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North America

# Nutrition Briefs

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## Cardiovascular Disease

### Multivitamin Use and Cardiovascular Disease in a Prospective Study of Women

*S. Rautiainen, I.-M. Lee, P.M. Rist, J.M. Gaziano, J.E. Manson, J.E. Buring, et al.*

*American Journal of Clinical Nutrition*, Vol. 101, No. 1; pp. 144–152, 2015

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

**Significance:** Neither baseline nor time-varying multivitamin use was associated with the long-term risk of major CVD events, MI, stroke, cardiac revascularizations, or CVD death in middle-aged and elderly women.

This prospective cohort study investigated how multivitamin use is associated with the long- and short-term risk of cardiovascular disease (CVD) in 37,193 women from the Women's Health Study aged  $\geq 45$  y and free of CVD and cancer at baseline. Subjects were followed for an average of 16.2 y. Women were categorized into no current use and current use of multivitamins. During follow-up, 1493 incident cases of CVD [defined as myocardial infarction (MI), stroke, and CVD death] occurred. In multivariable analyses, multivitamin use compared with no use was not associated with major CVD events (HR: 1.01; 95% CI: 0.89, 1.15), MI (HR: 1.04; 95% CI: 0.84, 1.27), stroke (HR: 0.99; 95% CI: 0.83, 1.18), or CVD death (HR: 1.10; 95% CI: 0.84, 1.45). A nonsignificant inverse association was observed between baseline multivitamin use and major CVD events among women aged  $\geq 70$  y (P-interaction = 0.04) and those consuming  $< 3$  servings/d of fruit and vegetables (P-interaction = 0.01). During follow-up, no associations were observed for major CVD events (HR: 0.91; 95% CI: 0.82, 1.02), MI (HR: 0.89; 95% CI: 0.74, 1.06), stroke (HR: 0.91; 95% CI: 0.78, 1.06), and CVD death (HR: 0.91; 95% CI: 0.71, 1.16).

### Rice Consumption and Risk of Cardiovascular Disease: Results From a Pooled Analysis of 3 U.S. Cohorts

*I. Muraki, H. Wu, F. Imamura, F. Laden, E.B. Rimm, F.B. Hu, et al.*

*American Journal of Clinical Nutrition*, Vol. 101, No. 1; pp. 164–172, 2015

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

**Significance:** Rice consumption may not pose a significant CVD risk among the U.S. population when consumed at current amounts.

This study examined prospectively the association of white rice and brown rice consumption with cardiovascular disease (CVD) risk in 207,556 women and men who were free of CVD and cancer at baseline. During 4,393,130 person-years of follow-up, medical records or self-reports confirmed 12,391 fatal and nonfatal

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CVD events. After adjustment for major CVD risk factors, rice consumption was not associated with CVD risk. The multivariable-adjusted HR of developing CVD comparing  $\geq 5$  servings/wk with  $< 1$  serving/wk was 0.98 (95% CI: 0.84, 1.14) for white rice, 1.01 (0.79, 1.28) for brown rice, and 0.99 (0.90, 1.08) for total rice. To minimize the potential impact of racial difference in rice consumption, the analyses were restricted to the whites only and obtained similar results: the HRs of CVD for  $\geq 5$  servings/wk compared with  $< 1$  serving/wk were 1.04 (95% CI: 0.88, 1.22) for white rice and 1.01 (0.78, 1.31) for brown rice. Greater habitual consumption of white rice or brown rice is not associated with CVD risk.

## Food Allergy

### Influence of Early-Life Exposures on Food Sensitization and Food Allergy in an Inner-City Birth Cohort

E.C. McGowan, G.R. Bloomberg, P.J. Gergen, C.M. Visness, K.F. Jaffee, M. Sandel, et al.

*Journal of Allergy and Clinical Immunology*, Vol. 135, No. 1; pp. 171–178, 2015

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



**Significance:** The cumulative incidence of food allergy in this study was extremely high, especially considering the strict definition of food allergy that was applied and that only 3 common allergens were included.

This study examined sensitization and clinical reactivity or early-life exposures in 516 inner-city children in the Urban Environment and Childhood Asthma birth cohort who were followed through age 5. Household exposures, diet, clinical history, and physical examinations were assessed yearly; levels of specific IgE to milk, egg, and peanut were measured at 1, 2, 3, and 5 years of age. On the basis of sensitization (IgE  $\geq 0.35$  kU/L) and clinical history over the 5-years, children were classified as having food allergy (FA) or being possibly allergic, sensitized but tolerant, or not allergic/not sensitized. Results showed that 55.4% of children were sensitized (milk, 46.7%; egg, 31.0%; and peanut, 20.9%), whereas 9.9% were categorized as having FA (peanut, 6.0%; egg, 4.3%; and milk, 2.7%; 2.5% to  $> 1$  food). The remaining children were categorized as possibly allergic (17.0%), sensitized but tolerant (28.5%), and not sensitized (44.6%). Eighteen (3.5%) reported reactions to foods for which IgE levels were not measured. Food-specific IgE levels were similar in children with FA versus sensitized but tolerant children, except for egg, levels of which were higher in patients with FA at ages 1 and 2 years.

### Distinct Parameters of the Basophil Activation Test Reflect the Severity and Threshold of Allergic Reactions to Peanut

A.F. Santos, G. Du Toit, A. Douiri, S. Radulovic, A. Stephens, V. Turcanu, et al.

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DOI: 10.1016/j.jaci.2014.09.001

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

**Significance:** CD63 peanut/anti-IgE and CD-sens values can be used to estimate the severity and threshold of allergic reactions during OFCs.

The utility of the basophil activation test (BAT) to predict the severity of the allergic reaction and threshold dose to peanut during oral food challenges (OFCs)

was assessed. Skin prick tests, measurements of specific IgE to peanut and its components, and BATs to peanut were performed on the day of the challenge. Of the 124 children submitted to OFCs, 52 (median age, 5 years) reacted with clinical symptoms that ranged from mild oral symptoms to anaphylaxis. Severe reactions occurred in 41% of cases, and 57% reacted to  $\leq 0.1$  g of peanut protein. The ratio of the percentage of CD63+ basophils after stimulation with peanut and after stimulation with anti-IgE (CD63 peanut/anti-IgE) was independently associated with severity, whereas the basophil allergen threshold sensitivity CD-sens ( $1/EC_{50} \times 100$ , where  $EC_{50}$  is half maximal effective concentration) value was independently associated with the threshold of allergic reactions to peanut during OFCs. Patients with CD63 peanut/anti-IgE levels of  $\geq 1.3$  had an increased risk of severe reactions (RR=3.4; 95% CI, 1.8-6.2). Patients with a CD-sens value  $\geq 84$  had an increased risk of reacting to  $\leq 0.1$  g of peanut protein (RR=1.9; 95% CI, 1.3-2.8).

## Diabetes

### Prospective Association of Fatty Acids in the De Novo Lipogenesis Pathway with Risk of Type 2 Diabetes: The Cardiovascular Health Study

W. Ma, J.H.Y. Wu, Q. Wang, R.N. Lemaitre, K.J. Mukamal, L. Djoussé, et al.

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**Significance:** Circulating palmitic acid and stearic acid were associated with higher diabetes risk, and vaccenic acid was associated with lower diabetes risk.

This prospective study investigated associations of major circulating saturated fatty acids (SFAs) [palmitic acid and stearic acid] and monounsaturated fatty acids (MUFAs) [oleic acid] in the hepatic de novo lipogenesis (DNL) pathway with metabolic risk factors and incident diabetes in 3004 community-based older U.S. adults in the Cardiovascular Health Study. Results showed that at baseline, circulating SFAs were positively associated with adiposity, triglycerides, inflammation biomarkers, and insulin resistance (P-trend < 0.01 each), whereas oleic acid showed generally beneficial associations (P-trend < 0.001 each). During 30,763 person-years, 297 incident diabetes cases occurred. With adjustment for demographics and lifestyle, palmitic acid (extreme-quintile HR: 1.89; 95% CI: 1.27, 2.83; P-trend = 0.001) and stearic acid (HR: 1.62; 95% CI: 1.09, 2.41; P-trend = 0.006) were associated with higher diabetes risk, whereas oleic acid was not significantly associated. In secondary analyses, vaccenic acid was inversely associated with diabetes (HR: 0.56; 95% CI: 0.38, 0.83; P-trend = 0.005).

## Fiber

### Dietary Fiber Is Positively Associated with Cognitive Control among Prepubertal Children

N.A. Khan, L.B. Raine, E.S. Drollette, M.R. Scudder, A.F. Kramer, C.H. Hillman

*Journal of Nutrition*, Vol. 145, No. 1; pp. 143–149, 2015

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

**Significance:** Children's diet quality, specifically dietary fiber, is an important correlate of performance on a cognitive task requiring variable amounts of cognitive control.



Cross-sectional associations between performance on an attentional inhibition task, assessed using a modified flanker task, and dietary fatty acids (FAs), fiber, and overall diet quality among 65 children aged 7–9 y were assessed. Hierarchical regression models were used to determine the relation between diet variables and task accuracy and reaction time across both congruent and incongruent trials of the flanker task. After adjustment of confounding variables (age, IQ, pubertal staging, VO<sub>2</sub>max, and %fat mass), congruent accuracy was positively associated with insoluble fiber ( $\beta = 0.26$ ,  $P = 0.03$ ) and total dietary fiber ( $\beta = 0.23$ ,  $P = 0.05$ ). Incongruent response accuracy was positively associated with insoluble fiber ( $\beta = 0.35$ ,  $P < 0.01$ ), pectins ( $\beta = 0.25$ ,  $P = 0.04$ ), and total dietary fiber ( $\beta = 0.32$ ,  $P < 0.01$ ). Higher diet quality was related to lower accuracy interference ( $\beta = -0.26$ ,  $P = 0.03$ ), whereas higher total FA intake was related to greater accuracy interference ( $\beta = 0.24$ ,  $P = 0.04$ ). No statistically significant associations were observed between diet variables and reaction time measures.

### Fiber Supplementation Influences Phylogenetic Structure and Functional Capacity of the Human Intestinal Microbiome: Follow-Up of a Randomized Controlled Trial

H.D. Holscher, J.G. Caporaso, S. Hooda, J.M. Brulc, G.C. Fahey Jr., K.S. Swanson

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DOI: 10.3945/ajcn.114.092064

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



**Significance:** This study conveys novel information about the impact of dietary fiber supplementation on the phylogenetic structure and functional capacity of the fecal microbiome of healthy adults.

This study used a systematic approach to study the impact of dietary fiber supplementation on fecal metabolites, bacterial taxa, and bacterial metagenomes. Whole-genome shotgun 454 pyrosequencing (WGSP) was used on the same fecal specimens collected in a previous clinical trial to obtain comprehensive fecal bacterial genome sequencing coverage and to explore the full range of bacterial genetic information in the fecal microbiome. Results showed that WGSP revealed fiber consumption shifted the Bacteroidetes:Firmicutes ratio, increasing the relative abundance of Bacteroidetes  $12 \pm 2\%$  and  $13 \pm 2\%$  with polydextrose and soluble corn fiber (SCF), respectively, compared with no supplemental fiber (NFC). Bivariate correlations showed a positive correlation between the Bacteroidetes:Firmicutes ratio and total dietary fiber intake but not BMI. Principal coordinates analysis of Bray-Curtis distances indicated that bacterial gene composition was more similar in participants consuming fibers (polydextrose and SCF combined) in comparison with NFC. Shifts in bacterial gene abundances after polydextrose and SCF supplementation included genes associated with carbohydrate, amino acid, and lipid metabolism, as well as metabolism of cofactors and vitamins.

### Fiber Intake and Risk of Subsequent Prostate Cancer in Japanese Men

N. Sawada, M. Iwasaki, T. Yamaji, T. Shimazu, S. Sasazuki, M. Inoue, et al. for the Japan Public Health Center-based Prospective Study Group

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DOI: 10.3945/ajcn.114.089581

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

**Significance:** Dietary fiber is inversely associated with advanced prostate cancer detected by subjective symptoms even among populations with relatively low intake.

The association between fiber intake and prostate cancer was examined in 43,435 Japanese men aged 45–74 y in a population-based prospective study. Results showed that during the 11.6-y follow-up, of the 825 men newly diagnosed with prostate cancer, 213 had advanced-stage cancer, 582 had organ-localized disease, and 30 had an undetermined stage of disease. Among them, 217 cases were detected by subjective symptoms. Total fiber was not associated with total or advanced prostate cancer, with respective multivariable HRs for the highest and lowest quartiles of 1.00 (95% CI: 0.77, 1.29; P-trend = 0.97) and 0.67 (95% CI: 0.42, 1.07; P-trend = 0.30). Total fiber and insoluble fiber intake were associated with a decreased risk of advanced cancers detected by subjective symptoms, with multivariate HRs (95% CIs) across increasing quartiles of 1.00, 0.58, 0.62, and 0.44 (0.21, 0.92; P-trend = 0.05) for total fiber and 1.00, 0.60, 0.52, and 0.46 (0.22, 0.93; P-trend = 0.04) for insoluble fiber. Soluble fiber intake showed no association with prostate cancer.

## Metabolic Syndrome

### Adipose Tissue N-3 Fatty Acids and Metabolic Syndrome

E. Cespedes, A. Baylin, H. Campos

*European Journal of Clinical Nutrition*, Vol. 69, No. 1; pp. 114–120, 2015

DOI: 10.1038/ejcn.2014.150

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

**Significance:**  $\alpha$ -Linolenic acid could exert a modest protective benefit, whereas eicosapentaenoic acid and docosahexaenoic acid are not implicated in metabolic syndrome.

This study examined associations of adipose tissue n-3 fatty acids (FA) with metabolic syndrome (MetS) in 1611 participants without prior history of diabetes or heart disease who were participants in a population-based case-control study of diet and heart disease (The Costa Rica Heart Study). Results showed that n-3 FA levels in adipose tissue were associated with MetS prevalence in opposite directions. The prevalence ratio (PR) (95% CI) for the highest compared with the lowest quartile adjusted for age, sex, BMI, residence, lifestyle, diet and other FAs were 0.60 (0.44, 0.81) for  $\alpha$ -linolenic acid (ALA), 1.43 (1.12, 1.82) for eicosapentaenoic acid (EPA), 1.63 (1.22, 2.18) for docosapentaenoic acid (DPA), and 1.47 (1.14, 1.88) for EPA:ALA, all P for trend <0.05. Although these associations were no longer significant (except DPA) after adjustment for BMI, ALA and DPA were associated with lower glucose and higher triglyceride levels, P<0.05 (respectively).



## Sleep

### Habitual Sleep Duration is associated with BMI and Macronutrient Intake and May Be Modified by CLOCK Genetic Variants

H.S. Dashti, J.L. Follis, C.E. Smith, T. Tanaka, B.E. Cade, D.J. Gottlieb, et al.

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**Significance:** Longer habitual sleep duration is associated with lower BMI and age- and sex-specific favorable dietary behaviors.

This study examined associations between habitual sleep duration, BMI, and macronutrient intake and assessed whether Circadian Locomotor Output Cycles Kaput (CLOCK) variants modify these associations. Inverse-variance weighted, fixed-effect meta-analyses of results of adjusted associations of sleep duration and BMI were conducted, and macronutrient intake as percentages of total energy as well as interactions with CLOCK variants from 9 cohort studies including up to 14,906 participants of European descent. A significant association between sleep duration and lower BMI ( $\beta \pm SE = 0.16 \pm 0.04$ ,  $P < 0.0001$ ) was observed; however, associations between sleep duration and relative macronutrient intake were evident in age- and sex-stratified analyses only. A significant association was observed between sleep duration and lower saturated fatty acid intake in younger (aged 20–64 y) adults (men:  $0.11 \pm 0.06\%$ ,  $P = 0.03$ ; women:  $0.10 \pm 0.05\%$ ,  $P = 0.04$ ) and with lower carbohydrate ( $-0.31 \pm 0.12\%$ ,  $P < 0.01$ ), higher total fat ( $0.18 \pm 0.09\%$ ,  $P = 0.05$ ), and higher PUFA ( $0.05 \pm 0.02\%$ ,  $P = 0.02$ ) intakes in older (aged 65–80 y) women. Two nominally significant interactions were observed: between sleep duration and rs12649507 on PUFA intake and between sleep duration and rs6858749 on protein intake.

## Chronic Diseases

### Impact of a 6-Wk Olive Oil Supplementation in Healthy Adults on Urinary Proteomic Biomarkers of Coronary Artery Disease, Chronic Kidney Disease, and Diabetes (Types 1 and 2): A Randomized, Parallel, Controlled, Double-Blind Study

S. Silva, M.R. Bronze, M.E. Figueira, J. Siwy, H. Mischak, E. Combet, et al.

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**Significance:** In comparison with low-phenolic olive oil (OO), supplementation for 6 wk with high-phenolic OO does not lead to an improvement in cardiovascular health markers in a healthy cohort.

The impact of supplementation with olive oil (OO), either low or high in phenolics, on urinary proteomic biomarkers of coronary artery disease (CAD), chronic kidney disease (CKD), and diabetes was evaluated in 69 self-reported healthy participants. Subjects were randomly allocated (stratified block random assignment) according to age and BMI to supplementation with a daily 20-mL dose of OO either low or high in phenolics (18 compared with 286 mg caffeic acid equivalents per kg, respectively) for 6 wk. The consumption of both OOs improved the proteomic CAD score at endpoint compared with baseline (mean improvement:  $-0.3$  for low-phenolic OO and  $-0.2$  for high-phenolic OO;  $P < 0.01$ ) but not CKD or diabetes proteomic biomarkers. However, there was no difference between groups for changes in proteomic biomarkers or any secondary outcomes including plasma triacylglycerols, oxidized LDL- and LDL-cholesterol.

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