow-mediated dilation (FMD) in 20 healthy non-obese subjects. Subjects ingested one cup of caffeinated (CC) and one cup of decaffeinated (DC) Italian espresso coffee in random order at 5- to 7-day intervals. Following CC ingestion, FMD decreased progressively and significantly (mean±s.e.m.: 0 min, 7.7±0.6; 30 min, 6.3±0.7; 60 min, 6.0±0.8%; ANOVA, $P<0.05$), but it did not significantly increase after DC ingestion (0 min, 6.9±0.6; 30 min, 8.1±0.9; 60 min, 8.5±0.9%; $P=0.115$). CC significantly increased both systolic and diastolic blood pressure; this effect was not observed after DC ingestion. Blood glucose concentrations remained unchanged after ingestion of both CC and DC, but insulin (0 min, 15.8±0.9; 60 min, 15.0±0.8 μU/ml; $P<0.05$) and C-peptide (0 min, 1.25±0.09; 60 min, 1.18±0.09 ng/ml; $P<0.01$) blood concentrations decreased significantly only after CC ingestion.

Coronary Heart Disease

Marine (n-3) Fatty Acids, Fish Consumption, and the 10-Year Risk of Fatal and Nonfatal Coronary Heart Disease in a Large Population of Dutch Adults with Low Fish Intake

J. de Goede, J.M. Geleijnse, J.M.A. Boer, D. Kromhout, W.M.M. Verschuren

Journal of Nutrition, Vol. 140, No. 5; pp. 1023-1028, 2010

Significance: In populations with a low fish consumption, EPA+DHA and fish may lower fatal coronary heart disease and myocardial infarction risk in a dose-responsive manner.

The dose-response relations within a low range of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and fish intake on fatal coronary heart disease (CHD) and nonfatal myocardial infarction (MI) were assessed in a population-based cohort study. EPA+DHA and fish intake were assessed at baseline among 21,342 participants aged 20–65 y with no history of MI or stroke. During 9–14 y of follow-up, 647 participants died, of which 82 of CHD. Fatal CHD mainly comprised MI (64 cases). In total, 252 participants survived an MI. Median intakes in quartiles of EPA+DHA were 40, 84, 151, and 234 mg/d. Medians of fish consumption in quartiles were 1.1, 4.2, 10.7, and 17.3 g/d. Compared with the lowest quartile of EPA+DHA, participants in the top quartile had a 49% lower risk of fatal CHD (95% CI: 6–73%) and a 62% lower risk of fatal MI (95% CI: 23–81%). We observed inverse dose-response

relations for EPA+DHA intake and fatal CHD (*P*-trend=0.05) and fatal MI (*P*-trend=0.01). Results were similar for fish consumption.

Lipids

The Comparative Efficacy of Plant Sterols and Stanols on Serum Lipids: A Systematic Review and Meta-Analysis

R. Talati, D.M. Sobieraj, S.S. Makanji, O.J. Phung, C.I. Coleman

Journal of the American Dietetic Association, Vol. 110, No. 5; pp. 719-726, 2010

Significance: Plant sterols and plant stanols do not have statistically or clinically relevant differing effects on total cholesterol, LDL-cholesterol, HDL-cholesterol, or triglyceride levels.

A meta-analysis of randomized controlled trials (RCTs) was performed to summarize direct comparisons between the effect of plant sterols vs. plant stanols on serum lipid levels in healthy patients and patients with hypercholesterolemia. A systematic literature search of MEDLINE, EMBASE, Cochrane CENTRAL, and the Natural Medicines Comprehensive Database was conducted from January 1950 through January 2009. Trials were included in the analysis if they were RCTs evaluating the effect of plant sterols vs. plant stanols in healthy patients or patients with hypercholesterolemia who reported efficacy data on total-, LDL- and HDL-cholesterol or triglycerides. Fourteen studies (n=531 patients) met the inclusion criteria. The results showed that there is no statistically or clinically significant difference between plant sterols and plant stanols in their abilities to modify total cholesterol (WMD −1.11 mg/dL, 95% CI = −4.12-1.90, *P*=0.47), LDL-cholesterol (WMD −0.35 mg/dL, 95% CI = −2.98-2.28, *P*=0.79), HDL-cholesterol (WMD −0.28 mg/dL, 95% CI = −1.18-0.62, *P*=0.54), or triglycerides (WMD −1.80 mg/dL, 95% CI = −6.80-3.21, *P*=0.48).

Sodium

Dietary Sodium Intake in a Sample of Adult Male Population in Southern Italy: Results of the Olivetti Heart Study

A. Venezia, G. Barba, O. Russo, C. Capasso, V. De Luca, E. Farinaro, et al.

European Journal of Clinical Nutrition, Vol. 64, No. 5; pp. 518–524, 2010

Significance: Habitual salt intake in this sample of male adult population is southern Italy was well above the recommended amounts.

The dietary habitual sodium intake and the association between daily sodium intake and anthropometric indices, food habits and hypertension in 940 adult male population participating in the Olivetti Heart Study were assessed. Results showed that dietary sodium intake estimated by 24 h urinary excretion was 203±70 mmol/day. Sodium excretion was significantly lower in treated hypertensive patients and higher in overweight/obese participants when

compared with normotensive and normal-weight individuals, respectively. In addition, the inverse correlation detected in normal-weight individuals (r=−0.321; P<0.05) between fractional proximal tubular sodium reabsorption and dietary sodium intake was disrupted in overweight/obese individuals (r=0.058; P=NS). The independent determinants of 24 h urinary sodium excretion were body mass index (BMI), the occurrence of antihypertensive treatment, and frequency of consumption of pasta and cold cuts.

Dietary Sources of Sodium in China, Japan, the United Kingdom, and the United States, Women and Men Aged 40 to 59 Years: The INTERMAP Study

C.A.M. Anderson, L.J. Appel, N. Okuda, I.J. Brown, Q. Chan, L. Zhao, et al.

Journal of the American Dietetic Association, Vol. 110, No. 5; pp. 736-745, 2010

Significance: This article identifies major food sources of sodium in diverse population samples

Identification of food sources of sodium in modern diets is critical to effective reduction of sodium intake worldwide. Data from the INTERMAP Study (an international, cross-sectional, epidemiologic study of 4,680 individuals ages 40-59 years from Japan (four samples), rural China (three samples), the United Kingdom (two samples), and the U.S. (eight samples)) to define major food sources of sodium in diverse population samples. In rural China, most (76%) dietary sodium was from salt added in home cooking, about 50% less in southern than northern samples. In Japan, most (63%) dietary sodium came from soy sauce (20%), commercially processed fish/seafood (15%), salted soups (15%), and preserved vegetables (13%). Processed foods, including breads/cereals/grains, contributed heavily to sodium intake in the United Kingdom (95%) and the U.S.

Achieving the Salt Intake Target of 6 g/Day in the Current Food Supply in Free-Living Adults Using Two Dietary Education Strategies

D-M. Ireland, P.M. Clifton, J.B. Keogh

Journal of the American Dietetic Association, Vol. 110, No. 5; pp. 763-767, 2010

Significance: Dietary sodium reduction is possible among free-living individuals who receive dietary advice.

This 8-week randomized parallel design study investigated whether dietary education enabled a reduction in salt consumption in 49 healthy free-living adults. Participants received dietary education to choose foods identified by either Australia's National Heart Foundation Tick symbol or by the Food Standards Australia and New Zealand's low-salt guideline of 120 mg sodium/100 g food. Sodium excretion was assessed by 24-hour urinary sodium collections at baseline and weeks 4 and 8. Forty-three participants completed the study. After 8 weeks, urinary sodium excretion decreased from 7.3±3.0 to 6.4±2.8 g salt/24 hours in the Tick group and from 7.9±2.6 to 6.0±3.0 g salt/24 hours in the Food Standards Australia New Zealand group (P<0.05, with no between-group difference).

Barriers to salt reduction were limited variety and food choice, difficulty when eating out, and increased time associated with identifying foods.

Carbohydrates

Dietary Glycemic Load, Glycemic Index, and Associated Factors in a Multiethnic Cohort of Midlife Women

Y. Hu, G. Block, B. Sternfeld, M-F. Sowers

Journal of the American College of Nutrition, Vol. 28, No. 6; pp. 636-647, 2010

Significance: Factors such as ethnicity, family income, and alcohol intake should be considered as potential confounders when investigating the associations of glycemic load and glycemic index with disease.

The intakes and correlates of dietary glycemic load (GL) and glycemic index (GI) in African American, Caucasian, Chinese, and Japanese women in 2025 women participating in the Study of Women's Health Across the Nation (SWAN) were described. The SWAN is a multi-ethnic, community-based cohort study of women transitioning into menopause. Results showed that GI and GL were consistently lower in Caucasian women than in African American, Japanese, or Chinese women. Education was inversely associated with GL and alcohol consumption was inversely associated with GI among all ethnic groups. The association between family income and glycemic measures varied across ethnic groups. GI was positively associated with consumption of grains and potatoes and inversely associated with consumption of fruits, juices, dairy foods, protein sources, and sweets among all ethnic groups.

Food Allergy

Diagnosing and Managing Common Food Allergies: A Systematic Review

J.J. Schneider Chafen, S.J. Newberry, M.A. Riedl, D.M. Bravata, M. Maglione, M.J. Suttorp, et al.

Journal of the American Medical Association, Vol. 303, No. 18; pp. 1848-1856, 2010

Significance: The evidence for the prevalence and management of food allergy is greatly limited by a lack of uniformity of criteria for making a diagnosis.

A systematic review of the evidence (between January 1988 and September 2009) on the prevalence, diagnosis, management, and prevention of food allergies was performed. Diagnostic tests were included if they had a prospective, defined study population, used food challenge as a criterion standard, and reported sufficient data to calculate sensitivity and specificity. For foods where anaphylaxis is common, cohort studies with a sample size of >100 participants were included. A total of 12,378 citations were identified; 72 citations were included. Food allergy affects more than 1%-2% but <10% of the population. It is unclear if the prevalence of food allergies is increasing. Summary receiver operating characteristic curves comparing skin prick tests (AUC=0.87; 95% CI, 0.81-0.93) and serum food-specific IgE (AUC=0.84; 95% CI, 0.78-0.91) to food challenge showed no statistical superiority for either test. Elimination diets have been rarely studied. Data on immunotherapy are insufficient to

recommend use. In high-risk infants, hydrolyzed formulas may prevent cow's milk allergy but standardized definitions of high risk and hydrolyzed formula do not exist.

Immunologic Features of Infants with Milk or Egg Allergy Enrolled in an Observational Study (Consortium of Food Allergy Research) of Food Allergy

S.H. Sicherer, R.A. Wood, D. Stablein, A.W. Burks, A.H. Liu, S.M. Jones, et al.

Journal of the American Dietetic Association, Vol. 125, No. 5; pp. 1077-1083, 2010

Significance: Infants with likely milk/egg allergy are at considerably high risk of having increased peanut-specific IgE levels (potential allergy).

This study explored the basic mechanisms responsible for food allergy and identified biomarkers (e.g., skin prick test (SPT) responses, food-specific IgE levels, and mononuclear cell responses) in infants 3-15 months with likely milk/egg allergy at increased risk of peanut allergy. Infants with a positive SPT response to milk or egg and either a corresponding convincing clinical history of allergy to milk or egg or moderate-to-severe atopic dermatitis were enrolled. Infants with known peanut allergy were excluded. Overall, 512 infants were studied; 60% had a history of a clinical reaction. Skin test responses, detectable food-specific IgE, or both revealed sensitization as follows: milk, 78%; egg, 89%; and peanut, 69%. SPT responses and food-specific IgE levels were discrepant for peanut (15% for IgE $\geq$0.35 kUA/L and negative SPT response vs 8% for positive SPT response and IgE <0.35 kUA/L, *P*=.001). Mononuclear cell allergen stimulation screening for *CD25*, cytokine-inducible SH2-containing protein *(CISH)*, forkhead box protein 3 *(FOXP3)*, *GATA3*, *IL10*, *IL4*, *IFNG*, and T-box transcription factor *(TBET)* expression by using casein, egg white, and peanut revealed that only allergen-induced *IL4* expression was significantly increased in those with clinical allergy to milk and in those sensitized to peanut.