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EDUCATE | CONNECT | ADVANCE

Window to Nutrition - EDITION 4, November 2015

Nutrition Policy

2015 German Federal Institute for Risk Assessment (BfR) Opinion (No. 025/2015) "Infant and follow-on formula: no evidence for health benefits of probiotic additives" - Infant Formula Enriched with Probiotics "is not superior to products without probiotics" for healthy babies, according to an Opinion issued by the German Federal Institute for Risk Assessment (BfR) which notes that "... it is not possible to infer on the basis of the available data that infant and follow-on formula to which the assessed strains of bacteria have been added have any health benefits for infants ..." - BfR also concluded that "... there are no indications from the currently available study results to suggest that these strains [of bacteria in probiotics] have any unwanted effects on healthy infants. In the view of the BfR, further data from well planned and controlled intervention studies would nevertheless be required to make reliable judgements on the safety of these microorganisms in the routine use in infant formula ..."
Relevance: Clinical studies need to be establish the health benefits of probiotics in infant nutrition.

EFSA published a report on Foods for Sportspeople - The report highlights: a) the essential role of carbohydrate intake in relation to physical performance, and particularly in relation to the recovery of normal muscle function after strenuous exercise, and the role of vitamin B1 on carbohydrate metabolism; b) the role of hydration and carbohydrate supply in the maintenance of physical performance during endurance exercise, as well as on the role of electrolytes (particularly sodium) in the maintenance of adequate hydration during exercise and in post-exercise re-hydration; c) the essential role of protein in the growth and maintenance of muscle mass, and the role of vitamin B6 in protein metabolism; d) the essential role of micronutrients and long-chain polyunsaturated fatty acids on body functions which may impact either athletic performance or specific health risks for athletes; e) the ergogenic properties of caffeine in endurance exercise; and f) the ergogenic effects of creatine in physical performance during short-term, high-intensity, repeated exercise bouts (i.e. in sports that require explosive, high-energy output activities especially of a repeated nature). In addition, EFSA completed the task of establishing Tolerable Upper Intake Levels for vitamins and minerals initiated by the SCF and provided advice on the safety of caffeine, also when consumed prior to intense physical

exercise. This report will be used by the Commission in its consideration on the necessity of legal provisions for food intended for sports people. The Commission report should be published by end of the year.
Relevance: Performance Nutrition food and beverage products should leverage the nutritional guidance to support NPD.

Scientific Opinion on the substantiation of a health claim related to "native chicory inulin" and maintenance of normal defecation by increasing stool frequency pursuant to Article 13.5 of Regulation (EC) No 1924/2006 - Beneo received a positive EFSA health claim for its chicory inulin. The EFSA Panel concludes that a cause and effect relationship has been established between the consumption of "native chicory inulin" and maintenance of normal defecation by increasing stool frequency. The following wording reflects the scientific evidence: "Chicory inulin contributes to maintenance of normal defecation by increasing stool frequency". In order to obtain the claimed effect, 12 g of "native chicory inulin" should be consumed daily.
Relevance: Products containing chicory inulin can help supports digestive health by promoting regular bowel movements.

Lactitol and the maintenance of normal defecation: evaluation of a health claim pursuant to Article 13(5) of Regulation (EC) No 1924/2006 -DuPont received a positive EFSA health claim for its sugar alcohol lactitol. The Panel also acknowledges the plausible mechanisms of action by which lactitol could exert the claimed effect. The dose of 10 g/day lactitol does not induce diarrhoea. The Panel concludes that a cause and effect relationship has been established between the consumption of lactitol and the maintenance of normal defecation. The following wording reflects the scientific evidence: "lactitol can contribute to normal defecation". To obtain the claimed effect, 10 g of lactitol should be consumed daily. The target population is the general adult population.
Relevance: Products containing lactitol can help support regular digestive function.

US Food and Drug Administration (FDA) moves to remove trans fats from foods - USFDA recent announcement that it would take steps to remove artificial trans fats from the food supply - a move that is expected to reduce the risk of coronary heart disease and prevent thousands of heart attacks every year. In 2013, the FDA made the determination that partially hydrogenated oils - the major source of artificial trans fats - were no longer "generally recognised as safe" (GRAS). Now they are finalising this action by determining they are not safe for use in any human food. The FDA is providing a three-year compliance period to allow the food industry to phase out the remaining applications of partially hydrogenated oils in foods.
Relevance: Removal of trans fat and partially hydrogenated oils provides an opportunity to innovate with healthy nutritional lipids.

US: Food and Drug Administration calls for cap on sugar intake - The US Food and Drug Administration (FDA) has recommended a cap on sugar consumption for Americans. FDA is proposing to establish a Daily Reference Value (DRV) of 10% of total energy intake from added sugars, proposing to require the declaration of the percent Daily Value (DV) for added sugars on the label. FDA is taking these actions based, in part, on the science underlying a new report released by the 2015 Dietary Guidelines Advisory Committee. For someone older than 3, it means eating no more than 12.5 teaspoons, or 50 grams, of sugar a day.
Relevance: Reducing the amount of added sugar across the food and beverage products will be key; utilizing taste solutions such as Kerry fmt™ will be essential.

US: FDA invites public comment on "natural" food labelling - The US Food and Drug Administration (FDA) is seeking public comments about the term "natural", in the hopes to obtain information and opinions regarding the "natural" label on food items for humans. Three citizen petitions had arrived at the FDA, asking to define "natural" in food labelling; one petition sought to ban the term. On its website, the FDA said federal courts have asked the agency for administrative decisions regarding food products with genetically-engineered ingredients or foods with high fructose corn syrup, and if these products could wear a "natural" label.
Relevance: This proposal when finalized will impact what is considered "natural."

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General Wellness

Intraduodenal infusion of a combination of tastants decreases food intake in humans - Taste receptors are expressed not only in taste buds but also in the gastrointestinal tract. It has been hypothesized that these receptors may play a role in satiety and food intake. This randomized, double blind, cross-over study investigated the effect of intraduodenal tastant infusions (bitter, sweet, and umami) on food intake, hunger and fullness, gastrointestinal symptoms, and gastrointestinal peptide release in 15 healthy male and female volunteers. Infusion of the combination of tastants substantially decreased food intake (422 vs. 486 kcal for placebo), whereas both a combination of tastants and umami decreased hunger scores compared with placebo. No change in cholecystokinin, GLP-1, or PYY concentrations was observed during the infusions. Intraduodenal infusion of umami and a combination of tastants inhibits feelings of hunger, but only the latter also reduces food intake. (Accompanying editorial: Taste and the regulation of food intake: it's not just about flavor)
Relevance: Sensory specific satiety impacts food and beverage intake; taste of products can impact nutritional status of individuals.

IARC Monographs evaluate consumption of red meat and processed meat - After thoroughly reviewing the accumulated scientific literature, a Working Group of 22 experts from 10 countries classified the consumption of red meat as probably carcinogenic to humans (Group 2A), based on limited evidence that the consumption of red meat causes cancer in humans and strong mechanistic evidence supporting a carcinogenic effect. This association was observed mainly for colorectal cancer, but associations were also seen for pancreatic cancer and prostate cancer. Processed meat

was classified as carcinogenic to humans (Group 1), based on sufficient evidence in humans that the consumption of processed meat causes colorectal cancer.
Relevance: Attention to intake of red meat and processed meats is warranted; finding "natural" systems for food safety will be essential.

The cross-sectional association between snacking behaviour and measures of adiposity: the Fenland Study, UK - Unhealthy dietary behaviours may contribute to obesity along with energy imbalance. Study investigated the associations between snacking frequency and adiposity among 10,092 adults residing in Cambridgeshire, England. Among normal-weight individuals, each additional snack was inversely associated with obesity measures: lower total body fat in men and women (-0·41%, -0·41%, respectively) and waist circumference (-0·52 cm) in men. In contrast, among the overweight/obese, there were positive associations: higher waist circumference (0·80 cm) and subcutaneous fat (0·06 cm) in women and waist circumference (0·37 cm) in men. Comparing intakes of snack-type foods showed that participants with BMI ≥25 kg/m2 had higher intakes of crisps, sweets, chocolates and ice-creams and lower intakes of yoghurt and nuts compared with normal-weight participants. Snacking frequency may be associated with higher or lower adiposity, with the direction of association being differential by BMI status and dependent on snack food choice. Improving snack choices could contribute to anti-obesity public health interventions.
Relevance: Healthy and nutritious snacking options can help in energy intake and can play an important role in weight management.

Does low-energy sweetener consumption affect energy intake and body weight? A systematic review, including meta-analyses, of the evidence from human and animal studies - By reducing energy density, low-energy sweeteners (LES) might be expected to reduce energy intake (EI) and body weight (BW). Systematic review of relevant studies assessed the totality of the evidence testing the null hypothesis that LES exposure (versus sugars or unsweetened alternatives) has no effect on EI or BW. Exposure to LES did not affect or decreased BW. Meta-analysis of short-term randomized controlled trials showed reduced total EI for LES- versus sugar-sweetened food or beverage consumption before an ad libitum meal (-94 kcal), with no difference versus water (-2 kcal). This was consistent with EI results from sustained intervention RCTs (10 comparisons). Meta-analysis of sustained intervention RCTs showed that consumption of LES versus sugar led to relatively reduced BW (-1.35 kg), and a similar relative reduction in BW versus water (-1.24 kg). The preponderance of evidence from all human RCTs indicates that LES do not increase EI or BW, whether compared with caloric or non-caloric (e.g., water) control conditions.
Relevance: Low-energy sweeteners can help lower energy intake and can be one of many tools to manage body weight.

Fructose and cardiometabolic health: What the evidence from sugar-sweetened beverages tells us - Recent attention has focused on fructose as having a unique role in the pathogenesis of cardiometabolic diseases. However, we rarely consume fructose in isolation, the major source of fructose in the diet comes from fructose-containing sugars, sucrose and high fructose corn syrup, in sugar-sweetened beverages and foods. Intake of sugar-sweetened beverages has been consistently linked to increased risk of obesity, type 2 diabetes, and cardiovascular disease in various populations. Putative underlying mechanisms include incomplete compensation for liquid calories, adverse glycemic effects, and increased hepatic metabolism of fructose leading to de novo lipogenesis, production of uric acid, and accumulation of visceral and ectopic fat. Review of the epidemiological and clinical trial evidence evaluating added sugars, especially sugar-sweetened beverages, and the risk of obesity, diabetes, and cardiovascular disease indicates cconsumption of sugary drinks that contain high levels of added sugars can

lead to excess weight gain and higher risks of developing diabetes and heart disease. Consuming one or two servings a day has been linked to the cause for up to a 26% greater risk of developing type 2 diabetes, a 35% greater risk of heart attack or fatal heart disease, and a 16% increased risk of stroke.
Relevance: Limiting intake of sugar sweetened beverages and added sugar is one simple change that can have a measurable impact on weight control and prevention of cardio-metabolic diseases.

Reduced-Sodium Lunches Are Well-Accepted by Uninformed Consumers Over a 3-Week Period and Result in Decreased Daily Dietary Sodium Intakes: A Randomized Controlled Trial - Processed foods are major contributors to excessive sodium intake in Western populations. Study investigated the effect of food reformulation on daily dietary sodium intake to determine whether uninformed consumers accept reduced-sodium lunches and to determine the effect of consuming reduced-sodium lunches on 24-hour urinary sodium excretion. The intervention group (n=36) consumed foods with 29% to 61% sodium reduction (some were partially flavor compensated). The control group (n=38) continued consuming regular foods. Compared with the control group, the intervention group's sodium intake per lunch was significantly reduced by -1,093 mg, equivalent to 43 mmol sodium. Remembered food liking, taste intensity, and saltiness were scored similarly for almost all of the reduced-sodium foods compared with the regular foods. After consuming reduced-sodium lunches, compared with the control group, intervention participants' 24-hour urinary sodium excretion was significantly lower by -40 mEq than after consuming regular lunches, and this reflects a decreased daily sodium intake of 1 g. Consumption of reduced-sodium foods over a 3-week period was well accepted by the uninformed participants in an experimental real-life canteen setting. The reduced-sodium foods did not trigger compensation behavior during the remainder of the day in the intervention group compared with the control group, as reflected by 24-hour urinary sodium excretion.
Relevance: Offering reduced-sodium foods without explicitly informing consumers of the sodium reduction can contribute to reductions in daily sodium intake.

Effects of a behavioral intervention that emphasizes spices and herbs on adherence to recommended sodium intake: results of the SPICE randomized clinical trial - Dietary sodium intake in individual diets has remained high, and few studies have examined strategies for maintaining recommended intakes. Study examined the effects of a behavioral intervention, which emphasized spices and herbs, on the maintenance of sodium intake at the recommended intake of 1500 mg/d in individuals to whom the US Dietary Guidelines for Americans apply. At the end of phase 2, mean 24-h sodium excretion was lower in the behavioral intervention than in the self-directed group (mean difference: −956.8 mg/d) after sodium intake at screening was controlled for. A multifactorial behavioral intervention emphasizing spices and herbs significantly reduced sodium intake. Because of the ubiquity of sodium in the US food supply, multilevel strategies addressing individual behaviors and the food supply are needed to improve adherence to recommendations.
Relevance: The use of herbs and spices to enhance flavor, can help individual's acceptance of reduced sodium foods.

Systematic review of the effect of processing of whole-grain oat cereals on glycaemic response - Whole-grain oats have been identified to blunt blood glucose increase after a meal. However, processing of oats changes the physical characteristics of the grain, which may influence human glycaemic response. Systematic review was conducted to examine the effect of different processes on acute postprandial glycaemic response, quantified using glycaemic index (GI) measurements. Steel-cut oats (GI=55), large-flake oats (GI=53) and muesli and granola (GI=56) elicited low to medium

glycaemic response. Quick-cooking oats and instant oatmeal produced significantly higher glycaemic response (GI=71 and 75, respectively) than did muesli and granola or large-flake oatmeal porridge. The analysis establishes that differences in processing protocols and cooking practices modify the glycaemic response to foods made with whole-grain oats. Smaller particle size and increased starch gelatinisation appear to increase the glycaemic response.
Relevance: Processing and cooking of whole grains can help modulate blood glucose responses.

Whole-grain and blood lipid changes in apparently healthy adults: a systematic review and meta-analysis of randomized controlled studies - Whole grains are recognized for their potential role in preventing cardiovascular diseases; however, results from randomized controlled studies on blood lipids are inconsistent, potentially because of compositional differences between individual grain types for some nutrients, including dietary fiber. Meta-analysis assessed the effect of whole-grain compared with non-whole-grain foods on changes in total cholesterol (TC), LDL cholesterol, HDL cholesterol, and triglycerides. Overall, whole-grain intake lowered LDL cholesterol, TC and TAG compared with the control. Whole-grain oat had the greatest effect on TC. No effect of whole-grain foods on HDL cholesterol was seen. Whole-grain oat appears to be the most effective whole grain for lowering cholesterol.
Relevance: Regular whole grain consumption can help lower cardiometabolic risk factors.

Whole-grain products and whole-grain types are associated with lower all-cause and cause-specific mortality in the Scandinavian HELGA cohort
- No study has yet investigated the intake of different types of whole grain (WG) in relation to all-cause and cause-specific mortality in a healthy population. The present study investigated the intake of WG products and WG types in relation to all-cause and cause-specific mortality in a large Scandinavian HELGA cohort. Study found lower all-cause mortality with higher intake of total WG products (women: MRR 0·89; men: MRR 0·89 for a doubling of intake). In particular, intake of breakfast cereals and non-white bread was associated with lower mortality. Also found lower all-cause mortality with total intake of different WG types (women: MRR 0·88; men: MRR 0·88 for a doubling of intake). In particular, WG oat, rye and wheat were associated with lower mortality. In conclusion, higher intake of WG products and WG types was associated with lower mortality among participants in the HELGA cohort. The study indicates that intake of WG is an important aspect of diet in preventing early death in Scandinavia.
Relevance: Diets high in whole grain foods can contribute to overall health and wellbeing.

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Infant & Child Nutrition

Associations of diet quality with cognition in children - the Physical Activity and Nutrition in Children Study - Evidence on the associations of dietary patterns with cognition in children is limited. Present cross-sectional investigated the associations of the Baltic Sea Diet Score (BSDS) and the Dietary Approaches to Stop Hypertension (DASH) score with cognition in children (aged 6-8 years;216 boys; 212 girls) based on Raven's Coloured Progressive Matrices (CPM) score, a higher score indicating better cognition. Among all children, the and the DASH score were directly associated with CPM score. Among boys, a lower BSDS and a lower DASH score were related to a lower Raven's CPM score. Boys in the lowest quartile of the BSDS and the DASH score had a lower Raven's CPM score than those in the highest quartile of the corresponding score. Among girls, the BSDS or the DASH score were not associated with cognition.
Relevance: Improving diet quality and nutrient intake of children can contribute to improvements in cognitive performance of children.

Reduced-Sodium Lunches Are Well-Accepted by Uninformed Consumers Over a 3-Week Period and Result in Decreased Daily Dietary Sodium Intakes - A randomized controlled trial demonstrates that consumption of reduced-sodium foods over a 3-week period was well accepted by the uninformed participants in an experimental real-life canteen setting. The reduced-sodium foods did not trigger compensation behavior during the remainder of the day in the intervention group compared with the control group, as reflected by 24-hour urinary sodium excretion.
Relevance: Offering reduced-sodium foods without explicitly informing consumers of the sodium reduction can contribute to daily sodium intake reduction.

Associations between human milk oligosaccharides and infant body composition in the first 6 mo of life - Study examined whether differences in the composition of human milk oligosaccharides (HMOs) correlate with infant growth and body composition at 1 and 6 mo of age (25 mother-infant dyads). Higher HMO diversity and evenness at 1 mo were associated with lower total and percentage fat mass at 1 mo. At 1 mo, each 1-μg/mL increase in lacto-N-fucopentaose (LNFP) I was associated with a 0.40-kg lower infant weight. At 6 mo, each 1-μg/mL increase in LNFPI was associated with a 1.11-kg lower weight and a 0.85-g lower lean mass. At 6 mo, each 1-μg/mL increase in LNFPI was associated with a 0.79-g lower fat mass, whereas disialyl-lacto-N-tetraose and LNFPII were associated with a 1.92-g and 0.42-g greater fat mass, respectively. At 6 mo, each 1-μg/mL increase in fucosyl-disialyl-lacto-N-hexaose and lacto-N-neotetraose was associated with 0.04% higher and 0.03% lower body fat, respectively.
Relevance: Inclusion of prebiotics in infant nutrition, such as HMOs found in breast milk, can have an impact on infant growth and body composition.

Human Milk Oligosaccharides Inhibit Candida albicans Invasion of Human Premature Intestinal Epithelial Cells Sara - Human milk oligosaccharides (HMOs) are a diverse group of unique glycans that are postulated to promote the development of a protective bacterial microbiota in the intestine and prevent adhesive and invasive interactions of pathogenic bacteria with mucosal epithelia. Candida albicans, a prevalent fungal colonizer of the neonatal gut, causes the majority of fungal disease in premature infants and is highly associated with life-threatening intestinal disorders.

Study examined the protective effects of HMOs in human premature intestinal epithelial cells (pIECs) from invasion by C. albicans. Treatment with HMOs reduced invasion of pIECs by C. albicans in a dose-dependent manner by 14-67%, with a physiologic concentration (15mg/mL) of HMOs causing a 52% reduction in invasion. The decreased invasive ability of C. albicans was associated with hyphal lengths that were ~30% shorter, likely because of a delay in the induction of hyphal morphogenesis after inoculation of yeast onto pIECs, which correlated with a 23% reduction in the combined expression level of hyphal-specific genes. HMOs caused a 40% decrease in the number of C. albicans cells able to associate with pIECs at the time of hyphal induction.
Relevance: Human milk oligosaccharides may protect the premature infant intestine from invasion and damage by pathogens.

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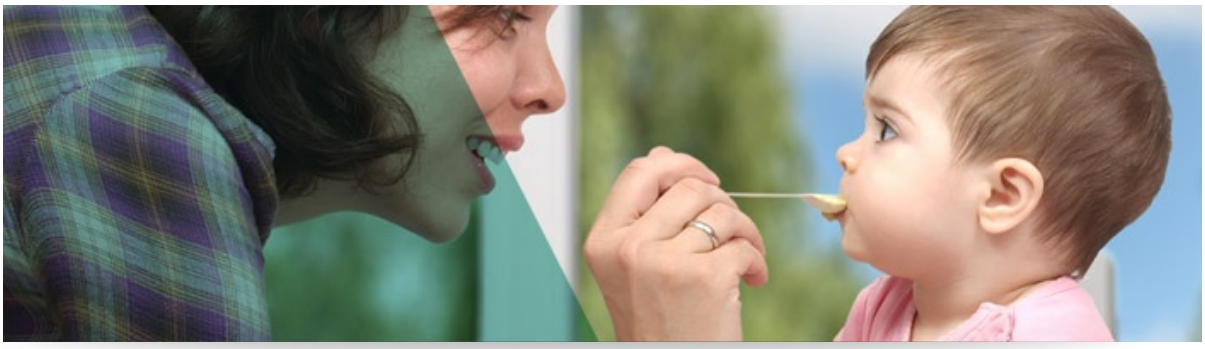

Maternal Nutrition

Gestational Diabetes Mellitus Can Be Prevented by Lifestyle Intervention: The Finnish Gestational Diabetes Prevention Study (RADIEL) A Randomized Controlled Trial - Intervention study assessed whether gestational diabetes mellitus (GDM) can be prevented by a moderate lifestyle intervention in pregnant women who are at high risk for the disease (n=293, <20 wk gestation, BMI ≥30 kg/m2). The incidence of GDM was 13.9% in the intervention group and 21.6% in the control group. Gestational weight gain was lower in the intervention group (−0.58 kg). Women in the intervention group increased their leisure time physical activity more and improved their dietary quality, compared with the women in the control group. A moderate individualized lifestyle intervention reduced the incidence of GDM by 39% in high-risk pregnant women.
Relevance: Improving dietary intake of pregnant mothers and achieving blood glucose regulation can impact health outcomes in both the mother and the child.

Maternal dietary patterns during pregnancy and body composition of the child at age 6 y: the Generation R Study - Maternal diet during pregnancy may affect body composition of the offspring later in life, but evidence is still scarce. Population-based prospective cohort study examined whether maternal dietary patterns during pregnancy are associated with body composition of the child at age 6 y (n= 2695 Dutch mother-child pairs) from a from fetal life onward. Statistically significant associations were found

for higher adherence to the vegetable, fish, and oil dietary pattern and the nuts, soy, and high-fiber cereals dietary pattern with lower body mass index, lower fat mass index, and lower risk of being overweight, but none of these associations remained significant after adjustment for sociodemographic and lifestyle factors.
Relevance: Maternal dietary intake influences child's body composition.

Higher Maternal Plasma n-3 PUFA and Lower n-6 PUFA Concentrations in Pregnancy Are Associated with Lower Childhood Systolic Blood Pressure - Population-based prospective cohort study assessed the associations of maternal polyunsaturated fatty acids (PUFAs) during pregnancy with childhood blood pressure (n= 4455 mothers and their children). Higher total maternal n-3 PUFA wt% and, specifically, docosahexaenoic acid (DHA; 22:6n-3) wt% were associated with lower childhood systolic blood pressure. Total maternal n-6 PUFA wt% was positively associated with childhood systolic blood pressure. A higher n-6:n-3 PUFA ratio was associated with higher childhood systolic blood pressure ($P < 0.05$). Pregnancy and childhood characteristics only partly explained the observed associations.
Relevance: Maternal PUFA intake during pregnancy can have an impact on child's blood pressure and long-term heart health.

Pregnancy diet and associated outcomes in the Avon Longitudinal Study of Parents and Children - A review of the The Avon Longitudinal Study of Parents and Children indicates that maternal diet during pregnancy was predictive of offspring diet during childhood. There were independent associations between prenatal fish consumption and lower frequency of maternal depressive and anxiety symptoms, as well as lower frequency of intrauterine growth retardation. Consistent evidence that fish consumption during pregnancy benefited the neurocognitive development of the child was also found. Two constituents of fish, n-3 polyunsaturated fatty acids and iodine, were associated with these benefits in children.
Relevance: Regular consumption of fish during pregnancy can have positive impact on maternal and child health and nutritional status.

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Healthcare Nutrition

AGING

A Healthy Dietary Pattern at Midlife, Combined with a Regulated Energy Intake, Is Related to Increased Odds for Healthy - Study investigated the association between dietary patterns (DP) in midlife and healthy aging (HA) after 13 y of follow-up a subsample of the SU.VI.MAX (SUpplémentation en Vitamines et Minéraux AntioXydants) cohort. A "Western" and a "healthy" DP were identified. Among subjects with low (i.e., less than the median) energy intake, higher scores on the healthy DP were related to higher odds of HA. The healthy pattern was not associated with HA among subjects with high (i.e., greater than or equal to the median) energy intake.
Relevance: Adherence to a healthy diet in midlife that provides micronutrients, fiber, and antioxidants while regulating energy intake may help to promote Healthy Aging.

BONE HEALTH

Percentage of Adults Aged 65 and Over With Osteoporosis or Low Bone Mass at the Femur Neck or Lumbar Spine: United States, 2005-2010 - 1 in 4 Senior women in SI has osteoporosis. About 6% of men aged 65 or older have osteoporosis. During 2005-2010, 16.2% of adults aged 65 and over had osteoporosis at the lumbar spine or femur neck. The age-adjusted prevalence of osteoporosis was higher among women (24.8%) than men (5.6%). The prevalence was higher among adults aged 80 and over (25.7%) than for adults aged 65-79 (12.8%). The age-adjusted prevalence of osteoporosis was highest among Mexican-American adults (24.9%), followed by non-Hispanic white adults (15.7%), and was lowest among non-Hispanic black adults (10.3%).
Relevance: Preventing and/or slowing the loss of bone mass through diet (protein, calcium, phosphorus, potassium, etc.) and exercise can help prevent osteoporosis and associated co-morbidities among older individuals.

CARDIO-METABOLIC HEALTH

Type and amount of dietary protein in the treatment of metabolic syndrome: a randomized controlled trial - Food-based dietary patterns emphasizing plant protein were evaluated in the Dietary Approaches to Stop Hypertension (DASH) and OmniHeart trials for the treatment of metabolic syndrome (MetS). Study compared 3 diets varying in type (animal compared with plant) and amount of protein on MetS criteria (n=63 adults)-modified DASH diet rich in plant protein (18% protein, two-thirds plant sources), a modified DASH diet rich in animal protein (Beef in an Optimal Lean Diet: 18.4% protein, two-thirds animal sources), or a moderate-protein diet (Beef in an Optimal Lean Diet Plus Protein: 27% protein, two-thirds animal sources). All groups achieved ~5% weight loss at the end of the WL phase and maintained it through FL, with no between-diet differences. All MetS criteria decreased independent of diet composition. All groups had a MetS prevalence decreased to 50-60% after WL and was maintained through FL.
Relevance: Heart-healthy weight-loss dietary patterns that emphasize either animal or plant protein can help improve MetS risk factors.

Manipulation of starch bioaccessibility in wheat endosperm to regulate starch digestion, postprandial glycemia, insulinemia, and gut hormone responses: a randomized controlled trial in healthy ileostomy participants - Structure and properties of plant foods have been identified as critical factors in influencing nutrient bioaccessibility. Wheat, is a major dietary source of starch, and the bioaccessibility of starch has implications for postprandial glycemia. Randomized crossover study (9 healthy ileostomy participants) compared the effects of 2 porridge meals (55 g starch) prepared from wheat endosperm with different degrees of starch bioaccessibility on postprandial metabolism (e.g., glycemia, provided as coarse (2-mm particles) or smooth (<0.2-mm particles) and on the resistant starch (RS) content of ileal effluent.

Blood glucose, insulin, C-peptide, and glucose-dependent insulinotropic polypeptide concentrations were significantly lower (i.e., 33%, 43%, 40%, and 50% lower 120-min incremental AUC, respectively) after consumption of the coarse porridge than after the smooth porridge. In vitro, starch digestion was slower in the coarse porridge than in the smooth porridge (33% less starch digested at 90 min). In vivo, the structural integrity of coarse particles (~2 mm) of wheat endosperm was retained during gastroileal transit. Microscopic examination revealed a progressive loss of starch from the periphery toward the particle core. The structure of the test meal had no effect on the amount or pattern of RS output.
Relevance: The structural integrity of wheat endosperm influences the rate of starch breakdown and, consequently, postprandial metabolism.

COGNITIVE HEALTH

A Nutritional Formulation for Cognitive Performance in Mild Cognitive Impairment: A Placebo-Controlled Trial with an Open-Label Extension - Thirty-four individuals with mild cognitive impairment were randomized for 6 months to a nutraceutical formulation (NF: folate, alpha-tocopherol, B12, S-adenosyl methioinine, N-acetyl cysteine, acetyl-L-carnitine) or placebo, followed by a 6-month open-label extension in which all individuals received NF. The NF cohort improved in the Dementia Rating Scale (DRS; effect size >0.7) and maintained baseline performance in CLOX-1. The placebo cohort did not improve in DRS and declined in CLOX-1.
Relevance: Consumption of key nutrients can play an important role in slowing mild cognitive decline.

Insulin Resistance Tied to Signs of Cognitive Decline in Women Specifically, higher HOMA-IR score associated with poorer verbal fluency in women, but not in men - Type 2 diabetes is an independent risk factor for cognitive decline. Insulin resistance occurring during midlife may increase the risk of cognitive decline later in life. Population-based study examined the association of insulin resistance on cognitive function in a nationwide Finnish (n=5,935, mean age 52.5 years, range 30-97 years). Higher insulin resistance was associated with poorer verbal fluency in women and with poorer verbal fluency. Furthermore, higher insulin resistance was associated with a slower simple reaction time in all study participants.
Relevance: Cardiometabolic health influences cognitive health; proper dietary intake to achieve glucose and insulin management can help lower risk of cognitive decline.

DIGESTIVE HEALTH

Dietary fiber intake reduces risk of inflammatory bowel disease: result from a meta-analysis - Meta-analysis was performed to quantitatively summarize the evidence from observational studies on the relationship between dietary fiber intake and inflammatory bowel diseases. The pooled relative risks with 95% confidence intervals of ulcerative colitis and Crohn's Disease (CD) for the highest vs lowest categories of dietary fiber intake were 0.80 and 0.44, respectively. A linear dose-response relationship was found between dietary fiber and CD risk, and the risk of CD decreased by 13% for every 10 g/d increment in fiber intake.
Relevance: Intake of dietary fiber was significantly associated with a decreased risk of inflammatory bowel disease.

Influence of galacto-oligosaccharide mixture (B-GOS) on gut microbiota, immune parameters and metabonomics in elderly persons - Ageing induces various changes to the human colonic microbiota, a reduction in bifidobacteria, which is

a health-positive genus. Prebiotics, such as galacto-oligosaccharides (GOS), selectively fortify beneficial gut microbial groups, and can potentially reverse the age-related decline in bifidobacteria and modulate associated health parameters. Study assessed the effect of GOS mixture (Bimuno (B-GOS)) on gut microbiota, markers of immune function and metabolites in 40 elderly (age 65-80 years) volunteers in a randomised, double-blind, placebo (maltodextrin)-controlled, cross-over study. The intervention periods consisted of 10 weeks with daily doses of 5·5 g/d with a 4-week washout period in between. B-GOS consumption led to significant increases in bacteroides and bifidobacteria, the latter correlating with increased lactic acid in faecal waters. Higher IL-10, IL-8, natural killer cell activity and C-reactive protein and lower IL-1β were also observed. Administration of B-GOS to elderly volunteers may be useful in positively affecting the microbiota and some markers of immune function associated with ageing.
Relevance: Prebiotic fibers modulate microbiome and can potentially impact immune health among older individuals.

MALNUTRITION

Oral Nutritional Supplements and Taste Adherence in Malnourished Adults Inpatients, Effect on Adhesion during Hospital Stance - Study evaluated the effects of a hypercaloric sweet milk-based oral nutrition supplement (ONS) in a prospective 3-day study designed to assess the taste preferences of ONS in malnourished inpatients (n=46) and the influence on adherence in daily intake. Sweet was better for chocolate flavor (3.9 points) than for vanilla flavor (2.7) and strawberry flavor (3.1 points). Chocolate flavored ONSs were rated as having more aftertaste (3.4 points) than vanilla (2.4 points) and strawberry (2.6 points). Patients who chose chocolate took a total of 20.7 average bricks during hospitalization (1.95/day), patients who chose vanilla took 18.6 bricks (1.9/day) and patients who chose strawberry took 14.5 bricks during admission (1.78/day). The taste preferences of all the ONSs are similar although the consumption is high in chocolate flavored ONS during hospitalization. Sweetness may have influenced this finding.
Relevance: Understanding the taste and sweetness preferences of individuals is important to achieving compliance with ONS.

A high energy intake from dietary fat among middle-aged and older adults is associated with increased risk of malnutrition 10 years later - A higher fat content in the diet could be an advantage for preventing malnutrition among older adults. Prospective cohort study in Swedish men and women (n=725; 53-80 y) examined whether a high energy intake of dietary fat is associated with the risk of malnutrition 10 years later. At the follow-up, 52·8 % participants were identified as being at risk of malnutrition and 7·2 % were identified as malnourished. Among individuals with a BMI<25 kg/m2 at the baseline, a high energy intake from total fat, saturated fat and monounsaturated fat increased the risk of exhibiting malnutrition 10 years later.
Relevance: Healthy dietary intake patterns, with moderate fat intake, may help prevent malnutrition in older adults.

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Performance Nutrition

The Skeletal Muscle Anabolic Response to Plant- versus Animal-Based Protein Consumption - Clinical and consumer market interest is increasingly directed toward the use of plant-based proteins as dietary components aimed at preserving or increasing skeletal muscle mass. Recent evidence suggests that the ingestion of the plant-based proteins (soy and wheat) results in a lower muscle protein synthetic response when compared with several animal-based proteins. The lower anabolic properties of plant-based protein sources may be attributed to the lower digestibility of plant-based sources, greater splanchnic extraction and urea synthesis of plant protein-derived amino acids compared with animal-based proteins. This may be related to the relative lack of specific essential amino acids in plant- as opposed to animal-based proteins. Most plant proteins have a relatively low leucine content, which may further reduce their anabolic properties when compared with animal proteins. Despite the proposed lower anabolic properties of plant vs. animal proteins, various strategies may be applied to augment the anabolic properties of plant proteins. These may include the following: 1) fortification of plant-based protein sources with the amino acids methionine, lysine, and/or leucine; 2) selective breeding of plant sources to improve amino acid profiles; 3) consumption of greater amounts of plant-based protein sources; or 4) ingesting multiple protein sources to provide a more balanced amino acid profile. *Relevance: Enhancing the amino acid profiles of plant based proteins may help support skeletal muscle mass gain or maintenance in both healthy and clinical populations.*

Higher Total Protein Intake and Change in Total Protein Intake Affect Body Composition but Not Metabolic Syndrome Indexes in Middle-Aged Overweight and Obese Adults Who Performed Resistance and Aerobic Exercise for 36 Weeks - Secondary data analysis assessed the impact of total protein intake (Tpro) and change in Tpro (CTPro) on changes in body composition (BC) and metabolic syndrome (MetS) indexes in overweight and obese middle-aged adults who participated in an exercise training program. Among all subjects, TPro and CTPro were inversely associated with changes in body mass, fat mass (FM), and BMI. Changes in BC were different among groups that consumed <1.0 vs. ≥1.0 to <1.2 (vs. ≥1.2 g · kg−1 · d−1). The TPro group with ≥1.0 to <1.2 g · kg−1 · d−1 reduced FM and %FM and increased percentage of LM (%LM) compared with the lowest TPro group, whereas the TPro group with ≥1.2 g · kg−1 · d−1 presented intermediate responses on changes in FM, %FM, and %LM. The gain in LM was not different among groups. In addition, MetS indexes were not influenced by TPro and CTPro.

Relevance: In conjunction with exercise training, total dietary protein intake can positively impact body composition.

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Weight Management

Protein-packed breakfast prevents body fat gain in overweight teens High-protein breakfast also improves teens' glycemic control - Randomized parallel-arm study examined the effects of daily consumption of normal-protein (NP) vs higher-protein (HP) breakfasts on glycemic control in overweight/obese, 'breakfast skipping' adolescents (n=28; 19 y; BMI: 29.9 kg m−2). Adolescents consumed either a 350 kcal NP breakfast (13 g protein) or HP breakfast (35 g protein) during a 12 week period. No main effects of time or group were detected. However, daily consumption of the HP breakfasts tended to reduce the 24-h glucose variability vs NP (−0.17 vs +0.09) and tended to reduce the time spent above the high glucose limit. The consumption of the HP breakfasts also reduced the 24-h maximal (peak) glucose response and reduced postprandial glucose fluctuations vs NP.
Relevance: High protein containing breakfast, may help improve glycemic control in overweight/obese adolescents.

Breakfasts Higher in Protein Increase Postprandial Energy Expenditure, Increase Fat Oxidation, and Reduce Hunger in Overweight Children from 8 to 12 Years of Age - Currently 1 in every 3 children aged 2-19 y is overweight or obese. Breakfast is a key component of a healthy diet and has the potential to affect children's health. Randomized, crossover-design study examined whether consumption of a protein-based breakfast (PRO) increases postprandial energy metabolism and substrate oxidation, reduces hunger, and reduces food intake at lunch compared with a carbohydrate-based breakfast (CHO) in normal weight (NW) vs. overweight/obese (OW) (NW n = 16; 33 kg; OW n = 13; 46 kg) children (10 y). Participants were served either a PRO [344 kcal, 21% protein (18 g), 52% carbohydrate, and 27% fat] or CHO [327 kcal, 4% protein (3 g), 67% carbohydrate, and 29% fat]. After breakfast, OW children in the PRO group had higher energy expenditure and fat oxidation over the 4 h period than did the NW children in the CHO and PRO groups. Fat oxidation was 16% higher after the PRO than the CHO and postprandial carbohydrate oxidation at 4 h was 32% higher after the PRO than the CHO. All participants had decreased feelings of hunger (−14%) and increased fullness (+32%) after the PRO than the CHO.
Relevance: Breakfast is a key component of a healthy diet and has the potential to affect

children's health. Breakfast macronutrient composition affects postprandial responses in children; higher protein breakfast has positive effect on energy metabolism and satiety.

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Scientific Conferences & Tradeshows

Kerry Nutrition External Scientific Engagement

Conference Presentations

The 14th ASEAN Food Conference (Manila, June 2015): Satya Jonnalagadda - Meeting the Nutritional Needs of ASEAN Population.

20th China Dairy Industry Association Annual meeting (Beijing, August 2015): Satya Jonnalagadda - Kerry's Science and Technology: Meeting Nutritional Needs Across Life Stages.

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For more information or feedback please contact:
kerryhealthandnutritioninstitute@kerry.com

Kerry Health and Nutrition Institute
Email | kerryhealthandnutritioninstitute.com | kerry.com