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Lipids

Effect of Whole Milk Compared With Skimmed Milk on Fasting Blood Lipids in Healthy Adults: A 3-Week Randomized Crossover Study

Engel S, Elhauge M, Tholstrup T. *Eur J Clin Nutr.* 2017 Dec 11. doi: 10.1038/s41430-017-0042-5. [Article Link](#)

Significance: Results of this 3-week crossover RCT in subjects with normal blood cholesterol suggest that whole milk consumption (compared to skim milk) can have beneficial effects on HDL cholesterol, without deleterious effects on total and LDL cholesterol, triacylglycerol, insulin, and glucose concentrations.

Background/Objectives: Dietary guidelines have for decades recommended choosing low-fat dairy products due to the high content of saturated fat in dairy known to increase blood concentration of LDL cholesterol. However, meta-analyses including observational studies show no association between overall dairy intake and risk of cardiovascular disease and even point to an inverse association with type 2 diabetes. The objective was to compare the effects of whole milk (3.5% fat) with skimmed milk (0.1% fat) on fasting serum blood lipids, insulin, and plasma glucose in healthy subjects. **Subject/Methods:** A randomized, controlled 2 × 3-week crossover dietary intervention in 18 healthy adults randomly assigned to a sequence of treatments consisting of 0.5 L/d of whole milk and skimmed milk as part of their habitual diet. A total of 17 subjects completed the intervention. **Results:** Whole milk increased HDL cholesterol concentrations significantly compared to skimmed milk ($P < 0.05$). There were no significant differences between whole milk and skimmed milk in effects on total and LDL cholesterol, triacylglycerol, insulin, and glucose concentrations. **Conclusions:** Intake of 0.5 L/d of whole milk did not adversely affect fasting blood lipids, glucose, or insulin compared to skimmed milk. Moreover, intake of whole milk increased HDL cholesterol concentration compared to skimmed milk. These findings suggest that if the higher energy content is taken into account, whole milk might be considered a part of a healthy diet among the normocholesterolemic population.

Effect of Omega-3 Fatty Acids on Cognition: An Updated Systematic Review of Randomized Clinical Trials

Rangel-Huerta OD, Gil A. *Nutr Rev.* 2017 Dec 12. doi: 10.1093/nutrit/nux064. [Article Link](#)

Significance: This systematic review including studies from 2012 to 2017 (PubMed only) indicates that evidence is inconclusive for effects of LC-PUFA consumed during pregnancy through adulthood.



Context: The increasing number of studies on the effects of n-3 long-chain polyunsaturated fatty acids (LC-PUFAs) on health, particularly cognition, in the last 5 years reflects the growing interest in this area of research. **Objective:** The aim for this systematic review was to evaluate the scientific evidence published in the last 5 years (2012-2017) on the effects of n-3 LC-PUFA intake on cognition, cognitive development, and cognitive decline to determine whether n-3 LC-PUFAs support cognitive development and prevent cognitive decline. **Data Sources:** The PubMed database was searched. **Study Selection:** The 51 articles included in this systematic review reported on healthy individuals with mild or moderate cognitive impairment and patients with Alzheimer's disease. Risk of bias was assessed using Cochrane methodology. **Data Extraction:** The number of study participants, the type of study, the type and dose of n-3 LC-PUFAs, and the key results are reported here. **Results:** Current evidence indicates that n-3 LC-PUFAs administered during pregnancy or breastfeeding have no effect on the skills or cognitive development of children in later stages of development. Evidence regarding the improvement of cognitive function during childhood and youth or in attention deficit/hyperactivity disorder is inconclusive. Moreover, it is still unclear if n-3 LC-PUFAs can improve cognitive development or prevent cognitive decline in young or older adults.

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Effect of Conjugated Linoleic Acid on Blood Inflammatory Markers: A Systematic Review and Meta-Analysis on Randomized Controlled Trials

Haghighatdoost F, Nobakht M Gh BF. *Eur J Clin Nutr.* 2017 Dec 29. doi: 10.1038/s41430-017-0048-z. [Article Link](#)

Significance: This systematic review and meta-analysis including 11 studies found that CLA suggests concern due to an increase in inflammatory markers.

Background/Objectives: Conjugated linoleic acid (CLA) is a polyunsaturated fatty acid with attractive biological activities. Numerous studies have been conducted on the inflammation-lowering effects of CLA in in vitro and animal models. However, the effects of CLA treatment on the inflammatory markers in humans are controversial. Therefore, the objective of this study was to perform a systematic review and meta-analysis on controlled clinical trials (RCT) assessing the effects of CLA supplementation on the circulating inflammatory markers, including C-reactive protein (CRP), interleukin-6 (IL-6), and tumor necrosis factor- α (TNF- α). **Subjects/Methods:** The literature search of RCTs was performed using PubMed/Medline, Scopus, ScienceDirect, Web of science, Cochrane, and Google Scholar databases from inception to March 2017. Weighted mean differences were estimated and the pooled effect size was calculated by a random effects model. **Results:** Of the 427 identified studies, eleven RCTs, including 420 subjects were included in the statistical analysis. Findings suggested that CLA supplementation increased blood levels of CRP by 0.89 mg/l (95% CI: 0.11, 1.68; $P=0.025$) and TNF- α levels by 0.39 pg/ml (95% CI: 0.23, 0.55; $P<0.0001$). However, blood IL-6 levels were marginally decreased by 0.32 pg/ml (95% CI: -0.71, 0.07; $P=0.11$) following CLA supplementation. There was a significant heterogeneity for the impact of CLA on CRP and IL-6, but not TNF- α . **Conclusions:** This meta-analysis showed that CLA supplementation may increase inflammatory markers (CRP and TNF- α). There are concerns about using CLA supplementation as an anti-obesity agent among the obese population for at least a short duration.

Effect of Omega-3 Long-Chain Polyunsaturated Fatty Acid Supplementation on Heart Rate: A Meta-Analysis of Randomized Controlled Trials

Hidayat K, Yang J, Zhang Z, Chen GC, Qin LQ, Eggersdorfer M, et al. *Eur J Clin Nutr.* 2017 Dec 28. doi: 10.1038/s41430-017-0052-3.

[Article Link](#)



Significance: RCTs and meta-analysis indicate that n-3 PUFA administration can reduce heart rate, with more evidence for an effect of EPA.

Background: Elevated resting heart rate (HR) has emerged as a new risk factor for all-cause and cardiovascular mortality. The effect of marine-derived omega-3 long-chain polyunsaturated fatty acid (n-3 LCPUFAs) supplementation on HR was investigated as an outcome in many clinical trials. The present study was to provide an updated meta-analysis on the HR-slowng effect of n-3 LCPUFAs, and to differentiate the chronotropic effect between eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). **Methods:** PubMed and Cochrane databases were searched for relevant articles examining the effects of n-3 PUFAs on HR through May 2017. A random-effects model was used to generate the pooled effect sizes and 95% confidence intervals (CIs). The pooled effect sizes were presented as weighted mean differences (WMDs). **Results:** A total of 51 randomized controlled trials (RCTs) with approximately 3000 participants were included in this meta-analysis. Compared to placebo, n-3 PUFA supplementation mildly but significantly reduced HR (-2.23 bpm; 95% CI: -3.07, -1.40 bpm). Moderate evidence of heterogeneity was observed among included trials ($I^2=49.1\%$, P heterogeneity <0.001). When DHA and EPA were separately administered, modest HR reduction was observed in trials that supplemented with DHA (-2.47 bpm; 95% CI: -3.47, -1.46 bpm), but not in trials with EPA. **Conclusions:** The present meta-analysis provides strong clinical evidence demonstrating the effect of heart rate reduction by n-3 LCPUFA supplementation. When DHA or EPA administered alone, heart rate was slowed by DHA rather than by EPA.

Short-Term Overfeeding With Dairy Cream Does Not Modify Gut Permeability, the Fecal Microbiota, or Glucose Metabolism in Young Healthy Men

Ott B, Skurk T, Lagkouvardos L, Fischer S, Büttner J, Lichtenegger M, et al. *J Nutr.* 2018 Jan 1;148(1):77-85. [Article Link](#)

Significance: Feeding men 48% of energy from fat as dairy cream for 7 days did not alter markers of inflammation, gut permeability, or microbiota but did increase LDL and HDL cholesterol and decrease triglycerides.

Background: High-fat diets (HFDs) have been linked to low-grade inflammation and insulin resistance. **Objective:** The main purpose of the present study was to assess whether acute overfeeding with an HFD affects insulin sensitivity, gut barrier function, and fecal microbiota in humans. **Methods:** In a prospective intervention study, 24 healthy men [mean \pm SD: age 23.0 \pm 2.8 y, body mass index (in kg/m²) 23.0 \pm 2.1] received an HFD (48% of energy from fat) with an additional 1000 kcal/d (as whipping cream) above their calculated energy expenditure for 7 d. Insulin sensitivity (hyperinsulinemic euglycemic clamp), gut permeability (sugar and polyethylene glycol absorption tests, plasma zonulin), and gut microbiota profiles (high-throughput 16S rRNA

gene sequencing) were assessed before and after overfeeding, and 14 d after intervention. Additionally, inflammation markers such as high-sensitivity C-reactive protein, lipopolysaccharide-binding protein, leptin, high-molecular-weight adiponectin, calprotectin, regulated on activation normal, T cell expressed and secreted (RANTES), and monocyte chemoattractant protein-1 were measured in plasma by ELISA. Finally, lipid parameters were analyzed in serum by a laboratory service. **Results:** Although participants gained 0.9 ± 0.6 kg ($P < 0.001$) body weight, overnutrition was not associated with a significant change in insulin sensitivity (M value and glucose disposal). Overfeeding for 7 d resulted in elevated serum total (10.2%), LDL (14.6%) and HDL (14.8%) cholesterol concentrations ($P < 0.01$). In contrast, fasting plasma triglyceride significantly declined (29.3%) during overfeeding ($P < 0.001$). In addition, there were no significant changes in inflammatory markers. Urine excretion of 4 sugars and polyethylene glycol, used as a proxy for gut permeability, and plasma concentration of zonulin, a marker of paracellular gut permeability, were unchanged. Moreover, overfeeding was not associated with consistent changes in gut microbiota profiles, but marked alterations were observed in a subgroup of 6 individuals. **Conclusions:** Our findings suggest that short-term overfeeding with an HFD does not significantly impair insulin sensitivity and gut permeability in normal-weight healthy men, and that changes in dominant communities of fecal bacteria occur only in certain individuals.

Dietary Glycemic Index and Glycemic Load Are Positively Associated With Oxidative Stress Among Premenopausal Women

Anderson C, Milne GL, Park YM, Sandler DP, Nichols HB. *J Nutr*. 2018 Jan 1;148(1):125–130. [Article Link](#)

Significance: Results from this cross-sectional study suggest a link between glycemic index or glycemic load and oxidative stress.

Background: Diets with a high glycemic index (GI) and glycemic load (GL) have been hypothesized to increase oxidative stress, but the limited human studies are inconsistent. **Objective:** The aim of this cross-sectional study was to investigate associations between dietary GI, GL, and carbohydrate intake and oxidative stress, as measured by F2-isoprostanes (F2-IsoPs). **Methods:** Concentrations of F2-IsoP and its metabolite (15-F2t-IsoP-M) were measured in urine samples collected at enrollment from 866 premenopausal women (aged 35–54 y) participating in the Sister Study. Total carbohydrate intake and dietary GI and GL were assessed using a validated food frequency questionnaire. Urinary F2-IsoP and 15-F2t-IsoP-M concentrations were compared across quintiles of carbohydrate intake, GI, and GL using multivariable linear regression models. **Results:** Urinary F2-IsoP concentrations were positively associated with dietary GI (P-trend = 0.023), and both F2-IsoP and 15-F2t-IsoP-M concentrations were positively associated with GL (F2-IsoP: P-trend < 0.001; 15-F2t-IsoP-M: P-trend < 0.001) and total carbohydrate intake (F2-IsoP: P-trend = 0.012; 15-F2t-IsoP-M: P-trend < 0.001). Stratified analyses suggested that a positive association between GI and urinary 15-F2t-IsoP-M concentrations was present among women with a body mass index [BMI (in kg/m²)] ≥ 30.0 , but not among those with a BMI of <25.0 or 25.0–29.9 (P-interaction = 0.01). **Conclusions:** Our cross-sectional analyses in a sample of premenopausal women support hypothesized relations between high dietary GI and GL and oxidative stress, as assessed by urinary F2-IsoP and 15-F2t-IsoP-M concentrations. Given potential associations between oxidative stress and the development of cardiovascular disease and type 2 diabetes, our findings may have important implications for reducing chronic disease risk.

Substitution of Dietary ω -6 Polyunsaturated Fatty Acids for Saturated Fatty Acids Decreases LDL Apolipoprotein B-100 Production Rate in Men With Dyslipidemia Associated With Insulin Resistance: A Randomized Controlled Trial.

Drouin-Chartier JP, Tremblay AJ, Lépine MC, Lemelin V, Lamarche B, Couture P. *Am J Clin Nutr*. 2018 Jan 1;107(1):26–34. [Article Link](#)

Significance: Four weeks on a fully controlled diet high in ω -6 PUFAs (11.3%) appeared to lower the apoB-100 production rate in comparison to a diet high in saturated fats (13.4%).

Background: The substitution of omega (ω)-6 (n-6) polyunsaturated fatty acids (PUFAs) for saturated fatty acids (SFAs) is advocated in cardiovascular disease prevention. The impact of this substitution on lipoprotein metabolism in subjects with dyslipidemia associated with insulin resistance (IR) remains unknown. **Objective:** In men with dyslipidemia and IR, we evaluated the impact of substituting ω -6 PUFAs for SFAs on the in vivo kinetics of apolipoprotein (apo) B-containing lipoproteins and on the intestinal expression of key genes involved in lipoprotein metabolism. **Design:** Dyslipidemic and IR men ($n = 36$) were recruited for this double-blind, randomized, crossover, controlled trial. Subjects consumed, in a random order, a fully controlled diet rich in SFAs (SFAs: 13.4% of energy; ω -6 PUFAs: 4.0%) and a fully controlled diet rich in ω -6 PUFAs (SFAs: 6.0%; ω -6 PUFAs: 11.3%) for periods of 4 wk, separated by a 4-wk washout period. At the end of each diet, the in vivo kinetics of apoB-containing lipoproteins were measured and the intestinal expression of key genes involved in lipoprotein metabolism was quantified in duodenal biopsies taken from each participant. **Results:** The substitution of ω -6 PUFAs for SFAs had no impact on TRL apoB-48 fractional catabolic rate ($\Delta = -3.8\%$, $P = 0.7$) and production rate ($\Delta = +1.2\%$, $P = 0.9$), although it downregulated the intestinal expression of the microsomal triglyceride transfer protein ($\Delta = -18.4\%$, $P = 0.006$) and apoB ($\Delta = -16.6\%$, $P = 0.005$). The substitution of ω -6 PUFAs for SFAs decreased the LDL apoB-100 pool size ($\Delta = -7.8\%$; $P = 0.005$). This difference was attributed to a reduction in the LDL apoB-100 production rate after the substitution of ω -6 PUFAs for SFAs ($\Delta = -10.0\%$; $P = 0.003$). **Conclusions:** This

study demonstrates that the substitution of dietary ω -6 PUFAs for SFAs decreases the production and number of LDL particles in men with dyslipidemia and IR.

Carbohydrates

Effectiveness of Behavioral Interventions to Reduce the Intake of Sugar-Sweetened Beverages in Children and Adolescents: A Systematic Review and Meta-Analysis

Abdel Rahman A, Jomaa L, Kahale LA, Adair P, Pine C. *Nutr Rev*. 2017 Dec 21. doi: 10.1093/nutrit/nux061. [Article Link](#)

Significance: This systematic review indicated that interventions did not result in significant differences in SSB intake or body weight.



Context: Consumption of sugar-sweetened beverages (SSBs) among children has been associated with adverse health outcomes. Numerous behavioral interventions aimed at reducing the intake of SSBs among children have been reported, yet evidence of their effectiveness is lacking. **Objective:** This systematic review explored the effectiveness of educational and behavioral interventions to reduce SSB intake and to influence health outcomes among children aged 4 to 16 years. **Data Sources:** Seven databases were searched for randomized controlled trials published prior to September 2016. Studies identified were screened for eligibility. **Study Selection:** Trials were included in the review if they met the PICOS (Population, Intervention, Comparison, Outcome, and Study design) criteria for inclusion of studies. **Data Extraction:** Data were extracted by 2 reviewers following Cochrane guidelines and using Review Manager software. **Results:** Of the 16 trials included, 12 were school based and 4 were community or home based. Only 3 trials provided data that could be pooled into a meta-analysis for evaluating change in SSB intake. Subgroup analyses showed a trend toward a significant reduction in SSB intake in participants in school-based interventions compared with control groups. Change in body mass index z scores was not statistically significant between groups. **Conclusions:** The quality of evidence from included trials was considered moderate, and the effectiveness of educational and behavioral interventions in reducing SSB intake was modest.

Effects of Glucose and Sucrose on Mood: A Systematic Review of Interventional Studies

van de Rest O, van der Zwaluw NL, de Groot LCPGM. *Nutr Rev*. 2017 Dec 8. doi: 10.1093/nutrit/nux065. [Article Link](#)

Significance: This systematic review including 19 studies showed limited effects of glucose ingestion on mood and no effect of sucrose on mood.

Context: Glucose is the main energy source for the brain, and as such, manipulation of glucose supply may affect brain function. It has been suggested that a change in blood glucose may influence mood. **Objective:** The aim of this review was to investigate the potential effects of glucose and sucrose, compared with placebo, on mood. **Data Sources:** The electronic databases PubMed and Scopus were searched. Reference lists of selected articles were checked manually. **Data Extraction:** Randomized controlled trials or crossover trials comparing the effects of glucose or sucrose on mood that were published up to May 2017 were eligible. Potentially eligible articles were selected independently by 2 reviewers. **Results:** In total, 19 studies were found. Thirteen studies investigated the effects of glucose consumption compared with placebo on mood. Seven of these 13 studies found no effect of glucose on mood. The other 6 studies found small and partial effects that may also be due to other factors like palatability and expectation. Seven of the 19 studies investigated the effects of sucrose ingestion versus placebo on mood. None of these studies found a positive effect on mood, and 1 study observed an adverse effect. One of the studies investigated the effects of both glucose and sucrose. **Conclusions:** The results from this review show limited effects of glucose ingestion on mood and no effect of sucrose on mood.

Determinants of Sugar-Sweetened Beverage Consumption Among Low-Income Children: Are There Differences by Race/Ethnicity, Age, and Sex?

Tasevska N, DeLia D, Lorts C, Yedidia M, Ohri-Vachaspati P. *J Acad Nutr Diet*. 2017 Dec;117(12):1900–1920. doi: 10.1016/j.jand.2017.03.013. [Article Title](#)

Significance: The authors examined intake data and demographics of participants in the New Jersey Childhood Obesity Study and found that age, ethnicity, and parental SSB consumption patterns and education were significantly associated with SSB intake.

Background: Understanding determinants of high consumption of sugar-sweetened beverages (SSBs), a highly prevalent obesogenic behavior, will help build effective customized public health interventions. **Objective:** Our aim was to identify child and parent lifestyle and household demographic factors predictive of high SSB consumption frequency in children from low-income, ethnically diverse communities that may help inform public health interventions. **Design:** We used a cross-sectional telephone household survey. **Participants/Setting:** Participants were 717 boys and 686 girls aged 3 to 18 years old from the New Jersey

Childhood Obesity Study living in five low-income cities (Camden, New Brunswick, Newark, Trenton, and Vineland). The adult most knowledgeable about household food shopping completed a questionnaire over the telephone inquiring about their and their child's dietary and physical activity habits, and household-, parent-, and child-level demographics. **Main Outcome Measures:** Child's SSB consumption frequency was measured. **Statistical Analysis Performed:** Multivariate ordered logit models were designed to investigate a variety of variables hypothesized to affect the frequency of SSB consumption. Exploratory stratified analyses by race, sex, and age were also conducted. **Results:** Eight percent of our study participants never consumed SSBs, 45% consumed SSBs at least once per day, and 23% consumed twice or more per day. SSB consumption was higher among children 12 to 18 years vs 3 to 5 years ($P<0.0001$), of non-Hispanic black vs non-Hispanic white race/ethnicity ($P=0.010$), who were moderate fast food consumers vs never consumers ($P=0.003$), and those whose parents were high vs low SSB consumers ($P<0.0001$). Living in a non-English-speaking household ($P=0.030$), having a parent with a college or higher education vs less than high school ($P=0.003$), and having breakfast 6 to 7 days/wk vs never to 2 days/wk or less were associated with lower SSB consumption ($P=0.001$). **Conclusions:** We identified a number of household-, parent-, and child-level predictors of SSB consumption, which varied by race, sex, and age, useful for building customized interventions targeting certain behaviors in ethnically diverse, low-income children.

Relation Between Sugar-Sweetened Beverage Consumption and Micronutrient Intake in a Prospective Study

Mullie P, Mertens E, Charlier R, Knaeps SS, Lefevre J, Clarys P. *Eur J Clin Nutr.* 2018 Jan;72(1):170–173. [Article Link](#)

Significance: SSB consumption was not associated with a significant reduction in micronutrient intake.

Micronutrient dilution following sugar-sweetened beverage (SSB) consumption can lead to a qualitative impoverishment of a dietary pattern. The aim of this prospective study was to investigate the relation between SSB consumption and micronutrients. A total 562 adults were tested in 2002 and 2012 for the same anthropometric, lifestyle and nutritional intake activity parameters. Calcium, iron and magnesium intake decreased with increasing baseline SSB intake, and with increasing SSB consumption during the 10 years. A 100ml increase in SSB consumption was associated with a 22 mg lower intake of calcium, 0.4 mg of iron and 9 mg of magnesium. There was no relation between vitamins and SSB consumption. In conclusion, there was limited evidence in our study, which suggests SSB have minimal dilutional effect on dietary micronutrient consumption. A major limitation of the present study is that of the original 1569 participants in 2002, 36% returned for participation in 2012.

Soda Intake Is Directly Associated With Serum C-Reactive Protein Concentration in Mexican Women

Tamez M, Monge A, López-Ridaura R, Fagherazzi G, Rinaldi S, Ortiz-Panozo E, et al. *J Nutr.* 2018 Jan 1;148(1):117–124. [Article Link](#)

Significance: SSB consumption, but not diet beverage consumption, was associated with C-reactive protein levels in Mexican women when adjusted for several potential confounders, including BMI.

Background: Soda intake is associated with an increased risk of cardiovascular disease. Consumption of diet sodas, often considered healthy alternatives to sodas, could also increase the likelihood of cardiovascular outcomes. **Objective:** This study aims to evaluate the relation between soda and diet soda and biomarkers of cardiovascular risk. **Methods:** We conducted a cross-sectional analysis among 825 Mexican women free of diabetes, cardiovascular disease, and cancer, and for whom serum concentrations of C-reactive protein (CRP), C-peptide, adiponectin, and leptin were available. Mean \pm SD age was 45.9 \pm 6.6 y, the majority of women were premenopausal (60.4%), and the prevalence of obesity was 35%. We estimated the adjusted percentage differences in biomarkers and 95% CIs by performing multiple linear regression models comparing categories of consumption for soda and diet soda adjusting for age, family history of heart disease, menopause, menopausal hormone therapy, socioeconomic status, region, smoking, physical activity, alcohol intake, and dietary patterns. **Results:** In the entire study sample we observed a 50% higher serum CRP concentration in women in the highest soda intake quartile (median intake: 202.9 mL/d, IQR: 101.4, 304.3 mL/d) compared to those in the lowest (median intake: 11.8 mL/d, IQR: 0.0, 152.1 mL/d). After stratification by menopausal status, results remained significant only for premenopausal women. Premenopausal women in the highest quartile of soda intake had 56% higher CRP concentration relative to women in the lowest quartile. We observed no significant association with the other biomarkers. After further adjustment for body mass index, a potential mediator, results remained significant only for CRP. Diet soda consumption was not associated with any of the biomarkers. **Conclusions:** Consumption of soda was associated with adverse levels in a biomarker of inflammation and cardiovascular risk, serum CRP, in Mexican women. These results add to the accumulating evidence on soda and cardiovascular risk. More research is necessary to understand the potential impact of artificially sweetened sodas.

Intake of Free Sugars and Micronutrient Dilution in Australian Adults

Mok A, Ahmad R, Rangan A, Louie JCY. *Am J Clin Nutr.* 2018 Jan 1;107(1):94–104. [Article Link](#)

Significance: Based on food recall data, micronutrient intake was diluted at >25% of energy from free sugars but was not notably affected otherwise unless energy from free sugars was <5%.

Background: The negative health effect of excessive intake of free sugars has been gaining increasing public awareness. **Objective:** This secondary analysis aimed to evaluate the impact of free-sugar intake on micronutrient dilution, and estimate a threshold level of free-sugar intake at which a decrease in micronutrient intake becomes evident, based on data from the Australian Health Survey 2011-2012. **Design:** Dietary data from adult respondents (weighted $n = 6150$) who had completed two 24-h recalls were analyzed. A published 10-step methodology was adopted and used to estimate the free-sugar intake of the respondents. Six modified cut-offs for percentage of energy of free sugars (%EFS) were created based on recommendations from the WHO and the Institute of Medicine to examine the association between %EFS on micronutrient intakes. Estimated marginal means and SEs were calculated using ANCOVA. Logistic regression was used to calculate the ORs of not meeting the nutrient reference values for Australia and New Zealand for each micronutrient with an increase in free-sugar intake. Analyses were adjusted for age, sex, socioeconomic status, country of birth, whether dieting, smoking status, and remoteness of living area. **Results:** Peak intake for most micronutrients was observed at %EFS between 5% and <15%. A significant reduction in most micronutrient intakes was observed at >25%EFS. At <5%EFS, some micronutrient intakes were reduced. Only small variations in micronutrient consumptions were observed when %EFS was between 5% and 25%. Core food intake decreased and discretionary food increased with an increase in free-sugar intake. **Conclusion:** A high free-sugar intake, particularly >25%EFS, was found to have a significant diluting effect on most nutrients. However, a free-sugar intake <5%EFS may increase the risk of undesirably low micronutrient consumption related to inadequate total energy intake.

Association of Whole Grain Intake With All-Cause, Cardiovascular, and Cancer Mortality: A Systematic Review and Dose-Response Meta-Analysis From Prospective Cohort Studies

Zhang B, Zhao Q, Guo W, Bao W, Wang X. *Eur J Clin Nutr.* 2018 Jan;72(1):57–65. [Article Link](#)

Significance: This study reports an association between reduced risk of mortality from various causes and intake of whole grains, in support of current dietary guidance.



Background/Objectives: Whole grains are rich source of nutrients and have shown beneficial effects on human health. This study was designed to systematically review the existing results and quantitatively assess the dose-response relationship of whole grain intake with all-cause and cause-specific mortality. **Subjects/Methods:** We searched 'whole grain' or 'whole grains' in combination with 'mortality' or 'cardiovascular disease' or 'cancer' through the Web of Science and PubMed databases till 20 January 2016. To be eligible for inclusion, publications should be prospective cohort studies and reported the influence of whole grain intake on human mortality. Relative risks (RRs) and 95% confidence intervals (CIs) from the included studies were pooled by a random effects model or fixed effect model. **Results:** We included 19 cohort studies from 17 articles, with 1 041 692 participants and 96 710 deaths in total, in the analyses. We observed an inverse relationship of whole grain intake with risk of total, cardiovascular disease and cancer mortality. The pooled RR was 0.84 (95% CI 0.81-0.88, $n=9$) for total mortality, 0.83 (95% CI 0.79-0.86, $n=8$) for CVD mortality and 0.94 (95% CI 0.87-1.01, $n=14$) for cancer mortality, comparing the highest intake of whole grain with the lowest category. For dose-response analysis, we found a nonlinear relationship of whole grain intake with risk of total, cardiovascular and cancer mortality. Each 28 g/d intake of whole grains was associated with a 9% (pooled RR: 0.91 (0.90-0.93)) lower risk for total mortality, 14% (pooled RR: 0.86 (0.83-0.89)) lower risk for CVD mortality and 3% (pooled RR: 0.97 (0.95-0.99)) lower risk for cancer mortality. **Conclusions:** Our study shows that whole grain intake was inversely associated with risk of total, CVD and cancer mortality. Our results support current dietary guidelines to increase the intake of whole grains. Government officials, scientists and medical staff should take actions to promote whole grains intake.

Protein

Protein Ingestion Before Sleep Increases Overnight Muscle Protein Synthesis Rates in Healthy Older Men: A Randomized Controlled Trial

Kouw IW, Holwerda AM, Trommelen J, Kramer IF, Bastiaanse J, Halson SL, et al. *J Nutr.* 2017 Dec;147(12):2252–2261. doi: 10.3945/jn.117.254532. [Article Link](#)

Significance: Provision of casein to men (average 72 y) before sleep resulted in digestion and myofibrillar uptake overnight.

Background: The loss of skeletal muscle mass with aging has been attributed to the blunted anabolic response to protein intake. Presleep protein ingestion has been suggested as an effective strategy to compensate for such anabolic resistance. **Objective:** We assessed the efficacy of presleep protein ingestion on dietary protein digestion and absorption kinetics and overnight muscle protein synthesis rates in older men. **Methods:** In a randomized, double-blind, parallel design, 48 older men (mean \pm SEM age: 72 ± 1 y) ingested 40 g casein (PRO40), 20 g casein (PRO20), 20 g casein plus 1.5 g leucine (PRO20+LEU), or a placebo before sleep. Ingestion of intrinsically L-[1-¹³C]-phenylalanine- and L-[1-¹³C]-leucine-labeled protein was combined with intravenous L-[ring-²H₅]-phenylalanine and L-[1-¹³C]-leucine infusions during sleep. Muscle and blood samples were collected throughout

overnight sleep. **Results:** Exogenous phenylalanine appearance rates increased after protein ingestion, but to a greater extent in PRO40 than in PRO20 and PRO20+LEU ($P < 0.05$). Overnight myofibrillar protein synthesis rates (based on L-[ring-2H5]-phenylalanine) were $0.033\% \pm 0.002\%/h$, $0.037\% \pm 0.003\%/h$, $0.039\% \pm 0.002\%/h$, and $0.044\% \pm 0.003\%/h$ in placebo, PRO20, PRO20+LEU, and PRO40, respectively, and were higher in PRO40 than in placebo ($P = 0.02$). Observations were similar based on L-[1-13C]-leucine tracer (placebo: $0.047\% \pm 0.004\%/h$ and PRO40: $0.058\% \pm 0.003\%/h$, $P = 0.08$). More protein-derived amino acids (L-[1-13C]-phenylalanine) were incorporated into myofibrillar protein in PRO40 than in PRO20 (0.033 ± 0.002 and 0.019 ± 0.002 MPE, respectively, $P < 0.001$) and tended to be higher than in PRO20+LEU (0.025 ± 0.002 MPE, $P = 0.06$). **Conclusions:** Protein ingested before sleep is properly digested and absorbed throughout the night, providing precursors for myofibrillar protein synthesis during sleep in healthy older men. Ingestion of 40 g protein before sleep increases myofibrillar protein synthesis rates during overnight sleep. These findings provide the scientific basis for a novel nutritional strategy to support muscle mass preservation in aging and disease. This trial was registered at www.trialregister.nl as NTR3885.

Food Reformulation

Food Reformulation and Nutritional Quality of Food Consumption: An Analysis Based on Households Panel Data in France

Spiteri M, Soler LG. *Eur J Clin Nutr.* 2017 Dec 22. doi: 10.1038/s41430-017-0044-3. [Article Link](#)

Significance: Food reformulation in France had a greater effect on consumer diet quality than consumer substitutions.

Background/Objectives: We aimed to quantify the contribution of food reformulation to changes in the nutritional quality of consumers' food purchases, and compare it with the impact of substitutions made by consumers. **Subjects/Methods:** Using a brand-specific data set in France, we considered the changes in the nutrient content of food products in four food sectors over a 3-year period. These data were matched with data on consumers' purchases to estimate the change in the nutritional quality of consumers' purchases. This change was divided into three components: the reformulation of food products, the launching of new products and the consumers' substitutions between products. Key nutrients were selected for each food group: breakfast cereals (sugar, fats, SFA, fiber, and sodium), biscuits and cakes (sugar, fats, SFA, and fiber), potato chips (fats, SFA, and sodium) and soft drinks (sugar). **Results:** Product reformulation initiatives have improved existing products for most food group-nutrient pairs. In particular, the contribution of food reformulation to the change in nutritional quality of food purchases was strong in potato chips (the sales-weighted mean SFA and sodium contents decreased by 31.4% to 52.1% and 6.7% to 11.1%, respectively), and breakfast cereals (the sales-weighted mean sodium content decreased by 7.3% to 9.7%). Regarding the launching of new products, the results were ambiguous. Consumers' substitutions between food items were not generally associated to an improvement in the nutritional quality of the food purchases. **Conclusions:** Policies aiming to promote food reformulation may have greater impact than those promoting changes in consumer behavior.

Dietary Patterns

Correlates of Overall and Central Obesity in Adults From Seven European Countries: Findings From the Food4Me Study

Celis-Morales C, Livingstone KM, Affleck A, Navas-Carretero S, San-Cristobal R, Martinez JA, et al.; Food4Me Study. *Eur J Clin Nutr.* 2017 Dec 15. doi: 10.1038/s41430-017-0004-y. [Article Link](#)

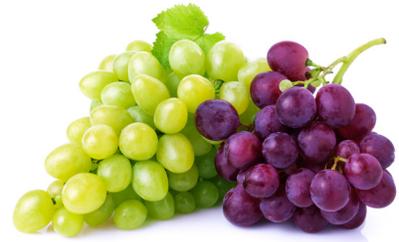
Significance: Among participants in the Food4Me study, specific dietary components and degree of physical activity were associated with higher or lower BMI.

Background/Objectives: To identify predictors of obesity in adults and investigate to what extent these predictors are independent of other major confounding factors. **Subjects/Methods:** Data collected at baseline from 1441 participants from the Food4Me study conducted in seven European countries were included in this study. A food frequency questionnaire was used to measure dietary intake. Accelerometers were used to assess physical activity levels (PA), whereas participants self-reported their body weight, height and waist circumference via the internet. **Results:** The main factors associated ($p < 0.05$) with higher BMI per 1-SD increase in the exposure were age ($\beta: 1.11 \text{ kg/m}^2$), intakes of processed meat ($\beta: 1.04 \text{ kg/m}^2$), red meat ($\beta: 1.02 \text{ kg/m}^2$), saturated fat ($\beta: 0.84 \text{ kg/m}^2$), monounsaturated fat ($\beta: 0.80 \text{ kg/m}^2$), protein ($\beta: 0.74 \text{ kg/m}^2$), total energy intake ($\beta: 0.50 \text{ kg/m}^2$), olive oil ($\beta: 0.36 \text{ kg/m}^2$), sugar sweetened carbonated drinks ($\beta: 0.33 \text{ kg/m}^2$) and sedentary time ($\beta: 0.73 \text{ kg/m}^2$). In contrast, the main factors associated with lower BMI per 1-SD increase in the exposure were PA ($\beta: -1.36 \text{ kg/m}^2$), intakes of wholegrains ($\beta: -1.05 \text{ kg/m}^2$), fibre ($\beta: -1.02 \text{ kg/m}^2$), fruits and vegetables ($\beta: -0.52 \text{ kg/m}^2$), nuts ($\beta: -0.52 \text{ kg/m}^2$), polyunsaturated fat ($\beta: -0.50 \text{ kg/m}^2$), Healthy Eating Index ($\beta: -0.42 \text{ kg/m}^2$), Mediterranean diet score ($\beta: -0.40 \text{ kg/m}^2$), oily fish ($\beta: -0.31 \text{ kg/m}^2$), dairy ($\beta: -0.31 \text{ kg/m}^2$) and fruit juice ($\beta: -0.25 \text{ kg/m}^2$). **Conclusions:** These findings are important for public health and suggest that promotion of increased PA, reducing sedentary behaviours and improving the overall quality of dietary patterns are important strategies for addressing the existing obesity epidemic and associated disease burden.

Bioactives

Do Grape Polyphenols Improve Metabolic Syndrome Components? A Systematic Review

Woerdeman J, van Poelgeest E, Ket JCF, Eringa EC, Serné EH, Smulders YM. *Eur J Clin Nutr.* 2017 Dec;71(12):1381–1392. doi: 10.1038/ejcn.2016.227. [Article Link](#)



Significance: This systematic review of 39 interventions did not indicate that grape polyphenols can positively influence glycemia, blood pressure, or lipid levels in individuals with or without the metabolic syndrome.

Background/Objectives: Epidemiological, in vitro and animal studies suggest that grape polyphenols, such as those present in wine, have favorable effects on the metabolic syndrome. However, controversy remains whether treatment with grape polyphenols is effective in humans. Here, we aimed to systemically review the effects of grape polyphenols on metabolic syndrome components in humans. **Subjects/Methods:** We systematically searched Medline, EMBASE and the Cochrane database for all clinical trials assessing the effects of grape polyphenols on insulin sensitivity, glycemia, blood pressure or lipid levels. We screened all titles and reviewed abstracts of potentially relevant studies. Full papers were assessed for eligibility and quality-rated according to the Jadad scale by two independent assessors. **Results:** Thirty-nine studies met the eligibility criteria. In individuals without component criteria of the metabolic syndrome, only low- and medium-quality studies were found with primarily neutral results. In individuals with the metabolic syndrome or related conditions, one of two high-quality studies suggested improvement in insulin sensitivity. Glycemia was improved in 2 of 11 lower-quality studies and 2 of 4 high-quality studies. Seven of 22 studies demonstrated a significant decrease in blood pressure, but only one was of high quality. Two of four high-quality studies pointed towards effects on total cholesterol while other lipidemic parameters were not affected. **Conclusions:** No compelling data exist that grape polyphenols can positively influence glycemia, blood pressure or lipid levels in individuals with or without the metabolic syndrome. Limited evidence suggests that grape polyphenols may improve insulin sensitivity.

Possible Mechanisms of Postprandial Physiological Alterations Following Flavan 3-ol Ingestion

Osakabe N, Terao J. *Nutr Rev.* 2018 Jan 5. doi: 10.1093/nutrit/nux070 [Epub ahead of print]. [Article Link](#)

Significance: This article reviews the potential mechanisms underlying the putative health benefits of flavan 3-ol consumption.

Foods rich in flavan 3-ols are known to prevent cardiovascular diseases by reducing metabolic syndrome risks, such as hypertension, hyperglycemia, and dyslipidemia. However, the mechanisms involved in this reduction are unclear, particularly because of the poor bioavailability of flavan 3-ols. Recent metabolome analyses of feces produced after repeated ingestion of foods rich in flavan 3-ols may provide insight into the chronic physiological changes associated with the intake of flavan 3-ols. Substantial postprandial changes have been reported after flavan 3-ol ingestion, including hemodynamic and metabolic changes as well as autonomic and central nervous alterations. Taken together, the evidence suggests that flavan 3-ols have both postprandial and chronic effects, which could involve different or common mechanisms. In general, the accumulation of acute functional changes induces chronic physiological alteration. Therefore, this review highlights the postprandial action of flavan 3-ols in order to address the yet unknown mechanism(s) for their physiological function.

Eating Behavior

Effectiveness of Dietetic Consultations in Primary Health Care: A Systematic Review of Randomized Controlled Trials

Mitchell LJ, Ball LE, Ross LJ, Barnes KA, Williams LT. *J Acad Nutr Diet.* 2017 Dec;117(12):1941–1962. doi: 10.1016/j.jand.2017.06.364. [Article Link](#)

Significance: This systematic review of 26 RCTs suggests that dietetic consultations can be effective for glycemic control, for dietary change, and for affecting anthropometric and triglycerides.

Background: A dietetic consultation is a structured process aimed at supporting individual patients to modify their dietary behaviors to improve health outcomes. The body of evidence on the effectiveness of nutrition care provided by dietitians in primary health care settings has not previously been synthesized. This information is important to inform the role of dietitians in primary health care service delivery. **Objective:** The aim of this systematic review was to evaluate the evidence of the effectiveness of individual consultations provided exclusively by dietitians in primary care to support adult patients to modify dietary intake and improve health outcomes. **Study Design:** ProQuest Family Health, Scopus, PubMed Central, Medline, the Cumulative Index to Nursing and Allied Health Literature, and Cochrane databases were searched for English language systematic reviews

or randomized controlled trials published before October 2016. The key terms used identified the provision of nutrition care exclusively by a dietitian in a primary health care setting aimed at supporting adult patients to modify dietary behaviors and/or improve biomarkers of health. Interventions delivered to patients aged younger than 18 years, in hospital, via telephone only, in a group or lecture setting, or by a multidisciplinary team were excluded. The methodologic quality of each study was appraised using the Cochrane Risk of Bias tool and the body of evidence was assessed using the Academy of Nutrition and Dietetics Evidence Analysis Manual. **Main Outcome Measures:** Outcomes included the effectiveness of dietetic interventions in terms of anthropometry, clinical indicators, and dietary intake. A statistically significant between-group difference was used to indicate intervention effectiveness ($P < 0.05$). **Results:** Twenty-six randomized controlled studies met eligibility criteria, representing 5,500 adults receiving dietetic consultations in a primary care setting. Eighteen of 26 included studies showed statistically significant differences in dietary, anthropometric, or clinical indicators between intervention and comparator groups. When focusing specifically on each study's stated aim, significant improvements favoring the intervention compared with control were found for the following management areas: glycemic control (four out of four studies), dietary change (four out of four studies), anthropometry (four out of seven studies), cholesterol (two out of eight studies), triglycerides (one out of five), and blood pressure (zero out of three) studies. **Conclusions:** Dietetic consultations for adults in primary care settings appear to be effective for improvement in diet quality, diabetes outcomes (including blood glucose and glycated haemoglobin values), and weight loss outcomes (eg, changes in weight and waist circumference) and to limit gestational weight gain (Grade II: Fair evidence). Research evaluated in this review does not provide consistent support for the effectiveness of direct dietetic counseling alone in achieving outcomes relating to plasma lipid levels and blood pressure (Grade III: Limited evidence). Therefore, to more effectively control these cardiovascular disease risk factors, future research might explore novel nutrition counseling approaches as well as dietitians functioning as part of multidisciplinary teams.

Biomarkers

Comparison of Self-Reported Dietary Intakes From the Automated Self-Administered 24-h Recall, 4-d Food Records, and Food-Frequency Questionnaires Against Recovery Biomarkers

Park Y, Dodd KW, Kipnis V, Thompson FE, Potischman N, Schoeller DA, et al. *Am J Clin Nutr*. 2018 Jan 1;107(1):80–93. [Article Link](#)

Significance: The authors found that Automated Self-Administered 24-h recall has acceptable accuracy for assessment of individual dietary intakes, when compared with specific intake biomarkers.

Background: A limited number of studies have evaluated self-reported dietary intakes against objective recovery biomarkers. **Objective:** The aim was to compare dietary intakes of multiple Automated Self-Administered 24-h recalls (ASA24s), 4-d food records (4DFRs), and food-frequency questionnaires (FFQs) against recovery biomarkers and to estimate the prevalence of under- and overreporting. **Design:** Over 12 mo, 530 men and 545 women, aged 50–74 y, were asked to complete 6 ASA24s (2011 version), 2 unweighed 4DFRs, 2 FFQs, two 24-h urine collections (biomarkers for protein, potassium, and sodium intakes), and 1 administration of doubly labeled water (biomarker for energy intake). Absolute and density-based energy-adjusted nutrient intakes were calculated. The prevalence of under- and overreporting of self-report against biomarkers was estimated. **Results:** Ninety-two percent of men and 87% of women completed ≥ 3 ASA24s (mean ASA24s completed: 5.4 and 5.1 for men and women, respectively). Absolute intakes of energy, protein, potassium, and sodium assessed by all self-reported instruments were systematically lower than those from recovery biomarkers, with underreporting greater for energy than for other nutrients. On average, compared with the energy biomarker, intake was underestimated by 15–17% on ASA24s, 18–21% on 4DFRs, and 29–34% on FFQs. Underreporting was more prevalent on FFQs than on ASA24s and 4DFRs and among obese individuals. Mean protein and sodium densities on ASA24s, 4DFRs, and FFQs were similar to biomarker values, but potassium density on FFQs was 26–40% higher, leading to a substantial increase in the prevalence of overreporting compared with absolute potassium intake. **Conclusions:** Although misreporting is present in all self-report dietary assessment tools, multiple ASA24s and a 4DFR provided the best estimates of absolute dietary intakes for these few nutrients and outperformed FFQs. Energy adjustment improved estimates from FFQs for protein and sodium but not for potassium. The ASA24, which now can be used to collect both recalls and records, is a feasible means to collect dietary data for nutrition research.

The $\delta^{13}\text{C}$ Value of Fingerstick Blood Is a Valid, Reliable, and Sensitive Biomarker of Sugar-Sweetened Beverage Intake in Children and Adolescents

MacDougall CR, Hill CE, Jahren AH, Savla J, Riebl SK, Hedrick VE, et al. *J Nutr*. 2018 Jan 1;148(1):147–152. [Article Link](#)

Significance: The $\delta^{13}\text{C}$ biomarker for added sugars discriminated high-SSB from low-SSB consumers better than consumers of high added sugars compared with consumers of low added sugars.

Background: Reliance on self-reported dietary intake methods is a commonly cited research limitation, and dietary misreporting is a particular problem in children and adolescents. Objective indicators of dietary intake, such as dietary biomarkers, are needed to overcome this research limitation. The added sugar (AS) biomarker $\delta^{13}\text{C}$, which measures the relative abundance of

^{13}C to ^{12}C , has demonstrated preliminary validity in adults. **Objective:** The purpose of this investigation was to determine the comparative validity, test-retest reliability, and sensitivity of the $\delta^{13}\text{C}$ biomarker to detect AS and sugar-sweetened beverage (SSB) intake using fingerstick blood samples in children and adolescents. **Methods:** Children (aged 6-11 y, $n = 126$, 56% male, mean \pm SD age: 9 ± 2 y) and adolescents (aged 12-18 y, $n = 200$, 44% male, mean \pm SD age: 15 ± 2 y) completed 4 testing sessions within a 3-wk period. Participants' height, weight, demographic characteristics, and health history were determined at the first session; 24-h recalls were obtained at each visit and fingerstick blood samples were collected at visits 1 and 3. Samples were analyzed for $\delta^{13}\text{C}$ value using natural abundance stable isotope mass spectrometry. $\delta^{13}\text{C}$ value was compared with dietary outcomes in the full sample, and in child and adolescent subgroups. t Tests and correlational analyses were used to assess biomarker validity and reliability, whereas logistic regression and area under the receiver-operator characteristic curve (AUC) were used to evaluate sensitivity. **Results:** Reported mean \pm SD AS consumption was 82.2 ± 35.8 g/d and 329 ± 143 kcal/d, and SSB consumption was 222 ± 243 mL/d and 98 ± 103 kcal/d. Mean $\delta^{13}\text{C}$ value was $-19.65 \pm 0.69\%$, and was lower in children than in adolescents ($-19.80 \pm 0.67\%$ compared with $-19.56 \pm 0.67\%$, $P = 0.002$). $\delta^{13}\text{C}$ values were similar across sessions (visit 1: $-19.66 \pm 0.68\%$; visit 3: $-19.64 \pm 0.68\%$; $r = 0.99$, $P < 0.001$) and were associated ($P < 0.001$) with intake of total AS (grams, kilocalories: $r = 0.29$) and SSB (milliliters, kilocalories: $r = 0.35$). The biomarker was able to better discriminate between high and low SSB consumers than high and low AS consumers, as demonstrated by the AUC (0.75 and 0.62, respectively). **Conclusions:** The $\delta^{13}\text{C}$ biomarker is a promising, minimally invasive, objective biomarker of SSB intake in children and adolescents. Further evaluation using controlled feeding designs is warranted.

New Alkylresorcinol Metabolites in Spot Urine as Biomarkers of Whole Grain Wheat and Rye Intake in a Swedish Middle-Aged Population

Landberg R, Wierzbicka R, Shi L, Nybacka S, Kamal-Eldin A, Hedblad B, et al. *Eur J Clin Nutr.* 2018 Jan 19. doi: 10.1038/s41430-017-0079-5 [Epub ahead of print]. [Article Link](#)

Significance: This study explores the use of alkylresorcinol metabolites detected in spot urine samples as a marker for intake of whole grain wheat and rye intake.

Background/Objectives: Studies on the health effects of whole grains typically use self-reported intakes which are prone to large measurement errors. Dietary biomarkers that can provide an objective measure of intake are needed. New alkylresorcinol (AR) metabolites (3,5-dihydroxycinnamic acid (DHCA), 2-(3,5-dihydroxybenzamido)acetic acid (DHBA-glycine) and 5-(3,5-dihydroxyphenyl) pentanoic acid (DHPPTA)) in 24h urine samples have been suggested as biomarkers for whole grain (WG) wheat and rye intake but remain to be evaluated in spot urine samples. **Subjects/Methods:** The reproducibility of the new AR metabolites (DHCA, DHBA-glycine and DHPPTA) was investigated in 4 repeated samples over a period of 2 wk in spot urine from 40 Swedish men and women enrolled in the SCAPIS-study, after adjustment of creatinine. Metabolite concentrations were correlated with total whole grain intake estimated during the same period. **Results:** The medium-term reproducibility determined for DHCA, DHPPTA and DHBA-glycine varied from moderate to excellent (intra-class correlation coefficient = 0.35-0.67). Moreover, DHCA and DHBA-glycine were independently associated with self-reported total WG intake ($\beta = 0.18$, $P = 0.08$ and $\beta = 0.18$, $P = 0.02$, respectively) and all metabolites except for DHPPTA were higher among women. **Conclusions:** This study supports the idea of using AR metabolites in one or several spot urine samples as biomarkers of whole grain intake. These findings need to be confirmed in different populations.

Micronutrients

Associations Between 25-Hydroxyvitamin D Levels, Body Composition and Metabolic Profiles in Young Women

Tabesh M, Callegari ET, Gorelik A, Garland SM, Nankervis A, Subasinghe AK, et al.; YFHI and Safe-D study groups. *Eur J Clin Nutr.* 2018 Jan 24. doi: 10.1038/s41430-018-0086-1 [Epub ahead of print]. [Article Link](#)

Significance: In young women, serum 25-OHD levels were associated with HDL, TGs, BMI, and measures of adiposity.

Background/Objectives: Cardiovascular disease (CVD) is a major cause of mortality and morbidity globally. Results from previous studies are inconsistent and it remains unclear whether low-serum 25 OHD levels are associated with an increased risk of CVD. These associations have been little studied in young women. The aim of this study was to assess the relationship between serum 25 OHD and obesity, body composition, metabolic profiles and blood pressure in young women. **Subjects/Methods:** Women aged 16-25 years living in Victoria, Australia, were recruited through Facebook advertising in this cross-sectional study. Participants completed an online survey and attended a site visit in a fasted state, where parameters, including blood pressure, anthropometry, metabolic profiles, serum 25 OHD levels and body composition (using dual energy X-ray absorptiometry) were measured. **Results:** A total of 557 participants were recruited into this study. Multiple linear regression analysis showed that after adjusting for visceral fat, season, smoking, physical activity, age, alcohol intake, oral contraceptive use, country of birth, taking multivitamins and taking vitamin D supplement, a 10 nmol/L increase in 25 OHD levels was associated with 0.65% greater HDL levels ($p = 0.016$) and 0.92% greater triglyceride levels ($p = 0.003$). It was also associated with 0.48% lower BMI ($p < 0.001$), 0.50%

lower total fat percentage ($p < 0.001$), 0.09% lower visceral fat percentage ($p < 0.001$), 0.14% lower visceral fat to total fat ratio ($p < 0.001$) and 0.36% lower trunk fat to total fat ratio ($p < 0.001$), after adjustment for season, smoking, physical activity, age, alcohol intake, oral contraceptive use, country of birth, taking multivitamins and taking vitamin D supplements. Although these associations were statistically significant, they were very small in magnitude and of uncertain clinical significance. **Conclusions:** These findings may help to explain an association between 25 OHD levels and CVD risk factors through associations with HDL, BMI, total body and visceral fat mass. Possible underlying mechanisms warrant further investigation.

Obesity

Reimagining Obesity in 2018: A JAMA Theme Issue on Obesity

Livingston EH. *JAMA*. 2018 Jan 16;319(3):238–240. [Article Link](#)

Links to selected papers:

- [Toward Precision Approaches for the Prevention and Treatment of Obesity](#)
- [Counting Calories as an Approach to Achieve Weight Control](#)
- [Can the Government Require Health Warnings on Sugar-Sweetened Beverage Advertisements?](#)
- [Taxes and Sugar-Sweetened Beverages](#)
- [Fitness or Fatness: Which Is More Important?](#)
- [Effect of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass on Weight Loss in Patients With Morbid Obesity: The SM-BOSS Randomized Clinical Trial](#)

Metabolic Syndrome

Differential Association of Dietary Carbohydrate Intake With Metabolic Syndrome in US and Korean Adults: Data From the 2007–2012 NHANES and KNHANES

Ha K, Kim K, Chun OK, Joung H, Song Y. *Eur J Clin Nutr*. 2018 Jan 16. doi: 10.1038/s41430-017-0031-8 [Epub ahead of print]. [Article Link](#)

Significance: National survey data indicated that higher carbohydrate intake as a proportion of energy from macronutrients was associated with metabolic abnormalities.

Background/Objectives: The risk factors for metabolic syndrome may differ between Western and Asian countries due to their distinct dietary cultures. However, few studies have directly compared macronutrient intake and its association with the risk of metabolic syndrome in US and Korean adults using national survey data. **Subjects/Methods:** Based on the data from the US and Korean versions of the 2007–2012 National Health and Nutrition Examination Survey (NHANES, KNHANES), a total of 3,324 American and 20,515 Korean adults were included. In both countries, dietary intake was measured using a 24-h dietary recall method and metabolic syndrome was defined using the National Cholesterol Education Program Adult Treatment Panel III criteria. **Results:** The percentages of energy intake from carbohydrate, protein, and fat were 50:16:33 in the US adults and 66:15:19 in the Korean adults. Regarding metabolic abnormalities, Korean adults in the highest quintile of carbohydrate intake showed an increased risk of metabolic syndrome in men and women, with abnormalities of reduced HDL cholesterol and elevated triglyceride levels. In contrast, the US men showed no significant association with metabolic syndrome and its abnormalities, while the US women showed an increased risk of reduced HDL cholesterol and elevated triglycerides. **Conclusions:** A high carbohydrate intake is associated with metabolic abnormalities. As Korean adults consume more carbohydrate than American adults, stronger associations of dietary carbohydrate with metabolic syndrome were observed. Thus, further studies are necessary to elucidate the underlying mechanisms of different contributors to developing metabolic disease in Western and Asian populations.