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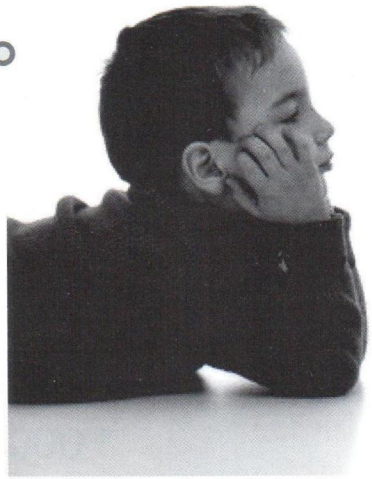
Editorial



Advertising has become a big industry and today when there are so many brands of the products especially the consumer products advertising has become extremely critical for any product to succeed in the market.

Advertising is necessary when there are multitudes of products. The prospective buyer must try to weigh pluses and minuses of different brands. Even when the products are standardised, there can be many factors to make one better than the other besides the price.

When a company has to fight against so many competitors with very similar products and similar advantages, advertising becomes a tool with which it can attract customers. Making a very attractive advertisement may have nothing to do with the product itself. Even when the product is superior to others, unless people are told about its presence, and persuade them to buy it at least once to give it a chance, it will never survive. Even the retailers are reluctant to put them on their shelves unless it is advertised.

Sometimes in order to attract the consumers, advertisers ride the line they are not supposed to cross. Although there are no rules or regulations about the advertisements, what is shown in the advertisement should be generally true. Some puffery is allowed. But then we see a lot of ads these days which are riding and at times going beyond this virtual line of control.

It is like the motorcyclists or autorikshaws are always straddling the stop line. If the policeman does not object, they will go even further. And if he still does nothing try to go through the red light. They are always trying to beat either the red or green light. And when they are caught doing that they will endlessly argue till the policeman either reacts angrily or let them go just to avoid a lot of aggravation.

In their goal of selling the products, they forget what ideas they are promoting. Of course if you talk to them they will probably say that it is not their problem. We earlier talked about safety being made laughable by many advertisements. And when one company starts stretching the imagination about what its product can do for the consumer, the others do not want the unfair advantage to go to only that company so others join in. Advertisers have also started giving scientific backing to their claims. When the entire industry starts doing that consumers feel that it must be true. Even the scientists probably start believing that it must be true when they see all these ads. Of course the companies never forget to write in small letters 'conditions apply' and consumers never know what these conditions are.

It is such practices that then make government to bring in regulations. When self regulation does not work then state regulations enter and make the matters worse both for industry and for the consumers. Industry must have its own cell to control itself and every company must abide by it. There are so many new products waiting to enter the markets especially in the category of health and nutrition. The market is huge and intense competitions have already begun. Let us hope that promotion of these products is truthful and not with the sole aim to capturing market by stretching the truth.

With season's greetings,

Prof. Jagadish S. Pai,
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The Chronic Diseases Food Remedy

It was known in ancient times that good health was inextricably linked to the foods humans consumed. Yet in modern times, diet with high saturated fat and added sugars, low in fibre, high in refined grains and animal products and low in plant foods does little to improve and maintain human health. Such dietary habits are contributing to many non-communicable chronic diseases, in particular, cardiovascular disease, certain cancers, obesity and type 2 diabetes. These are leading causes of death with 63% were attributed to non-communicable chronic diseases most being preventable. Cultures that have resisted the lure of unhealthy eating habits have avoided non-communicable diseases with high intakes of vegetables, fruits, and whole grains.

Plant foods are most nutritious and research has long indicated an inverse relationship between a high consumption of plant foods and chronic diseases. Recent discoveries in nutritional genomics are unveiling why such diets are effective in warding off disease. Plant foods contain bioactive compounds like vitamins and phytochemicals including antioxidants, which catalyse many changes within the body. They interact with cells, enzymes, hormones and DNA controlling the gene expression and cell changes that lead to chronic disease. Thus, genetic makeup of humans is not static but dynamic and gene expression can be swayed by nutrients positively.

Studies in the past highlighted the effects of various plant compounds on specific ailments. Lycopene from tomatoes appears to lower the risk of prostate, lung, and bladder cancers while anthocyanin-rich foods like blueberries and strawberries significantly reduce mortality from cardiovascular disease. It would be good to know the interaction between bioactive compounds in plants and the human genes.

Oxygen Radicals Stress Out DNA

Many chronic diseases are partly due to chronic inflammation and damage due to oxygen radicals. A by-product of body's natural metabolic process, reactive oxygen species are small, unstable molecules that can cause deleterious changes to complex cellular molecules like proteins and DNA. Oxygen radicals initiate chain reaction that impairs cells. Environmental factors like cigarette smoke, alcohol, UV rays and a poor diet also cause the formation of reactive oxygen species in the body.

Oxygen radicals are not all bad; some are essential for cells to generate energy and fight infections. However, when reactive oxygen species are overabundant, they cause oxidative stress. Body has enzymes to prevent oxidative stress and antioxidants are critical in this regard. Antioxidants prevent or reduce the stress by neutralising oxygen radicals. On its own body does not produce enough antioxidants to combat the oxidative stress caused by a daily exposure to various factors, so consumption of diet rich in antioxidants from plant foods is so important.

Whether caused by metabolic, environmental or dietary factors, oxidative stress triggers further production of oxygen radicals that causes damage to DNA. The damage can range from breaking of DNA strands to chromosomal rearrangements to, most notably, the abnormal expression and suppression of genes and atypical cell growth. Particularly, it has adverse effect on mechanism for turning on or off genes: DNA methylation, which plays important role in gene transcription and is an important biomarker for cancer. Hypermethylation can silence tumour-suppressing genes and hypomethylation may cause unchecked expression of tumour growth.

Certain bioactive compounds in foods may deter development of cancer by affecting DNA methylation. Epigallocatechin 3-gallate (EGCG) in green tea, genistein in soybeans, and isothiocyanates in green vegetables

reduce DNA hypermethylation which increases expression of tumour-suppressing genes. As DNA methylation is also related to obesity and contributing to type 2 diabetes, foods effective in controlling DNA methylation may also have positive effect on obesity related diseases.

The Gene that Doesn't Like Green(s)

Scientists have isolated genes that are associated with increased risk of cardiovascular diseases. Some predispose people to high cholesterol levels, some are linked to increased risk of plaque buildup in arteries and some with elevated blood pressure. Researchers at McGill and McMaster universities have revealed that people having 9p21 gene and consumed at least two servings of vegetables (especially raw and green leafy) and fruits per day lowered their risk of developing heart disease. Also carriers of 9p21 who ate the least amount of vegetables had two-fold increase in risk for heart attack.

This gene is also linked to several types of cancer including breast, bladder, and pancreatic cancers. However, no study specifically related diet rich in plant foods and a lower risk of cancer in people with 9p21. This may be because most cancers are attributed to lifestyle and environmental factors like cigarette smoking, alcohol consumption, physical inactivity and sun exposure along with dietary factors. What past research has determined is that fruits and non-starchy vegetables may offer a protective benefit against certain forms of cancer.

The research related to phytochemicals possessing anti-carcinogenic properties is more convincing. Compounds like allicin, anthocyanins, cinnamaldehyde, indoles, isothiocyanates, lignins, lutein, lycopene and resveratrol possess anti-inflammatory, anti-tumourigenic and anti-proliferative properties that help prevent cancer. A new rationale augments the importance of plant foods and their phytochemicals in battle against cancer stating that certain plants foods eliminate blood vessels that supply nutrients to cancer cells thereby impeding the proliferation of cancer.

Using Food to Starve Cancer and Obesity

Blood vessels transport oxygen, glucose and other nutrients to cells of all organs in the body. Without proper blood vessels, organs and tissues malfunction and fail. Amount of blood vessels in the body remains static from birth through adulthood except during menstruation, pregnancy and injury. Intricate system of enzymes, hormones, proteins and genes regulates blood-vessels growth. Some genes help growth while others help prune away vessels that are not necessary. Some genes act as guardians, preventing excessive blood vessel growth. But when blood-vessel regulatory system malfunctions, several chronic diseases can occur. All forms of cancer rely on the formation of new blood vessels, a process called angiogenesis.

Cancer begins as dormant cluster of cells or tumour with limited potential for adverse outcomes. This can grow, mutate and become harmful only if it acquires a set of blood vessels to supply nutrients needed for sustenance. Without angiogenesis, these small cancers come and go like pimples. Preventing angiogenesis to early-stage tumours would stop cancer before it has a chance to start.

Medical research in the last century focused on the cure of the disease. While research on cure is important, billions of dollars have been spent on it and still goal is not achieved. Focusing on early intervention and prevention is the new, best way to fight cancer, being better than cure.

Although anti-angiogenic drug therapies have been developed since the discovery of the role of angiogenesis in cancer, such therapies are expensive and usually initiated after cancers have already become problematic. Since diet accounts for 35% of cancers caused by lifestyle and environment, the new thinking is that why not apply anti-angiogenesis principles in healthy people to prevent cancers from forming?

Trying to treat cancer is like trying to chase horses after they have escaped the barn. It is not possible to treat everyone with the latest and most expensive drugs. But food is a medicine that everyone takes three times a day. Mother nature has already laced into many different foods naturally occurring chemicals that are natural inhibitors of angiogenesis. William Li and his colleagues at Angiogenesis Foundation, Cambridge, Massachusetts have identified a number of foods and spices that possess compounds that inhibit angiogenesis. The list includes artichokes, berries, garlic, green tea, green and cruciferous vegetables, lemons, mushrooms, nutmeg, onions, parsley, tomatoes and turmeric. Many of these foods may also be as effective as pharmaceutical therapies.

Abnormal angiogenesis also plays a key role in other chronic diseases e.g. insufficient angiogenesis can lead to coronary heart disease and stroke while excessive angiogenesis contributes to cancer and obesity. Hence inhibiting angiogenesis may also be the key to fight obesity and related disorders. Fat cells are also highly dependent on blood vessels to thrive. Growth of new blood vessels supplying oxygen and nutrients promotes expansion of fat cells. Research has shown that inhibiting angiogenesis in obese mice reduced their mass to a normal weight. Anti-angiogenesis therapy in obese mice does not make them ultra-thin but just normal size.

Can the concept of starving fat cells replace the advice to curb appetite to lose weight and excess fat? Foods deemed to be anti-angiogenesis are also low in calories so the outcome would be same. Controlling angiogenesis is central to regulating healthy balance to not only prevent obesity and overweight but also possibly type 2 diabetes. Anything that brings body back to normal will play an important role in stemming type 2 diabetes. Anti-angiogenic foods helping restore normal balance would be helpful in this respect.

Thus solution to cancer, obesity and other chronic diseases, pursued for decades, may be in the produce aisle. There is a likely synergistic interaction between identified phytochemicals and other unidentified plant compounds that prevent deviant growth of blood vessels to tumour cells as well as protect cells and DNA. Moreover consuming whole plant foods against isolated plant compounds in supplements, eliminates chances of toxicity or the loss of bioactivity or potency that can occur in the process of purification.

The Prescription for Health

It thus seems that many top chronic diseases are not the inevitable consequences of bad genes or aging but rather of unhealthy choices – key among them being poor and inadequate diet. Our genes are the fate that we inherit from our ancestors, but our environment affects what those genes actually do. Habits, food choices and conveniences of modern lifestyles bombard our body with influences it was not designed to handle. Science still supports eating a diet predominantly made of plant foods.

Food science has made many advances towards abundant and safe food. The best way forward is to develop solid scientific evidence. There is a disciplined process to innovate products using evidence-based approach giving a validation of the product's true value. The gap between life science and food science should be bridged by bringing knowledge from life-sciences world into food world. Life science that has worked to create blockbuster drugs to treat disease can create blockbuster foods that can maintain health.

Bioactive phytochemicals in vegetables and fruits influence the expression of positive traits of genes and help control cellular changes leading to chronic diseases. With this knowledge, the decision regarding what to eat is becoming clear. "Let food be thy medicine and medicine by thy food."

Condensed from article by Toni Tarver in Food Technology October 2012

Report on Study by Harvard School on Whole Grain Products & Rebuttal by Whole Grains Council

Foods Identified as 'Whole Grain' Not Always Healthy

Current standards for classifying foods as "whole grain" are inconsistent and, in some cases, misleading, according to a new study by Harvard School of Public Health (HSPH) researchers. One of the most widely used industry standards, the Whole Grain Stamp, actually identified grain products that were higher in both sugars and calories than products without the Stamp. The researchers urge adoption of a consistent, evidence-based standard for labelling whole grain foods to help consumers and organizations make healthy choices. This is the first study to empirically evaluate the healthfulness of whole grain foods based on five commonly used industry and government definitions.

"Given the significant prevalence of refined grains, starches, and sugars in modern diets, identifying a unified criterion to identify higher quality carbohydrates is a key priority in public health," said first author Rebecca Mozaffarian, project manager in the Department of Social and Behavioural Sciences at HSPH. The study appears in the January 4, 2013 advanced online edition of *Public Health Nutrition*.

The health benefits of switching from refined to whole grain foods are well established, including lower risk of cardiovascular disease, weight gain, and type 2 diabetes. Based on this evidence, the U.S. Department of Agriculture's (USDA) 2010 Dietary Guidelines recommend that Americans consume at least three servings of whole grain products daily, and the new U.S. national school lunch standards require that at least half of all grains be whole grain-rich. However, no single standard exists for defining any product as a "whole grain." Mozaffarian and her colleagues assessed five different industry and government guidelines for whole grain products:

- The Whole Grain Stamp, a packaging symbol for products containing at least 8 grams of whole grains per serving (created by the Whole Grain Council, a non-governmental organization supported by industry dues)
- Any whole grain as the first listed ingredient (recommended by the USDA's MyPlate and the Food and Drug Administration's Consumer Health Information guide)
- Any whole grain as the first ingredient without added sugars in the first three ingredients (also recommended by USDA's MyPlate)
- The word "whole" before any grain anywhere in the ingredient list (recommended by USDA's Dietary Guidelines for Americans 2010)
- The "10:1 ratio," a ratio of total carbohydrate to fiber of less than 10 to 1, which is approximately the ratio of carbohydrate to fiber in whole wheat flour (recommended by the American Heart Association's 2020 Goals)

From two major U.S. grocers, the researchers identified a total of 545 grain products in eight categories: breads, bagels, English muffins, cereals, crackers, cereal bars, granola bars, and chips. They collected nutrition content, ingredient lists, and the presence or absence of the Whole Grain Stamp on product packages from all of these products.

They found that grain products with the Whole Grain Stamp, one of the most widely-used front-of-package symbols, were higher in fibre and lower in trans fats, but also contained significantly more sugar and calories compared to products without the Stamp. The three USDA recommended criteria also had mixed performance for identifying healthier grain products. Overall, the American Heart Association's standard (a ratio of total carbohydrate to fibre of ≤10:1) proved to be the best indicator of overall healthfulness. Products meeting this ratio were higher in fibre and lower in trans fats, sugar, and sodium, without higher calories than products that did not meet the ratio.

"Our results will help inform national discussions about product labelling, school lunch programs, and guidance for consumers and organizations in their attempts to select whole grain products," said senior author Steven Gortmaker, professor of the practice of health sociology. (From Science Daily)

Whole Grains Council Rebuts Harvard Study: Stands behind Whole Grain Stamp

Last week, researchers at the Harvard School of Public Health released a study that claimed that products using the Whole Grain Stamp contain more sugar and more calories than products without the Stamp. The study suggested using a different criterion for labelling whole grain products—a ratio of 10:1 or better of carbohydrate to fibre.

The study, and this proposed alternative labelling idea, both have flaws, which are outlined below. Oldways, the parent organization of the Whole Grains Council, has partnered with the Harvard School of Public Health on many projects, including Oldways' well-respected Mediterranean Diet Pyramid. We have great respect for the scientists there; we know that they share our goal of working for better understanding of whole grains and clearer labelling of them, which leads to better consumer health.

However, we believe so passionately in the reliability and value of the Whole Grain Stamp that we feel compelled to point out several issues with this study:

The stamp is reliable and truthful

The Whole Grain Stamp reliably and truthfully labels products containing a significant amount of whole grain.

- When the WG Stamp was created in 2005, our intent was to promote truth in whole grain labelling and that is what we are still doing today.
- The Stamp was designed to denote the whole grain content of products and nothing more, and it has always been represented as such.
- The Whole Grain Stamp has been the cornerstone of one of the most successful public health and food campaigns of our time. Consumption of whole grains rose 20% in the three years following the introduction of the Stamp. This success came from the combination of a new "rule" (2005 U.S. Dietary Guidelines urging Americans to "make at least half your grains whole") and a new "tool" (The Whole Grain Stamp). Other foods recommended in the Dietary Guidelines did not show the same success.

Inaccuracies and data issues

While the motivation for this research is valid, we note inaccuracies—beginning with a basic definition of "grain" and "whole grain"—that bring into serious question the study's data and its conclusions.

- The study's definition of a "whole grain ingredient" is based on an outdated and inaccurate list of twenty-nine ingredients (including bran, psyllium husk etc.) that is no longer supported by USDA nor in line with FDA policy. Six of the 29 ingredients are not whole grains, and the list leaves out many others – such as hulled barley, millet, quinoa, teff, durum wheat, etc.—accepted as whole grains.
- The study states that it collected data on 545 grain products. Their supplemental materials, however, list only 543 products. At least four of these (Cape Cod Sweet Mesquite Potato Chips, Great Value BBQ Potato Chips, Great Value Ripple Cut Potato Chips, and Great Value Sour Cream and Onion Potato Chips) contain no grain ingredients whatsoever (beyond a trace of modified corn starch), and so should not be included in a study of "grain products."
- The study is not representative of whole grain products with the Stamp.
- Out of 543 products included in the study, only 113 using the Stamp were selected. The 113 Stamped products in the study represent only 1.7% of the products using the Stamp in the USA.

- The study covered only chips, breads, cereals, bars, crackers—foods in 10 of the 49 categories in the Stamped Products database. 57% of products using the Stamp fall in categories not included in the study.
- Rice and other "plain grains," pasta, flours, oatmeal, tortillas, and many other important categories are not included in the study.
- The study is skewed markedly toward products higher in sugar and calories, especially in its selection of products using the Stamp.
- Overall, 22% of products using the Stamp in the USA are bars and cereals.
- However, 38% of the overall products in the study were bars and cereals (categories with higher sugars); we estimate that about 68% of products in the Study using the Stamp were in these categories.
- Rapid changes in the industry may have outpaced this data.
- For example, 29 of the 113 study products (26%) using the Stamp are General Mills cereals. In recent years, General Mills reduced sugar in its products on average 14%—and up to 28%, while also reducing sodium in its products.

Labelling with the 10:1 ratio has drawbacks

The study's suggested top choice—labelling as whole grains any product with a 10:1 or better ratio of carbohydrate to fibre—is an interesting concept but when applied may have severe drawbacks and unintended consequences.

- Four of 14 whole grains commonly eaten would not qualify under 10:1 even in their most basic unprocessed state.
- Sorghum, wild rice, brown rice, whole cornmeal do not attain the 10:1 ratio.
- Many other manufactured whole grain foods—even some that are 100% whole grain and low in sugars—would not qualify under 10:1.
- Many products that are 10:1 are NOT whole grain foods and in fact may contain no whole grain ingredients.
- It's possible to add isolated fibres to a product full of refined grains and sugars to reach the 10:1 ratio.
- Our experience suggests FDA would find this approach misleading and unacceptable and would not allow use of the 10:1 ratio, if used on products that would not otherwise qualify as whole grains.

We have included examples of products on the Whole Grains Council's blog to illustrate this issue.

WGC'S Summary Comments

The only program that can potentially improve public health is one that is widely adopted and used. The Whole Grain Stamp is now used on more than 8,000 products in 36 countries.

Our work over the past 10 years has created a whole grain labelling program that satisfies four important conditions:

- It is scientifically sound,
- resonates with consumers,
- meets regulatory requirements,
- and is used on a wide variety of products by most manufacturers.

We encourage a follow up study that more accurately reflects the actual makeup of the Whole Grain Stamp program and includes the pros and cons of all approaches to whole grain labelling—including the major drawbacks of the 10:1 ratio.

-Cynthia Harriman, Director of Food and Nutrition Strategies, Oldways/The Whole Grains Council
(from Food Product Design)

Research in Health & Nutrition

Carb Loading For Athletes

December 28, 2012 Food Product Design

Many athletes can replace their glycogen stores by consuming an adequate amount of carbohydrate over the 24-hour period after a bout of exercise. However, athletes who train twice a day, have back-to-back training sessions or train hard every day must pay acute attention to their post-exercise carbohydrate intake. Approximately 1.2 grams of carbohydrate should be consumed within 30 to 45 minutes after endurance exercise and every hour thereafter for maximum glycogen resynthesis (*Current Sports Medicine Reports*, 2008; 7:193-201). During the time period immediately after exercise, muscle tissue is like a sponge, soaking up carbohydrate due to increased muscle insulin sensitivity and rapid glucose uptake (*Journal of Sports Medicine and Science*, 2004; 3:131-138). Glucose (or dextrose), sucrose, maltose and maltodextrin are rapidly absorbed in the body and quickly replenish muscle glycogen stores that are used to fuel long bouts of exercise, making them preferential sources of carbohydrate (*European Journal of Applied Physiology*, 2000; 81:346-351; *American Journal of Clinical Nutrition*, 1993; 58(1):75-79). Fuelling with multiple types of carbohydrate is an effective approach during exercise and it may be an effective approach post-exercise, as well. Studies show consuming multiple types of carbohydrate, as opposed to just one type of sugar, during long bouts of endurance exercise increases carbohydrate oxidation. Each type of sugar has a different transporter within the intestines. Once the transporter for a specific sugar becomes saturated, the glucose-only transporter, for instance, the body cannot handle any more glucose at that time (*Sports Medicine*, 2000; 29(6):407-424; *Medicine and Science in Sports and Exercise*, 2004; 36(9):1,551-1,558). By combining multiple sources of carbohydrate, the body can rapidly utilize more carbohydrate.

While carbohydrate is essential for endurance athletes and those engaging in multiple bouts of intense exercise, it also plays an important role in recovery for strength and power athletes. And, though carbohydrate may not further augment muscle protein synthesis if adequate protein is consumed post-exercise, carbohydrate will help replace muscle glycogen used and facilitate greater training adaptations over time (American Journal of Physiology Endocrinology and Metabolism, 2007; 293:E833-E842).

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Overweight Kids Likely Vitamin D Deficient

December 27, 2012 Food Product Design

Overweight and obese children have a high prevalence vitamin D deficiency, according to a new study published in the journal Pediatrics. The findings suggest targeted screening and treatment guidance is needed for children.

Researchers at the University of Texas Southwestern Medical Center compared vitamin D deficiency (25-hydroxyvitamin-D serum blood levels of less than 20 ng/mL) in a sample of 6- to 18-year-old children enrolled in the 2003-2006 National Health and Nutrition Examination Survey. Children were classified as healthy-weight, overweight, obese or severely obese by using recommended age- and gender-specific body mass index (BMI)-percentile cut points. Associations between BMI-percentile classification and vitamin D deficiency were examined after adjustment for relevant confounders.

Compared with healthy-weight children, overweight, obese, and severely obese children had significantly greater odds of vitamin D deficiency. The prevalence of vitamin D deficiency in healthy-weight, overweight, obese and severely obese children was 21%, 29%, 34% and 49%, respectively. Severely obese black children were the most likely to be vitamin D deficient (87%, where as severely obese Latino children were 53% vitamin D deficient, and severely obese Caucasian children were 27% deficient.

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Dark Chocolate Cuts Stroke, Heart Disease Risk

December 26, 2012 Food Product Design

Chocolate lovers listen up. Eating flavanol-rich dark chocolate has been found to protect against the risk of heart disease and stroke by improving platelet function within two hours of consumption, according to a new study published in the journal Molecular Nutrition & Food Research.

Researchers at the University of Aberdeen Rowett Institute of Nutrition and Health examined the effects of consumption of dark chocolate that was enriched with cocoa extract in the blood of 42 healthy volunteers, 26 women and 16 men. They compared platelet function of the participants who ate enriched dark chocolate with those who ate dark chocolate that contained a lower cocoa and flavanol content, and white chocolate.

Blood and urine samples were obtained and analysed two hours and six hours after chocolate consumption. They found the dark chocolate enriched with flavan-3-ols significantly decreased platelet activation and aggregation in men, but only decreased platelet aggregation in women.

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Whole Grains Slash Pre-Diabetes Risk

December 26, 2012 Food Product Design

The addition of more whole grains into a healthy diet is associated with a decreased risk of deteriorating glucose tolerance, including progression from normal glucose tolerance to pre-diabetes, according to a new study published in the American Journal of Clinical Nutrition.

Researchers at Karolinska Institutet and Karolinska University Hospital investigated whether a higher intake of whole grain protects against the development of pre-diabetes and type 2 diabetes and tested for modulation by polymorphisms of the TCF7L2 gene. Participants included 5,477 Stockholm residents aged 35 to 56 years who were not diagnosed with diabetes and who kept food journals of how much whole and refined grains they consumed. Researchers measured blood glucose in study participants and followed up 10 years later.

Participants who ate 59 grams of whole grains a day had a 34% lower risk to deteriorate in glucose tolerance compared to those who ate 30 grams of whole grains a day. Risk reduction was significant in men, but not in women. Participants who consumed 59 grams of whole grains a day also had a 27% reduced risk of becoming pre-diabetic.

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Fructose May Increase Appetite

A study published in the *Journal of the American Medical Association* shows that fructose may increase hunger levels.

Kathleen Page and her colleagues at Yale University examined factors that might link fructose and weight gain. Twenty healthy adults underwent two magnetic resonance imaging (MRI) sessions after drinking fructose or glucose. The researchers then measured changes in blood flow to a region of the brain called the hypothalamus—which regulates the human appetite—after each drink. The researchers found there was a significantly greater drop in blood around the hypothalamus after glucose rather than fructose ingestion.

“Glucose but not fructose ingestion reduced the activation of the hypothalamus, insula, and striatum-brain regions that regulate appetite, motivation, and reward processing,” wrote Page.

The researchers concluded that "increases in fructose consumption have paralleled the increasing prevalence of obesity, and high-fructose diets are thought to promote weight gain and insulin resistance. Therefore, fructose possibly increases food-seeking behavior and increases food intake."

IFT Weekly Newsletter January 2, 2013

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Prenatal Exposure To Fish Boosts Child's Brain Power

January 8, 2013 Food Product Design

Growing scientific evidence supports the theory that expectant mothers who eat fish regularly actually are helping boost their children's brain power, even though they usually are advised to avoid fish that contain high levels of neurotoxin methyl mercury, according to a new study published in the *Journal of Nutrition*.

Currently, the U.S. Food and Drug Administration (FDA) advises pregnant woman to eat only two meals of fish a week and to avoid most large fish to reduce the exposure of their babies' developing brains to mercury. However, a recent joint report from the World Health Organization (WHO) and the United Nations' Food and Agriculture Organization (FAO) recommended nations emphasize the benefits of eating fish for pregnant women and nursing mothers and the potential risks of not consuming fish to brain development.

Because those messages are confusing to most consumers, researchers at the University of Rochester, the University of Ulster, and in the Republic of Seychelles conducted a study to examine what happens to children's development when their mothers eat fish while pregnant.

The study, conducted in the Republic of Seychelles in the Indian Ocean where fish consumption among women is at least 10 times higher than women in the United States and the level of mercury in the fish is almost the same, included 225 mothers and their children. Detailed information about nutritional intake was obtained from the mothers and almost a dozen standard assessments on language and intelligence of the children were completed over several years.

"This study shows that there are no adverse effects of prenatal mercury exposure from fish on children at 5 years old on 10 developmental outcomes when adjusted for maternal levels of polyunsaturated fatty acids. In fact, we found positive associations with those nutrients and children's language development," said Phil W. Davidson, Ph.D., professor emeritus of Pediatrics, principal investigator of the ongoing Seychelles Child Development Study and an co-author of the study.

The study children's standard language development scores rose as levels of omega-3 fatty acids rose in mothers. They found positive associations between the level of polyunsaturated fatty acids in mothers and their children's subsequent scores on preschool language and verbal assessments. In particular, those scores were associated with DHA, an omega-3 fatty acid.

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Beta-Glucan Reduces Allergy Symptoms

January 3, 2013 Food Product Design

A new study published in the journal *Food Science & Nutrition* showed individuals taking a proprietary baker's yeast beta-glucan had reduced allergy symptoms and improved the quality of life of ragweed allergy sufferers.

The randomized, placebo-controlled, double-blinded study involved 48 healthy people equally divided into two groups. One group consumed a placebo, while the other group consumed a 250 mg serving of Wellmune

WPG daily for four weeks in an area of southeast Ohio where pollen counts are high. Participants completed allergy surveys, including the Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ) to assess differences in allergy symptoms.

Participants subjected to high pollen counts demonstrated statistically significant reductions in overall symptoms and severity, reductions in nasal and eye-related allergy symptoms and improvement on the Quality of Life Index.

"The findings suggest that Wellmune WGP can play an effective role in reducing seasonal allergy symptoms among ragweed allergy sufferers," said Shawn M. Talbott, Ph.D., lead investigator, GLH Nutrition LLC.

The study found Wellmune WGP modulated the immune system when less of an immune response was needed; results demonstrate that Wellmune can prime the immune system to keep the body healthy.

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Six things you should know about vitamin D

Figuring out all the factors that can affect your vitamin D level is complicated. Your body makes vitamin D when sunlight hits the skin. You can also get the vitamin from food (mainly because it has been added; few foods are natural sources of vitamin D) or by taking a supplement.

The process by which the body makes vitamin D is complex. It starts when the skin absorbs rays in the invisible ultraviolet B (UVB) part of the light spectrum. The liver and the kidneys also participate to make a form of the vitamin that the body can use.

A number of factors influence a person's vitamin D levels. Here are six important ones.

1. *Where you live.* The further away from the Equator you live, the less vitamin D–producing UVB light reaches the earth's surface during the winter. Residents of Boston, for example, make little if any of the vitamin from November through February. Short days and clothing that covers legs and arms also limit UVB exposure.

2. *Air quality.* Carbon particles in the air from the burning of fossil fuels, wood, and other materials scatter and absorb UVB rays, diminishing vitamin D production. In contrast, ozone absorbs UVB radiation, so pollution-caused holes in the ozone layer could end up enhancing vitamin D levels.

3. *Use of sunscreen.* Sunscreen prevents sunburn by blocking UVB light. Theoretically, that means sunscreen use lowers vitamin D levels. But as a practical matter, very few people put on enough sunscreen to block all UVB light, or they use sunscreen irregularly, so sunscreen's effects on vitamin D might not be that important. An Australian study that's often cited showed no difference in vitamin D between adults randomly assigned to use sunscreen one summer and those assigned a placebo cream.

4. *Skin color.* Melanin is the substance in skin that makes it dark. It "competes" for UVB with the substance in the skin that kick-starts the body's vitamin D production. As a result, dark-skinned people tend to require more UVB exposure than light-skinned people to generate the same amount of vitamin D.

5. *Weight.* Body fat sops up vitamin D, so it's been proposed that it might provide a vitamin D rainy-day fund: a source of the vitamin when intake is low or production is reduced. But studies have also shown that being obese is correlated with low vitamin D levels and that being overweight may affect the bioavailability of vitamin D.

6. *Age.* Compared with younger people, older people have lower levels of the substance in the skin that UVB light converts into the vitamin D precursor. There's also experimental evidence that older people are less efficient vitamin D producers than younger people.

Harvard Medical School Health Beat January 10, 2013

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Strawberries, Blueberries May Cut Heart Attack Risk in Women

Jan. 14, 2013 Science Daily

Women who ate at least three servings of blueberries and strawberries per week had fewer heart attacks. Blueberries and strawberries contain high levels of compounds that have cardiovascular benefits.

Eating three or more servings of blueberries and strawberries per week may help women reduce their risk of a heart attack by as much as one-third, researchers reported in*Circulation: Journal of the American Heart Association*.

Blueberries and strawberries contain high levels of naturally occurring compounds called dietary flavonoids, also found in grapes and wine, blackberries, eggplant, and other fruits and vegetables. A specific sub-class of flavonoids, called anthocyanins, may help dilate arteries, counter the buildup of plaque and provide other cardiovascular benefits, according to the study.

"Blueberries and strawberries can easily be incorporated into what women eat every week," said Eric Rimm D.Sc., senior author and Associate Professor of Nutrition and Epidemiology at the Harvard School of Public Health in Boston, Mass. "This simple dietary change could have a significant impact on prevention efforts." Blueberries and strawberries were part of this analysis simply because they are the most-eaten berries in the United States. Thus, it's possible that other foods could produce the same results, researchers said. Scientists from the Harvard School of Public Health in the United States and the University of East Anglia, United Kingdom conducted a prospective study among 93,600 women ages 25 to 42 who were registered with the Nurses' Health Study II. The women completed questionnaires about their diet every four years for 18 years.

During the study, 405 heart attacks occurred. Women who ate the most blueberries and strawberries had a 32-percent reduction in their risk of heart attack compared to women who ate the berries once a month or less -- even in women who otherwise ate a diet rich in other fruits and vegetables.

"We have shown that even at an early age, eating more of these fruits may reduce risk of a heart attack later in life," said Aedín Cassidy, Ph.D., lead author and head of the Department of Nutrition at Norwich Medical School of the University of East Anglia in Norwich, United Kingdom. The findings were independent of other risk factors, such as age, high blood pressure, family history of heart attack, body mass, exercise, smoking, caffeine or alcohol intake.

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Low fat, low carb, or Mediterranean: which diet is right for you?

Losing weight sometimes takes experimentation. If you give a diet your best shot and it doesn't work long term, maybe it wasn't the right one for you, your metabolism, or your situation. Genes, family, your environment — even your friends — influence how, why, what, and how much you eat, so don't get too discouraged or beat yourself up because a diet that "worked for everybody" didn't pay off for you. Try another, keeping in mind that almost any diet will help you shed pounds — at least for a short time.

Here is a look at three common diet approaches.

1. Low fat: Doesn't taste great … and is less filling

Once the main strategy for losing weight, low-fat diets were shoved aside by the low-carb frenzy. But healthy fats can actually promote weight loss, and some fats are good for the heart; eliminating them from the diet can cause problems.

Since fat contains nine calories per gram while carbohydrates contain four, you could theoretically eat more without taking in more calories by cutting back on fatty foods and eating more that are full of carbohydrates, especially water-rich fruits and vegetables. Still, such a diet tends to be less filling and flavourful than other diets, which lessens its long-term appeal. And if the carbs you eat in place of fat are highly processed and rapidly digested, you may be sabotaging your weight-loss plan.

2. Low carbohydrate: Quick weight loss but long-term safety questions

Eating carbohydrates — especially highly processed ones like white bread and white rice — quickly boosts blood sugar, which triggers an outpouring of insulin from the pancreas. The surge of insulin can rapidly drop blood sugar, causing hunger. Low-carb proponents claim that people who eat a lot of carbohydrates take in extra calories and gain weight. Limiting carbs in favour of protein and fat is supposed to prevent the insulin surge and make you feel full longer.

To make up for the lack of carbohydrates in the diet, the body mobilizes its own carbohydrate stores from liver and muscle tissue. In the process, the body also mobilizes water, meaning that the pounds shed are water weight. The result is rapid weight loss, but after a few months, weight loss tends to slow and reverse, just as happens with other diets.

The American Heart Association cautions people against following the Atkins diet because it is too high in saturated fat and protein, which can be hard on the heart, kidneys, and bones. The lack of carb-rich fruits and vegetables is also worrisome, because eating these foods tends to lower the risk of stroke, dementia, and certain cancers. Most experts believe that the South Beach and other less restrictive low-carbohydrate diets offer a more reasonable approach.

3. Mediterranean style: Healthy fats and carbs with a big side of fruits and vegetables

Good fats are the monounsaturated fats found in olive oil and other oils, and the polyunsaturated fats found in fish, canola oil, walnuts, and other foods. (Saturated fat and trans fat are the bad guys.) Mediterranean diets tend to have a moderate amount of fat, but most of it comes from healthy fats. The carbohydrates in Mediterranean-style diets tend to come from unrefined, fibre-rich sources like whole wheat and beans. These diets are also rich in fruits and vegetables, nuts, seeds, and fish, with only modest amounts of meat and cheese.

People living in Mediterranean countries have a lower-than-expected rate of heart disease. But the traditional lifestyle in the region also includes lots of physical activity, regular meal patterns, wine, and good social support. It is hard to know what relative role these different factors play — but there is growing evidence that, in and of itself, the diet can reduce cardiovascular risk and the development of diabetes.

Make your own

A good diet should provide plenty of choices, relatively few restrictions, and no long grocery lists of sometimes expensive special foods. It should be as good for your heart, bones, brain, and colon as it is for your waistline. And it should be something you can sustain for years. Such a diet won't give you a quick fix. But they can offer you something better — a lifetime of savoury, healthy choices that will be good for all of you, not just parts of you.

Harvard Medical School Health Beat January 17, 2013

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Egg consumption and risk of coronary heart disease, stroke

A study published in the *British Medical Journal* shows that consuming eggs may not be linked to coronary heart disease or stroke. The researchers performed a meta-analysis of eight studies that included 263,938 participants for coronary heart disease (CHD) and 210,404 participants for stroke and followed them for 8–22 years. Among the participants, the researchers documented 5,847 cases of coronary heart disease and 7,579 cases of stroke during the follow-up period. Egg consumption was measured by food frequency questionnaires in all studies.

This meta-analysis identified no significant association between egg consumption and risk of coronary heart disease or stroke. Higher intake of eggs (up to one egg per day) was not associated with risk of coronary heart disease or stroke. The relative risk of coronary heart disease for adding one egg per day was 0.99 (CI 0.85 0 1.15, p=0.88), while the relative risk of stroke for adding one egg per day was 0.91 (CI 0.81 – 1.02, p=0.10).

Similar results were obtained in subgroup analyses. However, among diabetic participants, higher egg consumption was associated with a significantly elevated risk of coronary heart disease. On the other hand, higher egg intake was associated with a lower risk of hemorrhagic stroke. These subgroup results should be interpreted with caution, because only a few studies focused on diabetic participants and particular stroke subtypes.

IFT Weekly Newsletter January 23, 2013

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Can Diet Beat Depression?

Science Daily *Jan. 3, 2012*

Research into diet and depression should follow the model of studies into diet and cardiovascular risk. So argue Almudena Sanchez-Villegas and Miguel A Martínez-González in an opinion piece, in BioMed Central's open access journal *BMC Medicine* this week.

The authors, from the universities of Las Palmas and Navarra, assess the evidence into links between diet and depression and find it lacking. "Depression is similar in many aspects to heart disease" they explained. "Both are associated with low-grade inflammation, endothelial dysfunction and worse lipid profiles. This tends to suggest that the underlying causes, such as a diet high in trans fats, are also the same."

Though there is plenty of evidence that there is an association, and that fast food increases risk of depression (while the Mediterranean diet decreases it), most of these studies do not show causality. Almudena Sanchez-Villegas continued, "It is difficult to be sure that the diet is responsible for depression – it could be that depressed people make bad food choices. Other study problems include 'confounders' which may influence dietary habits, such as marital status, exercise, alcohol (or smoking), medical conditions and social networks. Or simply genetics."

Miguel A Martínez-González concluded, “To address these issues we need long term, randomised clinical studies similar to ones successfully conducted for diet and cardiovascular disease risk. Only then will we really understand the impact of diet of depression.”

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Top Four Reasons Why Diets Fail

Science Daily *Jan. 3, 2013*

The battle of the bulge is on -- any movement on the scale yet? "Losing weight is one of the top resolutions made every year, yet only 20 percent of people achieve successful weight-loss and maintenance," says Jessica Bartfield,MD, internal medicine who specializes in nutrition and weight management at the Loyola Center for Metabolic Surgery & Bariatric Care.

Despite that fact that two-thirds of Americans say they are on a diet to improve their health, very few are actually decreasing in size. "Dieting is a skill, much like riding a bicycle, and requires practice and good instruction, " says Dr. Bartfield. "You're going to fall over and feel frustrated, but eventually you will succeed and it will get easier."

Top Four Reasons Why Dieters Don't Lose Weight

According to Dr. Bartfield, here are the top four reasons why many dieters fail to lose weight.

1. Underestimating Calories Consumed

"Most people (even experts!) underestimate the number of calories they eat per day. Writing down everything that you eat- including drinks and "bites" or "tastes" of food -- can help increase self-awareness. Pay attention to serving sizes and use measuring cups and spoons as serving utensils to keep portions reasonable. Food eaten outside of the home tends to be much larger portion sizes and much higher in calories. Try to look up nutrition information of your favorite take-out meal or restaurant and select a healthy meal before picking up the phone or going out to eat.

2. Overestimating Activity and Calories Burned

"Typically you need to cut 500 calories per day to lose 1 lb per week. This is very difficult to achieve through exercise alone, and would require 60 minutes or more of vigorous activity every day. A more attainable goal would be to try to increase activity throughout the day and get a total of 30 minutes of moderate to vigorous exercise most days of the week. Buy a pedometer and track your steps; try to increase to a goal of 10,000 steps per day. But be careful -- exercise is not an excuse to eat more!"

3. Poor Timing of Meals

"You need a steady stream of glucose throughout the day to maintain optimal energy and to prevent metabolism from slowing down. Eat breakfast every day within one hour of waking up, then eat a healthy snack or meal every three to four hours. Try not to go longer than 5 hours without eating a healthy snack or meal to keep your metabolism steady."

4. Inadequate Sleep

"Studies have shown that people who get fewer than six hours of sleep have higher levels of ghrelin, which is a hormone that stimulates appetite, particularly for high- carbohydrate/high- calorie foods. In addition, less sleep raises levels of cortisol, a stress hormone, which can lead to weight gain."

Dr. Bartfield regularly counsels patients through the Loyola Center for Metabolic Surgery & Bariatric Care, which offers surgical as well as non-surgical weight loss programs. "A registered dietitian, behavioral psychologist, exercise physiologist and a physician plus a surgeon if appropriate, all partner one-on-one with patients," said Bartfield. "Good health practices are more than just learned, they become a regular habit and a way of life."

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Used Coffee Grounds Are a Rich Source of Healthful Antioxidants

Jan. 9, 2013 Science Daily

To plant food, insect repellant and other homespun uses for spent coffee grounds, scientists are adding an application that could make the gunk left over from brewing coffee a valuable resource for production of dietary supplements. Their new report in ACS' *Journal of Agricultural and Food Chemistry* concludes that used coffee grounds are a rich source of healthful antioxidant substances.

Maria-Paz de Peña and colleagues explain that people around the world drink millions of cups of coffee every day, generating about 20 million tons of used grounds annually. Although some spent coffee grounds find commercial use as farm fertilizer, most end up in trash destined for landfills. Coffee itself is a rich source of healthful antioxidants. De Peña's team wondered about the amount of antioxidants that remained in used coffee grounds from different coffee-making methods.

They found that filter, plunger and espresso-type coffeemakers left more antioxidants in coffee grounds, while mocha coffeemakers left the least. Because filter and espresso coffeemakers are more common in homes and commercial kitchens, the authors report that most grounds are likely to be good sources of antioxidants and other useful substances. They note that after these compounds are extracted, the grounds can still be used for fertilizer.

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Which Nutritional Factors Help Preserve Muscle Mass, Strength and Performance in Seniors?

Jan. 18, 2013 Science Daily

New review by International Osteoporosis Foundation (IOF) Nutrition Working Group examines role of nutrition in sarcopenia, with focus on protein, vitamins D and B, and acid-based diet.

Sarcopenia, or the gradual loss of muscle mass, is a common consequence of aging, and poses a significant risk factor for disability in older adults. As muscle strength plays an important role in the tendency to fall, sarcopenia leads to an increased risk of fractures and other injuries.

The International Osteoporosis Foundation (IOF) Nutrition Working Group has published a new review which identifies nutritional factors that contribute to loss of muscle mass, or conversely, are beneficial to the maintenance of muscle mass. The Group reviewed evidence from worldwide studies on the role of nutrition in sarcopenia, specifically looking at protein, acid-base balance, vitamin D/calcium, and other minor nutrients like B vitamins.

"The most obvious intervention against sarcopenia is exercise in the form of resistance training," said Professor Jean-Philippe Bonjour, co-author and Professor of Medicine at the Service of Bone Diseases, University of Geneva. "However, adequate nutritional intake and an optimal dietary acid-base balance are also very important elements of any strategy to preserve muscle mass and strength during aging."

The review discusses and identifies the following important nutritional factors that have been shown to be beneficial to the maintenance of muscle mass and the treatment and prevention of sarcopenia:

- **Protein**: Protein intake plays an integral part in muscle health. The authors propose an intake of 1.0-1.2 g/kg of body weight per day as optimal for skeletal muscle and bone health in elderly people without severely impaired renal function.
- **Vitamin D**: As many studies indicate a role for vitamin D in the development and preservation of muscle mass and function, adequate vitamin D should be ensured through exposure to sunlight and/or supplementation if required. Vitamin D supplementation in seniors, and especially in institutionalized elderly, is recommended for optimal musculoskeletal health.

- **Avoiding dietary acid loads:** Excess intake of acid-producing nutrients (meat and cereal grains) in combination with low intake of alkalizing fruits and vegetables may have negative effects on musculoskeletal health. Modifying the diet to include more fruits and vegetables is likely to benefit both bones and muscles.

Emerging evidence also suggests that vitamin B12 and/or folic acid play a role in improving muscle function and strength.

As well, the Review discusses non-nutritional interventions such as hormones, and calls for more studies to identify the potential of antioxidants and anti-inflammatory compounds in the prevention of sarcopenia.
Dr. Ambrish Mithal, co-author and Chair and Head of Endocrinology and Diabetes division at Medanta, New Delhi underlined the need for further research in the field. "Strategies to reduce the numbers of falls and fractures within our aging populations must include measures to prevent sarcopenia. At present, the available evidence suggests that combining resistance training with optimal nutritional status has a synergistic affect in preventing and treating sarcopenia, " said Mithal.

"We hope that further studies will shed light on other effective ways of preventing and treating this condition."
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Beta Carotene May Protect People With Common Genetic Risk Factor for Type-2 Diabetes

Jan. 22, 2013 Science Daily

Stanford University School of Medicine investigators have found that for people harboring a genetic predisposition that is prevalent among Americans, beta carotene, which the body converts to a close cousin of vitamin A, may lower the risk for the most common form of diabetes, while gamma tocopherol, the major form of vitamin E in the American diet, may increase risk for the disease.

The scientists used a "big data" approach to hunt down interactions between gene variants previously associated with increased risk for type-2 diabetes and blood levels of substances previously implicated in type-2 diabetes risk. In people carrying a double dose of one such predisposing gene variant, the researchers pinpointed a highly statistically significant inverse association of beta carotene blood levels with type-2 diabetes risk, along with a suspiciously high positive association of gamma tocopherol with risk for the disease.

"Type-2 diabetes affects about 15 percent of the world's population, and the numbers are increasing," said Atul Butte, MD, PhD, associate professor of systems medicine in pediatrics. "Government health authorities estimate that one-third of all children born in the United States since the year 2000 will get this disease at some point in their lives, possibly knocking decades off their life expectancies."
Butte is the senior author of the new study, published online Jan. 22 in*Human Genetics*. The first author, Chirag Patel, PhD, is a former graduate student in Butte's lab and now a postdoctoral scholar at the Stanford Prevention Research Center.

The findings point the way to further experiments that could establish whether beta carotene and gamma tocopherol are, respectively, protective and harmful themselves, or merely "markers" whose blood levels dovetail with the presence or absence of some other substance, process or defect that is a true causal factor. Moreover, the fact that both beta carotene and gamma tocopherol interact with the same gene variant to influence diabetes risk, albeit in opposite directions, suggests that the protein the gene called, SLC30A4, codes for may play a crucial role in the disease. Indeed, that protein is relatively abundant in insulin-producing islet cells of the pancreas, where it aids the transport of zinc into those cells. This, in turn, triggers the release of insulin, whose adequate secretion by the pancreas and efficient uptake in muscle, liver and fat tissue counters the dangerous buildup of glucose in the blood and, in the long run, the onset of type-2 diabetes.

The genomes of some 50 to 60 percent of the U.S. population carry two copies of that very gene variant, which previous studies have shown to confer a slightly increased risk of contracting type-2 diabetes. This variant was one of 18, each found by other researchers to have a mild association with type-2 diabetes risk, that the Butte team incorporated into its analysis.

These gene/disease connections had been identified via so-called "genome-wide association studies," or GWAS. In such analyses, the genomes of large numbers of people with a disease are compared with those of people without it to see if certain versions of any gene variants occur with substantially greater frequency in one group than in the other.

The most well-studied gene variations are substitutions of one type of chemical unit of DNA for another one at a single position along the genome. "It's like a single-letter spelling change," said Butte. "'Grey' versus 'gray' may not matter much, if at all. But when 'grey' turns into 'grew,' you might have some serious semantic issues." The genome contains millions of spots at which such differences occur, so advanced statistical techniques must be employed to screen out "frequency differences" between the "diseased" and "healthy" groups that are, at bottom, the mere results of blind chance.

"While plenty of genetic risk factors for type-2 diabetes have been found," said Butte, "none of them taken alone, and not even all of them taken together, comes close to accounting for the prevalence of type-2 diabetes." But genes don't act in a vacuum, he added. (If food is hard to find, nobody gets fat, obesity predisposition or not.)

A few years ago, Butte and his associates designed an approach analogous to the GWAS: the EWAS, or environment-wide association study. Unlike the genome, which is huge but finite (about 3 billion chemical units long), the environment contains an infinite number of substances, from dietary micronutrients to synthetic pollutants, to which a person might be exposed over a lifetime. But increasing numbers of exposures are being cataloged by investigators -- including, for example, scientists at the federal Centers for Disease Control and Prevention who conduct massive biennial screenings to collect data that can guide public-health policy decisions. This ongoing endeavor, called the National Health and Nutrition Examination Survey, involves a detailed analysis of substances in blood drawn from thousands of volunteers along with their heights, weights, blood pressures, fasting blood-glucose levels and other indicators of their medical status.

In 2010, Patel, Butte and their colleagues published the results of the first-ever EWAS, in which they combed large public databases to compare people with or without high blood-glucose levels -- a defining marker of type-2 diabetes -- in pursuit of differences between the two groups' exposures to myriad environmental substances. The analysis fingered five substances, including both beta carotene, found in carrots and many other vegetables, and gamma tocopherol, which is relatively abundant in vegetable fats such as soybean, corn and canola oils and margarine.

The Stanford investigators learned that the NHANES contained data on numerous individuals' environmental exposures and, for many of the same individuals, their genomic compositions. This enabled the researchers to perform a novel study pairing each of the 18 type-2-diabetes-implicated gene variants with each of the five suspect environmental substances to see how, for individuals carrying a particular gene variant, different blood levels of a given substance correlated with those individuals' blood-glucose levels.

None of the genetic factors studied in isolation had shown a particularly impressive impact on type-2 diabetes risk. But when they were paired off one by one with the environmental factors, a couple of statistically robust results jumped out. First, for those carrying two copies of the variant in SLC30A4, higher beta-carotene levels correlated with lower blood-glucose levels. "This vitamin was already known as being 'good' with respect to type-2 diabetes, so it was no surprise that we saw it, too," said Butte. "But it was reassuring, as it suggested we were doing things right, and interesting to find it paired with SLC30A4."

The second finding was at once novel and disconcerting. High blood levels of gamma tocopherol appeared to be associated with increased risk for the disease.

The Butte lab is now gearing up to perform studies in which purified beta carotene and gamma tocopherol will be fed to lab mice. This may show whether those substances themselves are critical to preventing or accelerating the onset of type-2 diabetes. It also may throw light on precisely how these substances affect the production or performance of the protein for which the implicated gene codes.

"We can't say, based on just this study, that 'vitamin E is bad for you,'" said Patel. He noted that blood levels of alpha tocopherol -- another form of vitamin E that predominates in most supplements -- showed no deleterious interaction with the predisposing gene variant in the new study. But maybe it can't hurt to eat a few more carrots.

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Lose Fat Faster Before Breakfast

Jan. 24, 2013 Science Daily

People can burn up to 20% more body fat by exercising in the morning on an empty stomach, according to new research from Northumbria University.

In a study published online in the *British Journal of Nutrition* on January 24, academics sought to find out whether the known benefits of exercising after an overnight fast were undermined by an increased appetite and eating more food later in the day.

Researchers, led by Dr Emma Stevenson and PhD student Javier Gonzalez, asked twelve physically active male participants to perform a bout of treadmill exercise at 10am, either after they had eaten breakfast or in a fasted state having not eaten since the evening before.

Following the exercise all participants were given a chocolate milkshake recovery drink. Later in the day, participants were provided with a pasta lunch which they were asked to consume until they felt 'comfortably full'. Their lunchtime consumption of energy and fat was assessed and calculated, taking into account the amount of energy and fat burned during the morning period.

The researchers discovered that those who had exercised in the morning did not consume additional calories or experience increased appetite during the day to compensate for their earlier activity.

They also found that those who had exercised in a fasted state burned almost 20% more fat compared to those who had consumed breakfast before their workout. This means that performing exercise on an empty stomach provides the most desirable outcome for fat loss.

Javier Gonzalez, who is currently undertaking a PhD in Exercise and Metabolism, said: "In order to lose body fat we need to use more fat than we consume. Exercise increases the total amount of energy we expend and a greater proportion of this energy comes from existing fat if the exercise is performed after an overnight fast. "Our results show that exercise does not increase your appetite, hunger or food consumption later in the day and to get the most out of your session it may be optimal to perform this after an overnight fast."

Dr Emma Stevenson, Senior Lecturer in Sport and Exercise Nutrition and Associate Director of Northumbria University's Brain, Performance and Nutrition Research Centre, added: "This research is very important in helping to provide practical guidelines relating to food intake to individuals who are exercising to maximise fat mass loss. It must be highlighted that this is a short-term study and we can only speculate on the longer term outcomes of such nutritional practices."

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Cows Fed Flaxseed Produce More Nutritious Dairy Products

Jan. 25, 2013 Science Daily

Dairy cows that are fed flaxseed produce more nutritious milk, according to a new study by Oregon State University. Their milk contained more omega-3 fatty acids and less saturated fat, the study found. Diets high in saturated fat can increase cholesterol and cause heart disease, while those rich in omega-3 and other polyunsaturated fatty acids may reduce the risk of heart disease, studies have shown.

Traditional cattle feed mixtures of corn, grains, alfalfa hay and grass silage result in dairy products with low concentrations of omega-3 and other polyunsaturated fats, according to Gerd Bobe, the lead scientist on the study, which has been published online in the *Journal of Dairy Science.*

Ten pregnant cows at OSU's dairy were fed different amounts of flaxseed -- up to seven percent of their daily diet. Researchers attempted to pinpoint the amount of flaxseed that would maximize the amount of omega-3 in milk and dairy products without negatively affecting their production and texture.

"We were looking for a sweet spot," said Bobe, an expert in human and animal nutrition. "Too much of a good thing can be bad, especially when trying to maintain consistency with dairy products." Collaborators in OSU's food science and technology department assisted in turning milk into butter and fresh cheese, which were then tested for texture and nutritional composition.

The study found that feeding cows up to six pounds of extruded flaxseed improved the fat profile without negatively affecting the production and texture of the milk and other dairy products. Extrusion presses raw ground flaxseed into pellets with heat.

At six pounds per day, saturated fatty acids in whole milk fat dropped 18 percent, poly-unsaturated fatty acids increased 82 percent, and omega-3 levels rose 70 percent compared to feeding no flaxseed. Similar improvements were observed in butter and cheese. Still, saturated fat accounted for more than half of the fatty acids in the dairy products while the increase in polyunsaturated fats compromised no more than nearly nine percent of the total.

Researchers also noted that the refrigerated butter was softer and less adhesive thanks to fewer saturated fatty acids. Also, the cows produced the same amount of milk while eating flaxseed. Although flaxseed costs more than traditional cattle feeds, Bobe hopes that it still could be an affordable feed supplement for cows because products enriched with omega-3 can sell for a premium at the grocery store. "Many consumers already show a willingness to pay extra for value-added foods, like omega-3 enriched milk," he said.

One thing is for sure, he said: Dairy farmers will have no trouble convincing cows to eat flaxseed. "They loved it. They ate it like candy," he said.

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Consumption Of Colourful Fruit And Vegetables May Prevent Or Delay ALS

Medical News Today 31 Jan 2013

New research suggests that increased consumption of foods containing colorful carotenoids, particularly beta-carotene and lutein, may prevent or delay the onset of amyotrophic lateral sclerosis (ALS). The study, published by Wiley in *Annals of Neurology*, a journal of the American Neurological Association and Child Neurology Society, found that diets high in lycopene, beta-cryptoxanthin, and vitamin C did not reduce ALS risk.

Carotenoids give fruits and vegetables their bright orange, red, or yellow colors, and are a source of dietary vitamin A. Prior studies report that oxidative stress plays a role in the development of ALS. Further studies

have shown that individuals with high intake of antioxidants, such as vitamin E, have a reduced ALS risk. Because vitamin C or carotenoids are also antioxidants, researchers examined their relation to ALS risk.

According to the National Institutes of Neurological Disorders and Stroke (NINDS) roughly 20,000 to 30,000 Americans have ALS - also known as Lou Gehrig's disease - and another 5,000 patients are diagnosed annually with the disease. ALS is a progressive neurological disease that attacks nerve cells (neurons) in the brain and spinal cord, which control voluntary muscles. As the upper and lower motor neurons degenerate, the muscles they control gradually weaken and waste away, leading to paralysis.

"ALS is a devastating degenerative disease that generally develops between the ages of 40 and 70, and affects more men than women," said senior author Dr. Alberto Ascherio, Professor of Epidemiology and Nutrition at Harvard School of Public Health in Boston, Mass. "Understanding the impact of food consumption on ALS development is important. Our study is one of the largest to date to examine the role of dietary antioxidants in preventing ALS."

Using data from five prospective groups: the National Institutes of Health (NIH)-AARP Diet and Health Study, the Cancer Prevention Study II-Nutrition Cohort, the Multiethnic Cohort, the Health Professionals Follow-up Study, and the Nurses' Health Study, researchers investigated more than one million participants for the present study. A total of 1093 ALS cases were identified after excluding subjects with unlikely food consumption.

The team found that a greater total carotenoid intake was linked to reduced risk of ALS. Individuals who consumed more carotenoids in their diets were more likely to exercise, have an advanced degree, have higher vitamin C consumption, and take vitamin C and E supplements. Furthermore, subjects with diets high in beta-carotene and lutein - found in dark green vegetables - had a lower risk ALS risk. Researchers did not find that lycopene, beta-cryptoxanthin, and vitamin C reduced the risk of ALS. Long-term vitamin C supplement intake was also not associated with lower ALS risk.

Dr. Ascherio concludes, "Our findings suggest that consuming carotenoid-rich foods may help prevent or delay the onset of ALS. Further food-based analyses are needed to examine the impact of dietary nutrients on ALS."

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Iron-Enriched Potatoes Could Help Tackle Anaemia, Nanoscientists' Study Suggests

Medical News Today 31 Jan 2013

The humble potato could hold the answer to tackling the common condition iron deficiency anaemia, scientists believe. Researchers at Nottingham Trent University have been successful in developing a novel - and natural - way of enriching potatoes with iron by engineering 'nano-rust' particles, which can be broken down into regular iron and absorbed by the crop.

The World Health Organisation estimates that anaemia affects almost a quarter of the world's population, with half of these cases caused by iron deficiency anaemia. Iron deficiency is a major problem in many countries due to its low levels in staple foods such as potatoes, rice and wheat.

The research team has been able to vastly increase the iron concentration of potatoes. And the uptake of iron

upon consumption could be significantly higher than that achieved through iron supplements, or via the consumption of processed foods such as breakfast cereals, which only pass about 10% of available iron into the body.

The problem of anaemia is thought to be getting worse because iron-rich foods such as meat and fish are becoming more expensive, triggering a less nutritious and iron-deficient diet among many western people. Iron deficiency can also be an issue for some vegetarians.

The researchers have been able to fortify the potatoes with iron by covering the nano-rust particles in a stealth-like coating which 'tricks' the plantlets into absorbing the particles into the roots before breaking them down into iron.

They now plan to test if rice can be fortified with iron via the same process, which could potentially address iron deficiency in eastern diets.

"People have been looking for a way to get more iron into diets for some time and this could be the ideal solution," said Dr Gareth Cave, researcher and an expert in nanoscience and food fortification in Nottingham Trent University's School of Science and Technology.

He said: "If farmers were to start incorporating this into their potatoes then it could be a major step forward in tackling iron deficiency anaemia. As well as the additional iron, we have found that the potatoes have retained all their typical nutritional elements. This would be a far cheaper alternative than vitamin tablets, and could be explored for other elements such as calcium and selenium. It's also an alternative to genetically modified channels."

Iron is used by the body to make haemoglobin, which helps store and carry oxygen in red blood cells. If there is a lack of iron in the blood, organs and tissue will not get as much oxygen as they usually do and this can lead to iron deficiency anaemia. The main symptoms are tiredness and lethargy, but other symptoms include shortness of breath and changes in appearance such as a pale complexion and dry nails.

As well as increasing the iron content, the researchers have also found that the potatoes were growing faster and bigger. To try to understand why this might be happening they are about to embark on a project with the Potato Council with funding from the Biotechnology and Biological Sciences Research Council for an Industrial CASE studentship.

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Rapeseed Protein May Be The Answer To Food Shortages

Medical News Today 30 Jan 2013
Today, more than 500 million people are suffering from a lack of adequate protein in their diet. Each year, the number of human beings increases by 80 million, a figure which is equivalent to the present population of Germany. Thus, providing enough food, particularly sufficient protein for the increasing populace is a challenging task for societies all over the world. On a prospective basis, a progressively smaller proportion of human protein requirement can be provided by animal proteins such as meat, eggs, and milk. "However, by feeding valuable plant protein to animals, almost two third of it is wasted as it is transformed into animal protein," Professor Dr Gerhard Jahreis, nutritionist at Friedrich Schiller University Jena (Germany), says.

Rapeseed oil with its high nutritional value due to significant amounts of omega-3 fatty acids has gained a strong place in the human diet in recent years. Professor Jahreis comments: "Annually, 60 million tons of rapeseed are harvested worldwide, corresponding to about 15 million tons of rapeseed protein which is fed only to animals. We are taking a keen interest in making this important protein source available for human consumption." The research team at Jena University has now conducted the first human study worldwide on the use of rapeseed protein for human nutrition. Results from the study have recently been published in the internationally renowned journal *Clinical Nutrition.**

For the study, cold-pressed rapeseed oil was firstly produced under mild conditions. In cooperation with a Canadian Company, a protein isolate extracted from the residue was used in a study involving 28 volunteers. The study participants consumed either rapeseed protein isolate or soya protein isolate. After ingesting the protein meals, eight blood samples were drawn from each participant and the postprandial amino acid response in blood was analysed. Prof. Jahreis sums up: "Our findings have shown that there is no difference in the bioavailability between these two protein sources. Thus, soya, mostly cultivated in South and North America, and diversely used in the production of foods, can be fully replaced by rapeseed protein harvested in Europe."

Currently, legislation in Europe prevents the use of rapeseed protein for human nutrition. It requires registration as a "novel food" by the European Union. Ireland has already agreed to its use. In Germany, producers capable of isolating rapeseed protein are already waiting in the wings. The findings of the present study from the research group at the University of Jena represent a big step towards authorising approval of rapeseed protein for use in human nutrition.

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Do The Health Benefits Of Berries Make It Past Your Mouth?

Medical News Today 30 Jan 2013
Research has suggested that compounds that give colorful fruits their rich hues, especially berries, promote health and might even prevent cancer. But for the first time, scientists have exposed extracts from numerous berries high in those pigments to human saliva to see just what kinds of health-promoting substances are likely to survive and be produced in the mouth.

It's too early to name the best berry for health promotion based on this initial work, but the researchers have discovered that two families of pigments that provide berries with their colors, called anthocyanins, are more susceptible to degradation in the mouth than are the other four classes of these pigments.

The Ohio State University study also showed that bacteria living in the mouth are responsible for most of the breakdown of these compounds that occurs in saliva. Researchers are investigating whether it's the berry pigments themselves, or instead the products of their degradation, that actually promote health.

Scientists say that these early findings will contribute to the further development of confectionaries, gums and other delivery devices for the prevention and possibly the treatment of conditions such as periodontal disease and oral cancers.

The researchers exposed extracts of anthocyanin pigments from blueberries, chokeberries, black raspberries, red grapes and strawberries to the saliva collected from 14 people. Black raspberries, in particular, have been shown in numerous previous studies to have chemopreventive effects on tumors in the mouth, esophagus

and colon, mostly in animal studies. Their high anthocyanin content has been linked to those benefits.

"All fruits are unique because their chemical composition, or fingerprint, varies," said Mark Failla, professor of human nutrition at Ohio State and interim chair of the Department of Human Sciences. "There are many different edible berries. Some might be better for providing health-promoting effects within the oral cavity, whereas others may be more beneficial for colonic health. We simply do not know at this time.

"Increased intake of fruits and vegetables is associated with decreased risk of some chronic diseases. An understanding of the metabolism of these compounds, and the relative activities of the compounds in the consumed fruit and their metabolic products, is needed to make scientifically sound dietary recommendations and to develop effective delivery vehicles for the mouth," Failla said.

The research is published in a recent issue of the journal *Food Chemistry*.

Failla and colleagues asked 14 healthy individuals between the ages of 21 and 55 years to collect saliva in the morning before they had eaten breakfast or brushed their teeth. Research participants later collected additional saliva samples before and after they had rinsed their mouths with an antibacterial liquid.

The five fruits selected for study allowed the scientists to test the six distinct families of the anthocyanin pigments. Researchers purified the anthocyanins from each berry type and added the extracts to saliva. The extent of the pigment degradation in saliva was primarily a function of the chemical structure of a given anthocyanin, said Failla, also an investigator in Ohio State's Comprehensive Cancer Center and Food Innovation Center.

Two families of anthocyanins consistently degraded when exposed to saliva: delphinidin and petunidin. Four other families were more stable: cyanidin, pelargonidin, peonidin and malvidin.

"Our observations suggest that the bacteria within one's oral cavity are a primary mediator of pigment metabolism. The bacteria are converting compounds that are present in the foods into metabolites," Failla said. "One area of great interest is whether the health-promoting benefits associated with eating anthocyanin-rich fruits like berries are provided by the pigment itself, the natural combinations of the pigments in the fruit, or the metabolites produced by bacteria in the mouth and other regions of the gastrointestinal tract."

There is context for this study that further complicates the understanding of anthocyanins' benefits. Multiple studies have led to the conclusion that anthocyanins themselves are very poorly absorbed by the body.

"If anthocyanins are the actual health-promoting compound, you would want to design food products, confectionaries and gels containing mixtures of anthocyanins that are stable in the mouth. If, on the other hand, the metabolites produced by the metabolism of anthocyanins are the actual health-promoting compounds, there will be greater interest in fruits that contain anthocyanins that are less stable in the oral cavity," Failla said. "We lack such insights at this time."

The extent to which the anthocyanins were degraded varied among the 14 people whose saliva was used in the study. However, two families of anthocyanins consistently degraded the most in all volunteers. Failla said the observed variation among individuals is likely related to differences in the microbial community that resides in each person's mouth.

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What Chimpanzees Can Teach Us About Tooth Development And Weaning

Medical News Today 30 Jan 2013

For more than two decades, scientists have relied on studies that linked juvenile primate tooth development with their weaning as a rough proxy for understanding similar developmental landmarks in the evolution of early humans. New research from Harvard, however, is challenging those conclusions by showing that tooth development and weaning aren't as closely related as previously thought.

Using a first-of-its-kind method, a team of researchers led by professors Tanya Smith and Richard Wrangham and Postdoctoral Fellow Zarin Machanda of Harvard's Department of Human Evolutionary Biology used high-resolution digital photographs of chimps in the wild to show that after the eruption of their first molar tooth, many juvenile chimps continue to nurse as much, if not more, than they had in the past. Their study is described in a paper in the *Proceedings of the National Academy of Sciences.*

"When these earlier studies were published about 20 years ago, they found a very tight relationship between the eruption of the first molar and certain developmental milestones, particularly weaning," Smith explained. "A number of researchers have tried to extrapolate that relationship to the human fossil record, but it now appears that our closest living relative doesn't fit that pattern. That suggests we should be more cautious if we want to infer what juvenile hominins were like."

Getting an inside view of chimpanzee childhood, however, is no easy task.

Most prior studies of tooth development in juvenile chimps relied on two methods of collecting data - observing captive animals or studying skeletal remains of wild primates. Both, however, also came with challenges for researchers.

Studies have shown that captive chimps grow dramatically faster - often reaching adult size by age 10 or 11, compared to 13 to 15 for wild chimps. That early development means the milestones researchers rely on as proxies for understanding early human species likely occur earlier than they normally would. Researchers studying skeletal remains of wild primates face a similar challenge. To properly understand those developmental landmarks, remains must be properly identified and aged, a notoriously difficult process for primates in dense tropical forests.

To solve those problems, Smith, Wrangham and Machanda developed a unique method for studying juvenile chimps in the wild. Researchers studying the Kanyawara chimpanzee community in Kibale National Park in Uganda teamed up with wildlife photographers who snapped photos of juvenile chimp's teeth whenever they opened their mouths. The detailed photos, some of which captured the same individuals over months, allowed researchers to track precisely when molars erupted, and to correlate that information with chimp's behavior more closely than ever before.

What the images revealed, Smith and Machanda said, came as a surprise. Where earlier studies suggested that juvenile primates were weaned shortly after their first molar erupts, their study showed that, in addition to eating more solid food, chimps continued to "suckle as much, if not more, than they had before," Smith said. "They were showing adult-like feeding patterns while continuing to suckle, which was unexpected."

While questions of why juvenile chimps continue to nurse - in some cases for months - have yet to be answered, Machanda said those questions will likely be the subject of future studies.

"We're now working on a project that's focused on body size and growth, but we're also planning future studies that will look at their energetic condition so we can understand what they're trying to get from the mother by continuing to nurse," she said. "What's interesting, however, is that there can be conflict surrounding this where the juveniles are trying to get as much as possible from the mother and the mother is actually covering up her nipples and moving around. Sometimes they'll even throw these temper tantrums that look exactly like human babies."

"I think there are two bottom lines here," Smith said. "One, I think, is a cautionary tale. The findings in this paper are going to challenge us to find other proxies for weaning and the spacing between offspring, but the other aspect that is exciting is that we have some suggestion that we should start looking at how feeding behaviors develop in the wild.

"No one has looked at how infants become more adult-like, both in their food choice and in the time they spend feeding," she continued. "This actually appears to correlate fairly well with dental development, so, while this is a preliminary finding, we may have a new anatomical proxy for when juvenile primates begin eating like adults."

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Late Lunching Can Slow Weight Loss

Medical News Today 29 Jan 2013

A new study suggests if you are trying to lose weight, then you shouldn't just keep an eye on the calories you consume, but also when you consume them: if lunch is your big meal of the day, then a tendency to eat it later means you will lose weight more slowly and lose less of it, than if you ate it earlier.

In other words, the later you eat your main meal of the day, the harder it is to lose weight, say researchers from Brigham and Women's Hospital (BWH) and Tufts University in Boston in the US, and the University of Murcia in Spain, who write about their findings in the 29 January online issue of the *International Journal of Obesity*.

Senior author Frank Scheer, director of the Medical Chronobiology Program and associate neuroscientist at BWH, says in a statement: "This is the first large-scale prospective study to demonstrate that the timing of meals predicts weight-loss effectiveness."

"Our results indicate that late eaters displayed a slower weight-loss rate and lost significantly less weight than early eaters, suggesting that the timing of large meals could be an important factor in a weight loss program," adds Scheer, who is also assistant professor of medicine at Harvard Medical School.

The researchers were interested in doing the study because while there is lots of evidence from animal research of a link between timing of food intake and weight regulation, there is scarcely any to show whether this is true of humans.

For their investigation, Scheer and colleagues looked at data on 420 overweight people who took part in a 20-week weight loss program in Murcia, Spain, where the main meal of the day in this Mediterranean region is lunch. For this population, lunch also accounts for about 40% of daily calorie intake.

About half the participants were female, their average age was 42, and around half ate lunch early (up to 3 pm) and half ate it late (after 3 pm).

The researchers found those who ate lunch early lost significantly more weight than those who ate it late. The late-eaters also showed a much slower rate of weight loss, and a lower estimated rate of insulin sensitivity, which is a known risk factor for diabetes.

The study also looked at other factors that can influence weight loss, for example total calories consumed, energy burned, levels of appetite hormones (leptin and ghrelin), amount of sleep, and presence of clock gene (which has been linked to difficulty in losing weight).

The researchers found no significant differences between the two groups when they took these factors into account.

The timing of other meals, which were much smaller than lunch, also made little difference to the rate and quantity of weight loss, but the researchers noted that: "Nevertheless, late eaters were more evening types, had less energetic breakfasts and skipped breakfast more frequently that early eaters."

Lead author Marta Garaulet, professor of Physiology at the University of Murcia, says their findings show that timing of food intake may play a significant role in weight regulation in humans, and weight loss programs should therefore take into account not only "the caloric intake and macronutrient distribution, as it is classically done, but also the timing of food".

It is not clear, however, from these study results, how applicable the findings would be to populations where a significant proportion of calories is consumed outside mealtimes. For instance, in the US, snacking accounts for 25% of calorie intake.

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Childhood Weight May Be Influenced By Limiting Polyunsaturated Fatty Acid Levels During Pregnancy

Medical News Today 14 Jan 2013

Southampton researchers have demonstrated that mothers who have higher levels of n-6 polyunsaturated fatty acids (PUFAs), which are found in cooking oils and nuts, during pregnancy have fatter children.

The study, carried out by the Medical Research Council (MRC) Lifecourse Epidemiology Unit, University of Southampton, assessed the fat and muscle mass of 293 boys and girls at four and six years, who are part of the Southampton Women's Survey (SWS), a large prospective mother-offspring cohort.

Their assessments were compared to the concentrations of PUFAs which were measured in blood samples collected from their mothers during pregnancy. The study, published in the January edition of *Journal of Clinical Endocrinology and Metabolism*, found that children who were born to mothers who had had greater levels of n-6 PUFAs during pregnancy had greater fat mass.

Dr Nicholas Harvey, Senior Lecturer at the MRC Lifecourse Epidemiology Unit, University of Southampton, who led the research with Dr Rebecca Moon, Clinical Research Fellow, comments: "Obesity is a rising problem

in this country and there have been very few studies of mother's fatty acid levels during pregnancy and offspring fat mass. These results suggest that alterations to maternal diet during pregnancy to reduce n-6 PUFAs intake might have a beneficial effect on the body composition of the developing child."

Results from the study also showed weaker associations between a mother's levels of n-3 PUFAs, more commonly known as omega 3 and found in fish oil, and muscle mass in their offspring - the higher the level of n-3 the less fat and more muscle and bone in the baby.

This could suggest that a pregnancy supplementation strategy would be beneficial. However Dr Moon says: "n-6 and n-3 PUFAs seem to act in opposite directions on fat mass; previous trials have attempted to use n-3 supplementation to reduce fat mass, but our results suggest that such an approach might work best when combined with a reduction in dietary n-6 intake."

Professor Cyrus Cooper, Professor of Rheumatology and Director of the MRC Lifecourse Epidemiology Unit, University of Southampton adds: "This study forms part of a larger programme of research at the MRC Lifecourse Epidemiology Unit and University of Southampton in which we are seeking to understand how factors such as diet and lifestyle in the mother during pregnancy, and of the child in early life, influence a child's body composition and bone development. This work should help us to design interventions aimed at optimising body composition in childhood and later adulthood and thus improve the health of future generations."

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Food Science & Industry News

Fast food menus with calorie count, miles may lead to healthier choices

A study published in *Appetite* shows that people may choose healthier fast food options when shown not only the calories the food contains, but also how many miles they would have to walk to burn off those calories.

For the study, which used a web-based survey to gather information on the participants' choices, the researchers randomly assigned them to one of four groups, each given a different menu:

- A menu with calorie information
- A menu with calorie information and the minutes of walking required to burn off those calories
- A menu with calorie information and the miles of walking required to burn off the calories
- A menu with no nutritional information (the control group for comparison)

The survey asked participants to imagine they were in a fast food restaurant looking to choose a meal for themselves. What would they order from the menu, based on the information provided? The options on offer included burger meals, sandwiches, sides, salads, dressing, desserts, and drinks. The menu was compiled from online menus of common fast food restaurants in the United States, without pictures. One of the options was a regular burger containing 250 calories that would take 78 min or 2.6 miles (4.2 km) of walking to burn off.

The results showed a significant difference in the average number of calories ordered based on menu type. The group that had menus with no nutritional information ordered on average 1,020 calories, compared with 927 calories in the group that had only calorie information, 916 calories in the group given calories and minutes of walking, and 826 calories in the group given calories and miles of walking information.

The researchers concluded that "the menu with calories and the number of miles to walk to burn those calories appeared the most effective in influencing the selection of lower calorie meals when compared to the menu with no nutritional information provided." However, it should be noted that these labels need to be tested in real-life scenarios to see if they are still effective.

They researchers also reported that the vast majority (82%) of the 802 women participants said they preferred to see physical activity based menu labels rather than labels with calorie information alone or no nutritional information.

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Mining For Hidden Salt

You can easily tick off a list of salty, sodium-rich foods: potato chips, popcorn, hot dogs, pizza, pickles, and more. But there are plenty of high-sodium foods you probably aren't aware of. According to the Centers for Disease Control, Americans get almost one-third of their sodium from breads and rolls, chicken and chicken dishes, pizza, egg dishes, and pasta dishes. That's partly because these foods contain added salt and partly because we eat them so often. Here's another staggering number: up to 80% of the salt in your food was put there by someone other than you.

Why does salt matter? Your body needs a little bit of the sodium in salt to contract muscles, send nerve impulses, and maintain a healthy balance of fluids. But too much sodium can increase blood pressure, make

the heart work harder, thicken and stiffen blood vessels, and more. Higher salt and sodium consumption have been linked to increased risk of heart disease and stroke.

How can you avoid these hidden salt mines? Read food labels carefully. Look at both the amount of sodium per serving and the recommended daily sodium allowance percentage. Shop for products labeled "salt free," or "no salt added," or "low-sodium." Avoid condiments such as soy sauce, ketchup, teriyaki sauce, and salad dressings, which tend to be loaded with salt.

Another good strategy is to limit your use of prepared and processed foods, which tend to be made with a lot of salt. Adding more fresh or frozen fruits and vegetables to your diet can also lower sodium and increase potassium.

Restaurant foods are often loaded with salt. Many restaurants now offer low-sodium choices. If your food is being made to order, don't hesitate to ask that it be made without salt.

Harvard Medical School Health Beat January 5, 2013

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U.S., U.K. Focus On Innovation To Drive Growth

For the first time, economic forecaster The Economist Intelligence Unit (EIU) has teamed up with Mintel, the consumer market expert to predict key trends for the future of different Fast Moving Consumer Goods (FMCG) categories in emerging markets and the United Kingdom and United States.

Launched recently, the findings are revealed in the paper, *Convergence with Divergence*, which analyses how household spending in China, India, Mexico, Turkey, and South Africa will change in comparison to the U.S. and U.K. over the next three years. Providing an in-depth picture of micro and macro trends, the report reveals that consumer spending in these emerging markets is expected to grow between 7.7% and 15.2% a year between 2013 and 2016 compared with 4.5% in the U.S.

While the world's developed economies are still dealing with the fallout from the banking crisis of 2008, many emerging markets have seen incomes rise significantly, providing significant growth opportunities for FMCG businesses looking to enter new markets. Each market continues to differ and a need for businesses to understand their market remains integral.

In the U.S., the following trends are to be expected:

- While alcohol is currently experiencing a boom as demand for sparkling wine grows, this is not expected to last and will flatten out in the next three years
- The foodservice category is key and restaurants will continue to thrive as total spending recovers
- The non-alcoholic beverage market is set for a rebound, up to over 3% annually, as carbonated drinks benefit from new innovations

"In the U.S., total expenditure is likely to rise by just 2.8%—driven in part by the growth in their mighty foodservice market—currently worth twice the total spending on prepared food and commodity food. Each market is unique and understanding the trends and opportunities for each market should be central to all business investment decisions in the next three years," said Jon Copestake, Retail and Consumer Goods Analyst at the Economist Intelligence Unit.

Other key findings for the food and beverage industry include:

- India's prepared food market has more than doubled with cereal consumption increasing.

- South Africans are acquiring more expensive tastes in drinks and coffee is expected to see an annual growth of 8.8% a year.
- In the U.K., chocolates and other cheap treats are proving popular—particularly individually wrapped branded sweets

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Global Consumers Crave Foreign Fare, Handmade Care

Global tastes are diverse and nowhere is that more prevalent than in the kitchens and dining rooms of homes all around the world. When asked about their interest in a variety of unique food products to be eaten at home, global consumers indicated a wide array of interests, reflective of increased accessibility to food options as well as a broader acceptance of different types of food. These are the latest findings of a study conducted by Ipsos InnoQuest.

"We live in a world of greater food choice, with a heavier emphasis on health, freshness, and variety. But that also means that consumers are more willing to experiment with different types of foods, including some that might be considered unique or foreign to their traditional family meals," said Lauren Demar, Global CEO, Ipsos InnoQuest. "Our most recent study on the topic found that globally, consumers are most interested in foods from different regions and cultures as well as artisanal foods which have a handmade quality."

When asked about their interests for at-home dining and food preparation, overall, global consumers expressed a keen interest in a number of food types:

- 45% expressed interest in foods from different regions or cultures
- 44% stated an interest in artisanal foods
- 41% expressed a desire for retro or vintage foods

Do-it-yourself food kits and restaurant brands found in grocery stores met with lukewarm response, with 36% and 23% of global consumers expressing interest, respectively. And, despite the current trend of celebrity chefs putting their names on products from canned soup to pasta sauces to marinades, only 17% of global consumers showed an interest in food products by famous chefs.

Not surprisingly, different at-home dining options find their hot spots in different markets. Foods from different regions or cultures draw the most interest from consumers in the United Kingdom, Australia, and Germany (70%, 61%, and 60%, respectively), while artisanal foods gain the most attention from consumers in Italy, Poland, and Sweden (70%, 69%, and 69%, respectively). For products associated with famous chefs, they are bound to get more traction in India, China, and Singapore (37%, 29%, and 29%, respectively) where a larger percentage of respondents indicated an interest in such products.

"The varying levels of interest in packaged food options indicate that what may be exotic in one part of the world, may be rather pedestrian in another," said Demar. "For food marketers looking to develop new ideas and launch products in new markets, it is essential that they identify the size of the opportunity early on, taking into consideration local tastes, eating patterns, and customs."

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Regulatory & Safety News

Health Canada Limits Caffeine In Energy Drinks

January 2, 2013 Food Product Design

Health Canada officially reclassified energy drinks as beverages and has limited their caffeine content to 180 mg per serving. Formerly considered natural health products (NHPs) by Canadian regulators, energy drinks sold in Canada now must meet food regulations, and many previously sold drinks will have to be reformulated to meet the new caffeine restrictions.

Under the new rule, energy drink makers selling products in Canada also must submit annual data on sales, consumption and adverse events. The new rules, proposed in late 2011 and finalized in 2012, took a few weeks ago, and regulators said they will monitor the data from drink makers to see if any additional regulations are necessary.

The caffeine limit set by Health Canada is a total of 400 mg per litre, which amounts to 180 mg per serving and includes all natural and synthetic sources of the compound. The drinks will be subject to all food labelling regulations including ingredient, nutrition facts and allergen labelling, and are required to feature certain label statements, such as "high source of caffeine," "do not mix with alcohol" and "not recommended for children, pregnant/breastfeeding women, individuals sensitive to caffeine."

In making the regulatory changes, Health Canada said consumption and use data indicated energy drinks, which were previously regulated as NHPs due to content of herbal and nutritional ingredients, are now used mostly as beverages. Officials noted concerns over high caffeine content, both disclosed as a labelled ingredient and hidden in botanical ingredients, and the risk of consumers' too easily exceeding maximum intake levels for caffeine, particularly among the young people who dominate energy drink use demographics.

While Health Canada adopted the panel's recommendation for a caffeine limit of 400 mg total, it did not follow the panel's suggestion of a limit of 80 mg per single serving and suggested use at one beverage only every three to four hours. Health Canada said the 400 mg total limit meant no more than 100 mg of caffeine in a 250 mL serving, which is less than the amount of caffeine in a small cup of moderately strong coffee.

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EFSA's Risk Assessment Finds Aspartame Safe

The European Food Safety Authority (EFSA) has launched a public consultation on its draft scientific opinion on the safety of the artificial sweetener aspartame. EFSA's scientific experts have drawn upon all available information on aspartame and its breakdown products and, following a detailed and methodical analysis, have concluded in this draft opinion that they pose no toxicity concern for consumers at current levels of exposure. The current Acceptable Daily Intake (ADI) is considered to be safe for the general population and consumer exposure to aspartame is below this ADI. This is the first full evaluation of aspartame that has been requested of EFSA and has been carried out by the Authority's Scientific Panel on Food Additive and Nutrient Sources Added to Food (ANS Panel).

All stakeholders and interested parties are invited to comment on the draft opinion through the online public consultation by Feb. 15, 2013. As part of this process, EFSA will also hold a meeting with interested parties to discuss its draft opinion and the feedback received from the online public consultation.

The ANS Panel's draft opinion has benefitted from the latest scientific thinking and methodological approaches. This comprehensive review was made possible following two public calls for data which made

available a large body of scientific information, comprising both published and previously unpublished data and studies. This included the 112 original documents on aspartame that were submitted to support the request for authorization of aspartame in Europe in the early 1980s. In the interest of transparency and openness EFSA published the full list of these scientific studies and also made publicly available previously unpublished scientific data. This information has been critically evaluated and interpreted by EFSA's experts to underpin the key discussion points addressed in the draft opinion.

EFSA has also published a set of Frequently Asked Questions to help explain some of the key scientific concepts and initial conclusions of the draft opinion. Feedback from the consultation will be compiled in a report and, where appropriate, incorporated into the final scientific opinion, which the ANS Panel aims to adopt by May 2013.

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FDA Okays Canola Oil In Infant Formula

Canola oil is now generally recognized as safe (GRAS) for use as an ingredient in infant formula marketed in the United States. The U.S. Food and Drug Administration (FDA) recently made public that it has no questions in response to a notice that was filed with the agency for the inclusion of canola oil as a source of fat in term infant formulas. Canola oil can be included at levels up to 31% of the total fat blend.

All infant formulas marketed in the United States must meet federal nutrient requirements. According to the FDA, formulas must contain the essential fatty acids linoleic acid (LA), an omega-6 fatty acid, and alpha-linolenic acid (ALA), an omega-3 fatty acid, which aid in infant growth and development. Canola oil has among the highest ALA content of all edible oils—11% compared to 8% in soybean oil.

The FDA requires that any ingredient added to infant formulas be GRAS for the intended use. It also requires formula manufacturers to make a submission to the FDA in advance of the marketing of a new infant formula. The GRAS notification included a review by an expert panel of published scientific studies with infants fed formula containing canola oil.

"When used in combination with other oils that contain LA, canola oil can be used by infant formula manufacturers to target appropriate levels of LA (8–35% of total fatty acids) and ALA (1.75–4% of total fatty acids) and ensure the fat blend is within the recommended ratio of LA:ALA between 6:1 and 16:1," said the response by the FDA to the GRAS notice.

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Research Shows Using Text, Colour Makes Food Labels Easier to Understand

Jan. 4, 2013 Science Daily

As the spotlight on healthy eating and nutrition grows ever-brighter, new research suggests that including colourful and graphic nutrition information on product packages helps consumers better understand the information.

According to a literature review conducted by RTI International, using text and colour to describe the nutrient levels, rather than just numbers, is a more effective way to ensure consumers understand nutritional information.

A team of researchers found that when labels incorporated text and colour to indicate "high," "medium" or "low" levels of nutrients, they were easier for consumers to interpret than those that used only numbers, such as grams per serving or per cent of Recommended Dietary Allowances.

The literature review, published in the January issue of *Nutrition Reviews*, systematically analysed 38 studies on consumer responses to nutrition labels on the front of food packages and on grocery aisle shelves to determine which aspects of labels had the strongest impact on consumer attention, understanding and purchasing behaviour.

In general, the studies suggest that labels on the front of food packages and on grocery aisle shelves can help consumers make better food choices. The results may help guide development of nutrition labels that quickly capture the attention of consumers and prompt them to pick healthier foods.

"As standards for nutrition front-of-package and shelf-labelling systems are considered, it is important to know what is most effective in conveying scientifically accurate and useful information to consumers," said James Hersey, Ph.D., a senior scientist at RTI International and lead author of the study.
This review uncovered a number of knowledge gaps. "Although some research suggests that summary systems may influence consumers to purchase healthier products, more research is needed to assess front-of-package and shelf nutrition labels effects on consumers' shopping and eating behaviours," said Kelly Wohlgenant, policy analyst at RTI and the study's co-author.

The authors recommend that for the largest public health impact, nutrition label education and communication efforts should target consumers at high risk of obesity-related illness rather than those who are already focused on nutrition.
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