PFNDAI Bulletin February 2010

Editorial

Micronutrient deficiency has affected Indian children for many decades and has caused immeasurable harm in terms of human resources as well as medical cost. We have been able to tackle problems of one micronutrient namely iodine. Although there has been a lot of hue and cry over it, this has been accepted in most places.

No such project will be without any difficulty. What it needs is the decision by the government to get it done. There will always be protests because of mostly the ignorance or misinformation among some of the interest groups. Therefore, while undertaking any such pervasive and enduring project, there must be a thorough consultation among all stakeholders putting all the facts and figures on table. The scientists need to come forward with all the data from surveys, research studies on symptoms, detection and diagnosis, treatment options and doses, toxicity and side effects etc. from various studies carried out in India and abroad. If there are inadequate studies in India these must be sponsored by government agencies.

After adequate information is available, this must be communicated through various media to public as well as all the stakeholders and interest groups in order to make them all realise the enormity of the problem and how to tackle it. Everyone should realise that if we keep on fighting over whether or not to take steps or which is the best way to do it, we are letting millions of children every year that goes by to be adversely affected by various deficiency diseases adding not only to the cost to the nation but more importantly to the misery of these innocent children who are no way responsible for the existing problem.

We may err in our approach, but we can always improve upon it. We may encounter some technical and commercial problems. These could be sorted out while we are continuing with the project. Delay is much worse than committing a mistake and then learning from it and improving.

It must also be accepted that we need not rely only for the government to initiate an action or even creating awareness about deficiency. Industry has been doing some bit but only in its own interest. What we need is a joint effort by industry, government and academia to initiate this. We have been talking only in conferences about the problems and solutions but we have not taken the common people into this. It is time now to make the first move.

Even in urban societies, there is such a lack of awareness about nutritional needs; we shudder to think the kind of awareness that exists in villages where majority of our population resides. Our well-educated housewives and mothers still get easily swayed by some slick ads that are aimed at promoting certain food products. They will still try to give certain products to their children to top in their class without even wondering whether they can give some foods that might provide some of the essential nutrients.

Let us try to make Indian children healthy. With season’s greetings

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Iron: The Essential Mineral

Dr. Jagadish S. Pai, Executive Director, PFNDAI

Iron is among the most abundant of metals and is essential for normal functions of most life forms including humans. It is present in many proteins and enzymes that maintain good health. It is an essential part of proteins that carry oxygen in blood. Almost 2/3 of iron in body is present in hemoglobin in red blood cells which carry oxygen to tissues. Some iron is found in myoglobin which supplies oxygen to muscles and in enzymes catalyzing biochemical reactions. Iron deficiency restricts oxygen delivery to cells, causing fatigue, poor work performance and lowered immunity. It is essential for control of cell growth and differentiation. It also aids in immune function, cognitive development, and temperature regulation. Some of the important dietary sources of iron are meat, fish, poultry, lentils and beans, spinach and raisins.

Functions of Iron

Oxygen Transport & Storage: Heme has iron and it is found in many biologically important proteins like hemoglobin and myoglobin. Hemoglobin found in red blood cells and plays a vital role of transporting oxygen from lungs to the rest of the body due to its ability of acquiring oxygen rapidly during the short time and releasing it as required during blood circulation through various tissues. Myoglobin serves to transport and store for a short time oxygen in muscle cells, helping in supplying oxygen for energy purpose needed by muscles while working.

Electron Transport & Energy Metabolism: Cytochromes also contain heme and are critical to energy production by cells through mitochondrial electron transport carrying electrons during synthesis of ATP, the primary energy store of cells. Non-heme iron-containing enzymes like NADH dehydrogenase and succinate dehydrogenase are also critical to energy metabolism.

Anti-oxidant & Beneficial Pro-oxidant Functions: Heme-containing enzymes catalase and peroxidases protect cells from accumulation of hydrogen peroxide converting it to water and oxygen. During immune responses white blood cells engulf bacteria and expose them to reactive oxygen species like hypochlorous acid whose production is catalysed by heme-containing enzyme myeloperoxidase.

Among other useful functions are oxygen sensing in inadequate oxygen supply (hypoxia), DNA synthesis, regulation of intracellular iron etc.

Iron Deficiency

Iron deficiency is one of the most common nutrient deficiencies in the world. Three stages of deficiency are recognized from least to most severe. Storage Iron Depletion involves iron stores being depleted but the functional iron supply is not limited. Early Functional Iron Deficiency involves supply of functional iron bring low enough to impair red blood cell formation but not low enough to cause measurable anemia. Iron Deficiency Anemia (IDA) is where there is inadequate iron to support normal red blood cell formation resulting in anemia.

Iron deficiency anemia may cause one to feel tired and often look pale. It is a condition when blood lacks adequate healthy red blood cells that carry oxygen to tissues providing energy to cells. Iron deficiency anemia is common in women; one in five women and half of pregnant women are iron deficient and many of them suffer from anemia. Although there are other causes, most common cause of iron deficiency anemia is lack of adequate iron in diet.

In general, anemia causes extreme fatigue, pale skin, weakness, shortness of breath, headache, light-headedness and often cold hands and feet. There may be decreased work and school performance as well as slow cognitive and social development during childhood. The symptoms may also include inflammation or soreness of tongue, brittle nails, craving for such things as ice, dirt etc. and also poor appetite, especially in infants and young children. There is decreased immune function that increases susceptibility to infection. The symptoms worsen as deficiency becomes more severe, so in the initial stages the deficiency may go unnoticed as symptoms are mild. As per WHO estimates, as many as 80% of world's population may be iron deficient, while 30% may have iron deficiency anemia.

Iron deficiency develops gradually when iron intake does not meet the daily requirements. This depletes the storage form of iron while the blood hemoglobin level, a marker for iron status, remains normal. Iron deficiency anemia is an excessive depletion of iron that occurs when storage of iron is deficient and blood levels cannot meet daily requirements. Blood hemoglobin levels are below normal with anemia.

Iron Deficiency in India

Life expectancy in India has more than doubled and infant mortality halved in last fifty years. Paradoxically, malnourished people are most and child malnutrition is among highest in India. One third of Indian population suffers from vitamin and micronutrient deficiency. Intake of micronutrient in daily diets is less than 50% RDA in 70% of Indian population resulting in loss of 1% of GDP amounting to a loss of almost Rs. 28,000 crores per annum in terms of productivity, illness, increased health care costs and death. Every day, over 6,000 children below 5 die in India over half of them caused by malnutrition mostly of vitamin A, iron, iodine, zinc and folic acid.

Iron deficiency anemia is a public health problem of global magnitude. With total world population of 6,700 million, iron deficiency affects 3,600 millions of which about 2000 million have iron deficiency anemia with children and women in reproductive age group being more vulnerable. As per WHO over one third of world population has anemia, India being one of the countries with highest prevalence of anemia. According to National Family Health Survey 3, the prevalence of anemia in children is 70 to 80%, in pregnant women 70% and in adult men 24% and the reasons being low dietary intake, poor availability of iron and chronic blood loss due to hook worm infestation and malaria.

During adolescence rapid growth increases iron requirement in both boys and girls and about 65 to 75% adolescent girls in India are anemic, these being the potential mothers. Thus it has deleterious effects on future generation. Incidence of low birth weight, prematurity, neonatal and infant mortality in children born to undernourished adolescent girls is high. Twenty percent of all maternal deaths in India are due to anemia during pregnancy and in further 40%, anemia is contributory.

Causes of Iron Deficiency

Red blood cells contain hemoglobin that is iron-rich and has most of body's iron. It enables red blood cells to carry oxygen from lungs to various parts of the body. Red blood cells are made in bone marrow which needs iron along with vitamins, adequate calories and protein to make hemoglobin. All these are obtained from foods that are consumed as well as some iron is recycled from old red blood cells. Anemia is developed when the body lacks iron to make adequate hemoglobin without which red blood cells are smaller and paler and cannot carry adequate oxygen to tissues. Lack of iron may be due to several causes including:

Blood Loss: As blood contains red blood cells, when bleeding occurs, iron is lost. Women having excessive loss of blood during periods are at risk of iron deficiency anemia. Slow, chronic blood loss from such ailments like peptic ulcer, kidney or bladder tumor, colon polyp, colorectal cancer or uterine fibroids etc. can cause iron deficiency anemia. Gastrointestinal bleeding may occur due to regular use of aspirin etc. Hookworm also causes blood loss.

Lack of Dietary Iron: Body gets iron from foods eaten in diet, so if less iron-containing foods are consumed over time body becomes iron deficient. Examples of iron-rich foods are meat, eggs, dairy products and iron-fortified foods.

Inability to Absorb Iron: Digested food in small intestine has iron which is absorbed into bloodstream. Intestinal disorders like Crohn's disease or celiac disease affect intestine's ability to absorb nutrients from digested food. This can lead to iron deficiency anemia. Surgical removal or bypass of part of intestine may also affect ability to absorb iron and other nutrients. Certain medications like stomach acid blockers may also lead to iron deficiency in some cases as stomach acid is needed for dietary iron absorption.

Ability to absorb iron through diet also depends on several factors. Healthy adults can absorb about 10% to 15% of dietary iron. Storage level of iron has great influence on iron absorption. Iron absorption is higher when body stores are low and when stores are high the absorption decreases helping protect against toxic effects of iron overload. Absorption is also higher of heme iron from meat proteins, ranging about 15% to 35% which is not affected by diet. On the other hand, non-heme iron absorption from plant foods like rice, maize, black beans, soybeans, wheat etc. is anywhere from 2% to 20% and is very much influenced by various food components. Meat proteins and vitamin C will improve the absorption of non-heme iron while tannins, calcium, polyphenols and phytates can decrease its absorption.

Pregnancy: Iron deficiency anemia occurs in many pregnant women as their iron stores have to serve their own increased blood volume as well as source of extra hemoglobin for the growing fetus, which needs iron to develop red blood cells, blood vessels and muscle.

Children: These need extra iron during growth spurts because iron is important in muscle red blood cells and blood vessels development. Their requirement suddenly increases in spurts.

Recommended Dietary Allowances

The US FDA has given recommended dietary allowances for humans in various stages from infancy to old age based on the recommendations of Institute of Medicine.

Recommended Dietary Allowance (RDA) for Iron			
Life Stage	Age	Males (mg/day)	Females (mg/day)
Infants	0-6 months	0.27	0.27
Infants	7-12 months	11	11
Children	1-3 years	7	7
Children	4-8 years	10	10
Children	9-13 years	8	8
Adolescents	14-18 years	11	15
Adults	19-50 years	8	18
Adults	51 years and older	8	8
Pregnancy	all ages	-	27
Breastfeeding	18 years and younger	-	10
Breastfeeding	19 years and older	-	9

Indians have mostly a vegetarian diet in which there is not only dearth of heme-iron but also there are cereals and pulses containing many inhibitors of absorption of iron. Hence the Indian Council of Medical Research has recommended much higher quantities of iron considering daily requirements as given below

Table: Recommended Daily Allowances for Iron (mg/day)

Group	Particulars	Iron (mg/d)
Man	Sedentary, Moderate & Heavy Work	28
Woman	Sedentary, Moderate & Heavy Work	30
	Pregnant woman	38
	Lactation 0-6 months 6-12 months	30
Infants	0-6 months 6-12 months	
Children	1-3 years	12
	4-6 years	18

	7-9 years	26
Boys	10-12 years	34
Girls	10-12 years	19
Boys	13-15 years	41
Girls	13-15 years	28
Boys	16-18 years	50
Girls	16-18 years	30

Source: ICMR

As can be seen there are three groups of people who require more iron from food or supplement namely, those with greater need for iron, those who tend to lose more iron, and those who do not absorb iron normally either due to their physiologic condition or their diet. These individuals include: pregnant women, preterm & low birth weight infants, older infants & toddlers, teenage girls, women of childbearing age, especially those with heavy menstrual losses, people with renal failure, especially those undergoing routine dialysis, people with gastrointestinal disorders who do not absorb iron normally and those individuals having mostly vegetarian diet.

Foods Providing Good Sources of Iron

As was mentioned above, the animal foods not only contain good amounts of iron but the heme-iron is more absorbed than non-heme iron. That does not mean that vegetarian diet does not contribute adequate iron to body. There are many good sources of iron including lentils, various beans like kidney, lima, and soya, tofu, spinach, whole wheat products, raisins, prunes, oatmeal, ready-to-eat cereals and many food supplements containing added iron. Following tables give some of the sources of iron from different foods.

Table 1: Selected Food Sources of Heme Iron

Food	mg/serving
Chicken liver, cooked, 3½ ounces	12.8
Oysters, breaded and fried, 6 pieces	4.5
Chicken, leg, meat only, roasted, 3½ ounces	1.3
Chicken, breast, roasted, 3 ounces	1.1
Crab, blue crab, cooked, moist heat, 3 ounces	0.8
Tuna, white, canned in water, 3 ounces	0.8
Shrimp, mixed species, cooked, moist heat, 4 large	0.7

Table 2: Selected Food Sources of Non-heme Iron

Food	mg/ serving
Oatmeal, instant, fortified, prepared with	10.0

water, 1 cup	
Soybeans, mature, boiled, 1 cup	8.8
Lentils, boiled, 1 cup	6.6
Beans, kidney, mature, boiled, 1 cup	5.2
Ready-to-eat cereal, 25% iron fortified, ¾ cup	4.5
Tofu, raw, firm, ½ cup	3.4
Spinach, boiled, drained, ½ cup	3.2
Black-eyed peas (cowpeas), boiled, 1 cup	1.8
Raisins, seedless, packed, ½ cup	1.5
Whole wheat bread, 1 slice	0.9
White bread, enriched, 1 slice	0.9

Source: USDA

Table 3: Iron Contents of some common Indian foods (mg/100g)

Bajra	8.0	Cashew nuts	5.81
Jowar	4.1	Gingelli seeds	9.3
Ragi	3.9	Groundnuts	2.5
Rice parboiled, handpounded	2.8	Linseed (flax seed)	2.7
Rice milled	0.7	Dates dried	7.3
Wheat flour whole	4.9	Watermelon	7.9
Bengal gram dal	5.3	Pineapple	2.42
Cow pea	8.6	Seetaphal	4.31
Horse gram	6.77	Raisins	7.7
Lentil	7.58	Bombay duck (dry)	19.1
Peas dry	7.05	Crab muscle	21.2
Rajmah	5.1	Mackerel	4.5
Amaranth (math)	3.49	Prawn	5.3
Colocasia leaves	10.0	Surmai	2.0
Mustard leaves	16.3	Egg	2.1
Shepu	17.4	Sheep liver	6.3
Spinach	1.14	Mutton	2.5
Almonds	5.09	Jaggery	2.64

From: Nutritive Value of Indian Foods: Gopalan et al.

Food Fortification and Supplements with Iron

When a person becomes deficient in iron and develops anemia, higher intake of iron-rich foods is beneficial but usually is not enough to cure the problem as one needs not only to meet the body's daily requirements but also to build the iron reserves. In case of pregnant women, intake should be enough to not only correct her deficiency but meet the requirements of the fetus.

For children or adults with mild iron deficiency anemia, daily multivitamin supplement containing iron may be recommended. Although oral iron supplements are absorbed better in an empty stomach it may irritate stomach so supplements are normally recommended along with food. Supplements are also recommended along with orange juice or vitamin C tablet as they help iron absorption. Iron supplement also can cause constipation so stool softener may also be recommended. Iron usually turns stools black, this being a harmless side effect. Iron deficiency takes a long time to correct and may take even several months to replenish iron reserves.

Some facts about iron supplements

When diet alone cannot restore deficient iron levels then iron supplementation is useful. Supplements are important when clinical symptoms of iron deficiency anemia are experienced in order to supply adequate iron to restore normal storage levels of iron and to replenish hemoglobin deficits. When hemoglobin levels are low, serum ferritin, which is the storage form of iron is measured. A serum ferritin is less than or equal to 15 micrograms per litre, iron deficiency anemia is diagnosed in women and iron supplementation is recommended.

Ferrous salts namely fumarate, sulphate and gluconate are the best absorbed forms of iron supplements. Amount of iron present in these forms is given in figure below. As iron absorbed decreases with increasing doses, it is recommended that daily requirement is taken in 2 or 3 equally spaced doses.

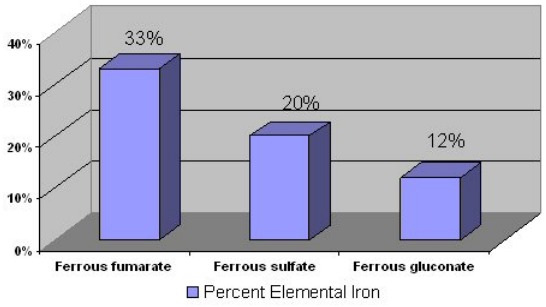

Figure 1: Percent Elemental Iron in Iron Supplements

Iron supplements are given along with food and is quite effective in controlling anemia, however, it is expensive and is normally considered as a short-term measure. Fortification is much more cost effective and has been shown in many studies to have a more prolonged benefit although both fortification and supplements have the advantage that they do not make drastic changes in the diet. When dietary changes are recommended for population suffering from iron deficiency, in most cases it is not feasible due to several reasons like poverty, tradition etc.

Studies conducted in four regions including South American, European, African and South East Asian regions with different rates of child and adult mortality showed that both iron fortification and supplementation are cost effective means of controlling iron deficiency diseases including anemia. It is very important that fewer dietary changes are made in order for long-term compliance and beneficial effect of fortification. Here iron powder was mixed in cereal flours with no changes in the appearance, colour and flavour of the final food.

The similar experience was seen in other studies. One four-country study tried successful fortification of common foods consumed by target population. Rice was fortified in the Philippines, flours in Venezuela, fish sauce in Vietnam and soy sauce in China to enhance iron intake. Fortification has sharply lowered iron deficiency including anemia in the study groups showing great promise to remove iron deficiency disease by iron fortification of staple foods and condiments which leads to long-term compliance to consumption of fortified foods.

Selection of Iron Fortificant:

There are many different iron compounds that can serve as fortificants. They vary in costs as well as attributes such as bioavailability and ease of processing. Ferrous sulphate has high bioavailability and low cost but can cause colour problems in some food products because of reactivity. Ferrous fumarate has high similar bioavailability and being of low solubility in water has less colour problems but is expensive. Iron powders are not expensive and have less colour problems but their bioavailability is low.

Bioavailability is also affected by certain factors such as presence of phytic acid and polyphenols etc. These substances are present in many foods and lower the absorption of iron. When phytic acid levels in foods are high, sodium iron EDTA may be considered as fortificant as it is not affected by phytic acid.

There are also technological solutions to some unique traditional problems. When rice is to be fortified fortificant may be used in coating. However, when rice is washed prior to cooking fortificant may be lost. In one study they used extrusion technology to incorporate iron into rice and this extruded rice was mixed with normal rice in such proportions that it was not noticed. Sometimes encapsulation was used to prevent reaction and loss of fortificant. Studies have also shown effectiveness of enzymic dephytinisation to increase bioavailability.

Iron Toxicity due to Overload

Although oral lethal dose of elemental iron is about 200 to 250 mg/kg body weight, less amounts have been found to be fatal. Accidental overdose of iron-containing products have caused fatalities in children less than 6 years of age. Symptoms of acute toxicity may occur with iron doses of 20-60 mg/kg body weight and severity of iron toxicity is related to the amount of elemental iron absorbed. Initial symptoms may include nausea, vomiting, abdominal pain, lethargy, weak and rapid pulse, low blood pressure, fever, difficulty in breathing and coma. Symptoms may subside for 24 hours and may return. Overdose may cause damage to cardiovascular system, kidney, nervous system and liver. Genetic disorder hemochromatosis may lead to pathological accumulation of iron in the body even when iron intake is normal. However, in healthy individuals without this disorder, iron overload due to prolonged supplementation is very rare. There is body’s mechanism that controls intestinal iron absorption protects it from adverse effects of iron overload. However, giving iron supplements to individuals who are not iron deficient should be avoided.

Conclusions

Iron is among the vital nutrients having far-reaching consequences. There is a great lack of awareness about the importance of iron intake and the care in vegetarian diet as bioavailability iron is low. This is more critical for the vulnerable population especially children, adolescent and pregnant women majority

of whom suffer from iron deficiency anemia. It is very important to assess iron deficiency among these groups and prevent and control anemia by iron supplementation or fortification along with improving diets to enhance intake of iron. It is very important that such vulnerable group is given diet consisting of foods that are rich in iron so they do not become deficient. It is also extremely important to create awareness by nutrition education among all stakeholders.

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POWERFUL ANTIOXIDANTS: Proanthocyanidins

By Dr. S.V. Padgaonkar, Technical Director- Clarico FPC/Spica Tech Specialities

Despite their awkward name, Proanthocyanidins are making headlines in the health food and supplement arena, where they are available as pine bark extracts (Pycnogenol) and grape seed extracts. Proanthocyanidins are highly regarded for their strong antioxidant properties and for their functions in supporting the body's connective tissues and capillary blood vessel system. But what exactly are these Proanthocyanidins?, what is the secret of their antioxidant actions, and what other functions do they have?

Proanthocyanidins (also called Leucoanthocyanidins) are a class of natural polyphenolic bioflavonoids that are very widespread in nature. They are found in many plant sources, like certain pine barks, grape seeds, wine, cranberries and the leaves of bilberry, birch, ginkgo and hawthorn. Proanthocyanidins are the main precursors of the blue-violet and red pigments in plants. They occur as single molecules (monomers, like Catechin and epi-catechin) and as chains of two, three or more molecules, which they are called oligomeric proanthocyanidins (opc) or sometimes procyanidolic oligomers.

Europeans have been studying and using various forms of these natural proanthocyanidins for several decades for their numerous beneficial effects. Proanthocyanidins and their outstanding antioxidant activities were discovered by Professor Jacques Masquelier of the University of Bordeaux, France. Prof. Masquelier isolated these Proanthocyanidins first from pine bark and later from grape seeds and obtained patent protection of the extraction methods. Prof. Masquelier confirmed the structure, effects and lack of toxicity of these Proanthocyanidins.

Today, both the pine bark and grape seed extracts are considered the major sources of Proanthocyanidins. Pine bark extract from the European coastal pine (Pinus maritama) is sold as Pycnogenol and contain about 80 to 85 % proanthocyanidins, while grape seed extract (from vitis vinifera) is sold as Grapenol and is standardized to contain minimum of 92% Proanthocyanidins. Prof. Masquelier's most recent patent (U.S. Patent No. 4 , 698,360,1987) protects both grape seed extract and Pycnogenol, as well as other extracts providing significant amounts of proanthocyanidins for their antioxidant uses.

Proanthocyanidins have very useful antioxidant properties. Some researchers claim them to be many times stronger than vitamin C or E. However, the antioxidant potential is usually measured in the test-tube (in-vitro) and may not adequately reflect their action in the living organism (in vivo). Also, antioxidant properties of nutrients in vivo are often complementary or synergistic rather than additive. Therefore, it is better to say that Proanthocyanidins are powerful antioxidants, which may have their own unique place in the body's overall protection against harmful free radical damage. Proanthocyanidins appear to be

especially effective in neutralizing highly reactive hydroxyl and singlet oxygen radicals. Both of these reactive oxygen species are involved in inflammatory processes.

Proanthocyanidins also support and enhance the activity of vitamin C and are known for their ability to help support the health of the body's capillary system and connective tissues. Proanthocyanidins have been shown to bind with collagen fibers, thereby protecting them from premature degradation. This helps maintain the natural elasticity of collagen in skin, joints, arteries and other connective tissues. Studies with Proanthocyanidins from Pycnogenol showed that of all the bioflavonoids tested, Proanthocyanidins were the most effective in maintaining optimum capillary resistance.

In addition to Proanthocyanidins, Pycnogenol and Grapenol contain an assay of other biologically active compounds. Pycnogenol contains about 15% of various forms of organic acids, among them ferulic acid, caffeic acid, vanillic acid, parahydroxy benzoic acid, and toxifolin. These phenolic organic acids are wide spread in nature and contribute to the beneficial action of Pycnogenol through their antioxidant and other metabolic actions.

Ferulic acid, for example, appears to have a role in maintaining a normal, smooth muscle tone in blood vessels and the uterus. Caffeic acid may support digestion by stimulating bile flow from the liver. This function also helps maintain the liver's ability in detoxification, as animal studies have shown .

Caffeic acid has been shown to possess antioxidant benefits and it may keep immune function in check by maintaining adequate synthesis of leucotrienes. Both caffeic and ferulic acids have been shown to inhibit the formation of harmful nitroso compounds in the gut. Grape seed extract, in turn, contains gallic acid and gallic acid esters, compounds that are known for their astringent and antioxidant (gallic acid esters) properties.

(References available on request).

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Defeating Diabetes

Prevalence of diabetes has increased in the US. Nutrition is important in managing diabetes. American Diabetes Association lists top 10 foods to include in the diet. All these have low glycemic index (GI) and provide key nutrients calcium, potassium, fibre, magnesium, and vitamins A, C and E, that are lacking in diet. Such foods include beans, dark green leafy vegetables, citrus fruit, sweet potatoes, berries, tomatoes, salmon, whole grains, nuts, and fat-free milk and yogurt. Packaged foods and beverages are aimed at diabetes, many formulated with low GI sweeteners, whole grains and fibre. Some nutraceuticals that can help manage or prevent the risk of diabetes are given below.

Black Tea: Polysaccharides in black tea can potentially help manage diabetes. Hypoglycaemic effects of tea polysaccharides have been studied but little is known of their glycosidase inhibition. One study isolated 3 polysaccharide rich fractions from green, oolong and black teas and found that black tea polysaccharides had most glucose-inhibiting properties while they also had highest free radical scavenging properties. The latter effect might be useful in prevention of cancer and rheumatoid arthritis.

Blueberries: These are rich in anthocyanins having potency to alleviate symptoms of hyperglycemia in diabetic mice. When mice were given 500 mg/kg body weight either phenolic extract or anthocyanin rich fraction, they showed comparable hypoglycaemic activities to that of an anti-diabetic drug with anthocyanin fraction being more effective in lowering elevated blood glucose.

Another team investigated anti-obesity and antidiabetic potential in mice with leptin resistance of blue-berry juice biotransformed using Serratia vaccinii bacteria from the skin of the fruit. The juice protected mice from hyperphagia, significantly reduced their weight and gave protection against development of glucose intolerance and diabetes mellitus.

Chromium: This has shown to improve insulin sensitivity. In one study commercial niacin-bound chromium complex helped promote insulin sensitivity and improves long-term blood sugar control with 12% lower level of HbA1, showing an improvement in glucose control and long-term blood sugar status. It also reduced triglyceride and total cholesterol levels by 52% and 26% in rats.

Chromium picolinate is also shown to reduce hyper-glycemia and stabilising blood glucose, increasing lean mass and reducing body fat, and maintaining healthy cholesterol levels. In a review of several clinical studies of effects of chromium picolinate supplementation on type 2 diabetes found substantial reductions in hyperglycemia and hyperinsulinemia reducing the risk of disease complications. Data supports the safety and therapeutic value of chromium picolinate to reduce blood glucose, insulin, cholesterol and triglyceride levels as well as lesser hypoglycaemic medication.

Cinnamon: Insulin sensitivity has been shown to improve with cinnamon. In one study, cinnamon polyphenols have been shown to improve insulin sensitivity in *in vitro*, animal and human studies. Cinnamon reduced fasting serum glucose, triacylglycerol, total cholesterol and LDL cholesterol in subjects with type 2 diabetes consuming 1 to 6 g cinnamon per day for over a month. Subjects with metabolic syndrome who consumed extract of cinnamon had improved fasting blood glucose, systolic BP, % body fat, and increased lean mass compared to control group.

Olive Extract: Extract from juice of olives contains high levels of polyphenols with strong antioxidant and anti-inflammatory activities. Major polyphenol hydroxytyrosol is considered responsible for health benefits of Mediterranean diet including lower incidence of cardiovascular disease. This may stimulate the function of mitochondria in cells thought to help prevent diseases like diabetes and obesity. Using mice fat cells effects of hydroxytyrosol were tested. The results showed that it stimulated mitochondrial biogenesis and function. This may provide possible mechanism for efficacy of Mediterranean diet for lowering risks of CVD and may also be useful in preventing type 2 diabetes and obesity.

Pistachios: Research has showed that pistachios in daily meals delayed emptying of stomach and blunting blood sugar curve which may lead to long-term blood sugar control. In meals of white bread, 2 oz of pistachios reduced peak blood sugar levels and serum ghrelin levels were lower than those who did not eat pistachios. Thus pistachios may improve long-term glycemic control.

Pulses: Peas, beans, lentils and other pulses have low GI beneficial for people with diabetes improving the markers of long-term glycemic control in humans. In a review of several studies investigating effects of pulses alone or as part of low-GI or high-fibre diets, on markers of glycemic control in people with and without diabetes, it showed that pulses lowered fasting blood glucose levels and improved glycosylated

haemoglobin (HbA1c), an indicator of long-term blood sugar control. In fact, when pulses were part of high-fibre or low GI diet, significant reduction in HnA1c seen in those with type 2 diabetes was comparable to patients on medications.

Resistance Starch: Preliminary results of consumption of resistant starch from maize showed significant increase in insulin sensitivity in subjects with insulin resistance and metabolic syndrome. Over 8 weeks, overweight subjects of above problem who consumed 40 g dietary fibre from maize with resistant starch per day increased their hepatic and peripheral (muscle) insulin sensitivities and their glucose uptake. They also showed lower fasting insulin levels, reduced postprandial insulin responses to meals and much lower fasting non-esterified fatty acids. Earlier research had also showed similar responses with people with normal blood glucose levels and with people with type 2 diabetes.

Salba Seeds: Salba is a new variety of ancient oily grain Salvia hispanica L. Long term intake may have cardio-protective effect in those with type 2 diabetes. Over 3 months salba seeds with diabetes therapy showed beneficial lowering of systolic BP as well as levels of C-reactive protein.

Soya: Soy protein reduced serum LDL cholesterol in adults with type 2 diabetes. In a double-blind, randomised, crossover, placebo controlled study , subjects consumed aglycone isofalvones soy protein isolate or milk protein isolate. Soya reduced serum LDL cholesterol but did not affect total cholesterol, HDL cholesterol, triacylglycerol, apolipoproteins B or A-I. Soya also modulated serum lipids to help lower risk of CVD in adult type 2 diabetics.

Condensed from an article by Linda Milo Ohr in Food Technology November 2009

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Health & Nutrition News

Fast Food Menus with Calorie Information Lead to Lower Calorie Selections for Young Children

In a new study, the amount of calories selected by parents for their child's hypothetical meal at McDonald's restaurants were reduced by an average of 102 calories when the menus clearly showed the calories for each item. This is the first study to suggest that labeled menus may lead to significantly reduced calorie intake in fast food restaurant meals purchased for children. Led by researcher Pooja S. Tandon, MD, from Seattle Children's Research Institute, these findings support nutritional menu labeling and show that when parents have access to this information they may make smarter meal choices for their children. "Nutrition Menu Labeling May Lead to Lower-Energy Restaurant Meal Choices for Children" published online January 25 in Pediatrics.

At a pediatric practice in Seattle, 99 parents of 3- to 6-year-olds who sometimes eat in fast food restaurants with their children were surveyed about their fast food dining habits. They were presented with sample McDonald's restaurant menus which included current prices and pictures of items, and asked what they would select for themselves and also for their children as a typical meal. Half of the parents were given menus that also clearly showed calorie information for each item. Choices included most of the items sold at McDonald's, including a variety of burgers, sandwiches, salads, dressings, side items, beverages, desserts and children's "Happy Meals." Parents who were given the calorie information chose 102 fewer calories on average for their children, compared with the group who did not have access to calorie information on their menus. This reflects a calorie reduction of approximately 20%. Notably, there was no difference in calories between the two groups for items the parents would have chosen for themselves.

"Even modest calorie adjustments on a regular basis can avert weight gain and lead to better health over time," said Dr. Tandon, research fellow at Seattle Children's Research Institute and the University of Washington School of Medicine. "Just an extra 100 calories per day may equate to about ten pounds of weight gain per year. Our national childhood obesity epidemic has grown right alongside our fast food consumption. Anything we can do to help families make more positive choices could make a difference. Interestingly, by simply providing parents the caloric information they chose lower calorie items. This is encouraging, and suggests that parents do want to make wise food decisions for their children, but they need help. Now that some areas are requiring nutritional information in chain restaurants, we have opportunities to further study what happens when we put this knowledge in the hands of parents."

There was no correlation between the families' typical frequency of fast food dining and calories selected, for either parents or children.

A growing number of jurisdictions across the country have begun mandating that nutritional information be readily available at point-of-ordering in chain restaurants. Currently more than 30 localities or states are considering policies that would require calories and other nutrition information to be clearly visible—four have already implemented policies. Federal menu labeling standards have also been discussed as part of health care reform legislation.

From: Bioscience Technology 25 Jan 2010

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Promising Probiotic Treatment for Inflammatory Bowel Disease

Bacteria that produce compounds to reduce inflammation and strengthen host defences could be used to treat inflammatory bowel disease (IBD). Such probiotic microbes could be the most successful treatment for IBD to date, as explained in a review published in the February issue of the Journal of Medical Microbiology.

IBD is inflammation of the gastro-intestinal tract that causes severe watery and bloody diarrhoea and abdominal pain. It is an emerging disease that affects 20 out of 100,000 genetically susceptible people in Europe and North America. The most common manifestations of IBD are Crohn's disease and ulcerative colitis. While the exact causes are unclear, IBD is known to be the result of an overactive immune response that is linked to an imbalance of the normal types of bacteria found in the gut.

Several recent studies have identified butyric acid as a potential therapeutic agent for IBD. Some gut bacteria produce butyric acid naturally in the intestines, but in IBD patients some of these strains are heavily depleted. Trials in mice have shown that injecting one such strain Faecalibacterium prausnitzii into the digestive tract is effective at restoring normal levels of gut bacteria and treating the symptoms of IBD. In addition, novel identified butyrate-producing strains, such as Butyricicoccus pullicaecorum, have been shown to exert similar effects.

Butyric acid has well-known anti-inflammatory effects and is able to strengthen intestinal wall cells - making it an ideal therapeutic agent against IBD. In addition to butyric acid, it is hypothesized that strains such as F. prausnitzii and B.pullicaecorum secrete other anti-inflammatory compounds that may enhance the therapeutic effect.

Prof. Filip Van Immerseel, a medical microbiologist from Ghent University in Belgium said that a new treatment for IBD would be welcomed. "Conventional drug therapy has limited effectiveness and considerable side effects. Probiotics are live bacterial supplements or food ingredients, which when taken in sufficient numbers confer health benefits to the host," he said. Previous trials of probiotics to treat IBD using mainly lactic acid bacteria have given mixed results. "Now we realise that lactic acid is used for growth by a certain population of bacteria that produce butyric acid, which could explain why some of the older studies had a positive outcome. Recent trials focussing on butyric acid-producing bacterial strains have been extremely promising and could lead to a new treatment for IBD."

Developing an effective probiotic treatment for IBD will not be easy, however. "As butyric acid-producing bacteria are naturally depleted in IBD patients, we will need to identify strains that are able to colonize the gut without being outcompeted. Many bacterial species produce butyric acid and possibly other anti-inflammatory molecules so it's a case of finding which is the most robust under Prof. Van Immerseel.

From: Breakthrough Digest Medical News January 18, 2010

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Obesity Now Poses as Great a Threat to Quality of Life as Smoking

As the US population becomes increasingly obese while smoking rates continue to decline, obesity has become an equal, if not greater, contributor to the burden of disease and shortening of healthy life in comparison to smoking. In an article published in the February 2010 issue of the American Journal of

Preventive Medicine, researchers from Columbia University and The City College of New York calculate that the Quality-Adjusted Life Years (QALYs) lost due to obesity is now equal to, if not greater than, those lost due to smoking, both modifiable risk factors.

QALYs use preference-based measurements of Health-Related Quality of Life (HRQOL) which allow a person to state a relative preference for a given health outcome. Since one person may value a particular outcome differently than another person, these measures capture how each respondent views his or her own quality of life.

The 1993-2008 Behavioral Risk Factor Surveillance System (BRFSS), the largest ongoing state-based health survey of US adults, has conducted interviews of more than 3,500,000 individuals; annual interviews started with 102,263 in 1993 and culminated with 406,749 in 2008. This survey includes a set of questions that measures HRQOL, asking about recent poor health days and tracking overall physical and mental health of the population. The authors analyzed these data and converted the measures to QALYs lost due to smoking and obesity.

From 1993 to 2008, when the proportion of smokers among US adults declined 18.5%, smoking-related QALYs lost were relatively stable at 0.0438 QALYs lost per population. During the same period, the proportion of obese people increased 85% and this resulted in 0.0464 QALYs lost. Smoking had a bigger impact on deaths while obesity had a bigger impact on illness.

Investigators Haomiao Jia, PhD and Erica I. Lubetkin, MD, MPH, state, "Although life expectancy and QALE have increased over time, the increase in the contribution of mortality to QALYs lost from obesity may result in a decline in future life expectancy. Such data are essential in setting targets for reducing modifiable health risks and eliminating health disparities."

The article is "Trends in Quality-Adjusted Life-Years Lost Contributed by Smoking and Obesity" by Haomiao Jia, PhD, and Erica I. Lubetkin, MD, MPH. The article appears in the American Journal of Preventive Medicine, Volume 38, Issue 2 (February 2010) published by Elsevier.

Source: Nutrition Horizon: 5 Jan 2010

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Adding Micronutrients To Food Would Be Highly Cost-Effective Form Of Foreign Aid, New York Times Columnist Writes

"As the United States reorganizes its chaotic aid program, it might try promoting what just may be the world's most luscious food: micronutrients," New York Times columnist Nicholas Kristof writes. Micronutrients -- such as folic acid, iodine, zinc, iron and vitamin A -- are "lifesaving for children and for women who may become pregnant," and "there's scarcely a form of foreign aid more cost effective than getting them into the food supply," Kristof adds.

Deficiencies of micronutrients, particularly folic acid, in pregnant women can lead to neural tube defects and other deformities in their infants, Kristof writes. Iodine deficiency leads to "malformation of fetuses' brains, so they have 10 to 15 points permanently shaved off their I.Q.'s," he says, adding, "Then there's zinc, which reduces child deaths from diarrhea and infections." In addition, a lack of iron "causes widespread anemia," while "some 670,000 children die each year because they don't get enough vitamin A, and lack of the vitamin remains the world's leading cause of childhood blindness," according to

Kristof.

"The most cost-effective way to distribute micronutrients isn't to hand them out" because "impoverished women can be hard to reach, and even if they are given folic acid pills, they sometimes won't take them for fear that they actually are birth control pills," he continues. "So micronutrients instead are often added to such common foods as salt, sugar, flour or cooking oil," Kristof writes, adding that supplementing food with micronutrients costs "about 30 cents per person reached per year" (Kristof, New York Times, 1/3).

From: Medical News Today 06 Jan 2010

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Nepal Looks to Introduce Fortified Flour at Small Mills to Reduce Anemia

Nepal will enlist the help of small millers to boost the production of fortified cereal flour, which can help reduce anemia and other illnesses linked to vitamin and mineral deficiencies, particularly in poor, rural areas.

To support the government's goal, the Japan Fund for Poverty Reduction (JFPR) - financed by the Government of Japan and administered by the Asian Development Bank - is providing a grant of $1.8 million for producing fortified flour at small, village-based milling centers, known as Chakki mills. The project is targeting the addition of iron, folic acid and vitamin A to milled wheat, maize and millet, benefiting around 200,000 people.

Anemia, caused by a lack of essential nutrients, is a major public health issue in Nepal, resulting in many maternal and perinatal deaths and development problems in children. Fortified flour, used to combat anemia, is now produced in large, commercial milling enterprises but this is only a small proportion of the total consumed, and cost, technology and other barriers have hindered its introduction at smaller mills.

The government, along with the Canadian non-government organization, Micronutrient Initiative, is now testing low-cost fortification systems at water and electric-powered Chakki mills and the JFPR-funded project will help accelerate and expand this process.

'Fortified flour can reduce national rates of vitamin and mineral deficiencies within one year of implementation,' said Snimer Sahni, Principal Project Economist in ADB's South Asia Department. 'This project will define the conditions, capacities and resources needed for the sustainable expansion of small-mill flour fortification, benefiting the poor and vulnerable.'

The project will seek to find realistic solutions to the problems that currently prevent flour fortification at small mills, such as recurring costs, supply and support system difficulties, quality assurance issues, and a lack of consumer awareness. Among the innovations it will consider are community-based financing options, including possible channels for converting grain received as payment for use of the milling facilities, into hard cash.

Community participation is a key element of the project, with 65 village development committees to receive resources for the delivery and monitoring of the use of nutrients by millers, for collecting payments, for providing quality assurance monitors, and for raising community awareness. The target is to provide 360 small millers with the equipment and training to produce about 19,000 metric tons of fortified flour which will give nutrition protection for more than 200,000 people for two years.

Once the project outcomes have been assessed, they may be expanded to other parts of Nepal through ADB's country assistance program.

Along with JFPR, the government will provide $122,000, the private sector $14,725, and beneficiaries about $130,000, for a total project cost of $2.066 million. The Ministry of Health and Population is the executing agency for the project which will run from 2010 to 2012.

Soya Tech eNews January 2, 2010

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Reducing Salt Intake Could Mean Fewer Heart Attacks, Strokes and Deaths

Reducing salt in the American diet by as little as one-half teaspoon (or three grams) per day could prevent nearly 100,000 heart attacks and 92,000 deaths each year, according to a new study. Such benefits are on par with the benefits from reductions in smoking and could save the United States about $24 billion in healthcare costs, the researchers add.

A team from the University of California, San Francisco, Stanford University Medical Center and Columbia University Medical Center conducted the study. The findings appear January 20 in online publication by the New England Journal of Medicine and also will be reported in the February 18 print issue of the journal.

The team's results were derived from the Coronary Heart Disease Policy Model, a computer simulation of heart disease among U.S. adults that has been used by researchers to project benefits from public health interventions.

"A very modest decrease in the amount of salt, hardly detectable in the taste of food, can have dramatic health benefits for the U.S.," said Kirsten Bibbins-Domingo, PhD, MD, lead author of the study, UCSF associate professor of medicine and epidemiology and the co-director of the UCSF Center for Vulnerable Populations at San Francisco General Hospital.

"It was a surprise to see the magnitude of the impact on the population, given the small reductions in salt that we were modeling," Bibbins-Domingo added.

The CHD Policy Model found that reducing dietary salt by three grams per day (about 1200 mg of sodium) would result in 11 percent fewer cases of new heart disease, 13 percent fewer heart attacks, 8 percent fewer strokes, and 4 percent fewer deaths. For African Americans, who researchers believe are more likely to have high blood pressure and may be more sensitive to salt, this degree of salt reduction could reduce new cases of heart disease by 16 percent and heart attacks by 19 percent.

"Reducing dietary salt is one of those rare interventions that has a huge health benefit and actually saves large amounts of money. At a time when so much public debate has focused on the costs of health care for the sick, here is a simple remedy, already proven to be feasible in other countries," said Lee Goldman, MD, MPH, senior author, executive vice president for health and biomedical sciences and dean of the faculties of health sciences and medicine at Columbia University.

The American Heart Association reports that salt consumption among Americans has risen by 50 percent

and blood pressure has risen by nearly the same amount since the 1970s - despite evidence linking salt intake to high blood pressure and heart disease.

“In addition to its independent benefits on blood pressure, reducing salt intake can enhance the effects of most anti-hypertensive (blood pressure lowering) agents and reduce complications associated with diabetes, obesity and kidney disease,” said Glenn M. Chertow, MD, study co-author, professor of medicine and chief of the Division of Nephrology at Stanford University.

According to federal government data, the average American man consumes more than10 grams of salt (4000 mg sodium) daily. Most health organizations recommend far lower targets - no more than 5.8 grams of salt per day (2300 mg sodium) and less than 3.8 grams for those over 40. Each gram of salt contains 0.4 grams of sodium.

“It’s clear that we need to lower salt intake, but individuals find it hard to make substantial cuts because most salt comes from processed foods, not from the salt shaker,” Bibbins-Domingo said. “Our study suggests that the food industry and those who regulate it could contribute substantially to the health of the nation by achieving even small reductions in the amount of salt in these processed foods.”

The New York City Department of Public Health and other state and local municipalities nationally have seen salt as an important target for regulation. Mayor Michael Bloomberg has already made sweeping changes to the City’s health regulations, including cutting trans fats in eating places and requiring fast-food restaurant menus to list calories. Now the city is seeking to join a national movement in cutting salt intake by 25 percent, which he referenced in today’s State of the City address.

“Our projects suggest that these regulatory efforts could both improve health and save money because of the healthcare costs avoided,” said Bibbins-Domingo. “For every dollar spent in regulating salt, anywhere from seven to 76 healthcare dollars could be saved.”

From: Columbia University Medical Centre: Featured News & Events January 20, 2010

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Herbs & Spices Represent Most Potent Antioxidants

From: Nutraceuticals World Breaking News January 28, 2010

Common herbs and spices have the highest antioxidant content of all food groups, according to a recent study published in the January 2010 edition of the *Nutrition Journal*. The multinational authors of the study analyzed the oxidative content of more than 3000 different foods from around the world, including berries, beverages, cereals, chocolates, seafood, fruit, grains, legumes, meat, fish, nuts and seeds, vegetables and oils. Authors concluded, "Spices, herbs and supplements include the most antioxidant rich products in our study, some exceptionally high."

The analysis found that the culinary herbs and spices that have the greatest antioxidant content were clove, allspice, peppermint, cinnamon, oregano, thyme, sage and rosemary. Moreover, the average antioxidant activity of spices was 300% higher than that of berries, 2300% greater than that of other fruit, 3600% higher than that of vegetables and 600% more than that of nuts.

These result back up a similar study published in the July 2006 edition of the *American Journal of Clinical Nutrition*. In this earlier, smaller survey, culinary herbs and spices were also found to have the highest antioxidant content of all food types. The authors of the 2010 study go on to suggest that with respect to plant based antioxidant compounds, "We suggest that both their numerous individual functions as well as their combined additive or synergistic effects are crucial to their health beneficial effects."

Additionally, they stated: "It is hypothesized that antioxidants originating from foods may work as antioxidants in their own right as well as bring about beneficial health effects through other mechanisms, including acting as inducers of mechanisms related to antioxidant defense, longevity, cell maintenance and DNA repair." The conclusions that they draw suggest that a VARIETY of antioxidant-rich plant foods should be consumed and propose that such dietary diversity will boost the synergistic and additive effects of the beneficial, bioactive compounds in these foods.

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Research in Food Science & Nutrition

What You Eat After Exercise Matters

Many of the health benefits of aerobic exercise are due to the most recent exercise session (rather than weeks, months and even years of exercise training), and the nature of these benefits can be greatly affected by the food we eat afterwards, according to a study published in the Journal of Applied Physiology (http://jap.physiology.org).

"Differences in what you eat after exercise produce different effects on the body's metabolism," said the study's senior author, Jeffrey F. Horowitz of the University of Michigan. This study follows up on several previous studies that demonstrate that many health benefits of exercise are transient: one exercise session produces benefits to the body that taper off, generally within hours or a few days.

"Many of the improvements in metabolic health associated with exercise stem largely from the most recent session of exercise, rather than from an increase in 'fitness' per se," Dr. Horowitz said. "But exercise doesn't occur in a vacuum, and it is very important to look at both the effects of exercise and what you're eating after exercise."

Specifically, the study found that exercise enhanced insulin sensitivity, particularly when meals eaten after the exercise session contained relatively low carbohydrate content. Enhanced insulin sensitivity means that it is easier for the body to take up sugar from the blood stream into tissues like muscles, where it can be stored or used as fuel. Impaired insulin sensitivity (i.e., "insulin resistance") is a hallmark of Type II diabetes, as well as being a major risk factor for other chronic diseases, such as heart disease.

Interestingly, when the research subjects in this study ate relatively low-calorie meals after exercise, this did not improve insulin sensitivity any more than when they ate enough calories to match what they expended during exercise. This suggests that you don't have to starve yourself after exercise to still reap some of the important health benefits.

The paper, "Energy deficit after exercise augments lipid mobilization but does not contribute to the exercise-induced increase in insulin sensitivity," appears in the online edition of the journal. The authors are Sean A. Newsom, Simon Schenk, Kristin M. Thomas, Matthew P. Harber, Nicolas D. Knuth, Haila Goldenberg and Dr. Horowitz. All are at the University of Michigan. The American Physiological Society (APS: www.the-aps.org) published the research.

Study Design

The study included nine healthy sedentary men, all around 28-30 years old. They spent four separate sessions in the Michigan Clinical Research Unit in the University of Michigan Hospital. Each session lasted for approximately 29 hours. They fasted overnight before attending each session, which began in the morning.

The four hospital visits differed primarily by the meals eaten after exercise. The following describes the four different visits:

1. They did not exercise and ate meals to match their daily calorie expenditure. This was the control trial.

2. They exercised for approximately 90 min at moderate intensity, and then ate meals that matched their

caloric expenditure. The carbohydrate, fat, and protein content of these meals were also appropriately balanced to match their expenditure.

3. They exercised for approximately 90 min at moderate intensity and then ate meals with relatively low carbohydrate content, but they ate enough total calories to match their calorie expenditure. This reduced-carbohydrate meal contained about 200 grams of carbohydrate, less than half the carbohydrate content of the balanced meal.

4. They exercised for approximately 90 min at moderate intensity and then ate relatively low-calorie meals, that is, meals that provided less energy than was expended (about one-third fewer calories than the meals in the other two exercise trials). These meals contained a relatively high carbohydrate content to replace the carbohydrate "burned" during exercise.

The exercise was performed on a stationary bicycle and a treadmill. The order in which the participants did the trials was randomized.

In the three exercise trials, there was a trend for an increase in insulin sensitivity. However, when participants ate less carbohydrate after exercise, this enhanced insulin sensitivity significantly more. Although weight loss is important for improving metabolic health in overweight and obese people, these results suggests that people can still reap some important health benefits from exercise without undereating or losing weight, Dr. Horowitz said.

The study also reinforces the growing body of evidence that each exercise session can affect the body's physiology and also that differences in what you eat after exercise can produce different physiological changes.

Next Steps

The research team is now performing experiments with obese people, aimed at better identifying the minimum amount of exercise that will still improve insulin sensitivity at least into the next day.

From: The American Physiological Society Press Release January 28, 2010

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Ginkgo Herbal Medicines May Increase Seizures in People with Epilepsy

Restrictions should be placed on the use of Ginkgo biloba (G. biloba) — a top-selling herbal remedy — because of growing scientific evidence that Ginkgo may increase the risk of seizures in people with epilepsy and could reduce the effectiveness of anti-seizure drugs, a new report concludes. The article appears in ACS' monthly Journal of Natural Products. It also suggests that Ginkgo may have harmful effects in other people after eating raw or roasted Ginkgo seed or drinking tea prepared from Ginkgo leaves.

Eckhard Leistner and Christel Drewke note that consumers use pills, teas, and other products prepared from leaves of the Ginkgo tree to treat a wide array of health problems. Those include Alzheimer's disease and other memory loss, clinical depression, headache, irritable bladder, alcohol abuse, blockages in blood vessels, poor concentration, and dizziness. Scientific concern focuses mainly on one chemical compound in the herb. It is a potentially toxic material known as ginkgotoxin.

They reviewed scientific research on Ginkgo, and found 10 reports indicating that patients with epilepsy who take Ginkgo products face an increased risk of seizures. They note that laboratory studies explain how Ginkgo could have that unwanted effect. Ginkgotoxin seems to alter a chemical signaling pathway in ways that may trigger epileptic seizures. Further evidence showed that Ginkgo can interact with anti-seizure medications and reduce their effectiveness. "Contrary to our own previous assumption, we are now convinced, however, that G. biloba medications and other products can have a detrimental effect on a person's health condition," the report concludes. "It is therefore important that the large number of G. biloba product users and their health care providers be made aware of these risks, in order to enable them to make informed decisions about the use of these preparations."

From: American Chemical Society Press Release January 27, 2010

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K-State Study that Antioxidants aren't Always Beneficial to Your Health and Can Sometimes Impair Muscle Function

Antioxidants increasingly have been praised for their benefits against disease and aging, but recent studies at Kansas State University show that they also can cause harm. Researchers in K-State's Cardiorespiratory Exercise Laboratory have been studying how to improve oxygen delivery to the skeletal muscle during physical activity by using antioxidants, which are nutrients in foods that can prevent or slow the oxidative damage to the body. Their findings show that sometimes antioxidants can impair muscle function.

"Antioxidant is one of those buzz words right now" said Steven Copp, a doctoral student in anatomy and physiology from Manhattan and a researcher in the lab. "Walking around grocery stores you see things advertised that are loaded with antioxidants. I think what a lot of people don't realize is that the antioxidant and pro-oxidant balance is really delicate. One of the things we've seen in our research is that you can't just give a larger dose of antioxidants and presume that there will be some sort of beneficial effect. In fact, you can actually make a problem worse"

David C. Poole and Timothy I. Musch, K-State professors from both the departments of kinesiology and anatomy and physiology, direct the Cardiorespiratory Exercise Laboratory, located in the College of Veterinary Medicine complex. Researchers in the lab study the physiology of physical activity in health and disease through animal models. Copp and Daniel Hirai, an anatomy and physiology doctoral student from Manhattan working in the lab, have conducted various studies associated with how muscles control blood flow and the effects of different doses and types of antioxidants.

Abnormalities in the circulatory system, such as those that result from aging or a disease like chronic heart failure, can impair oxygen delivery to the skeletal muscle and increase fatigability during physical activity, Copp said. The researchers are studying the effects antioxidants could have in the process.

"If you have a person trying to recover from a heart attack and you put them in cardiac rehab, when they walk on a treadmill they might say it's difficult" Poole said. "Their muscles get sore and stiff. We try to understand why the blood cells aren't flowing properly and why they can't get oxygen to the muscles, as happens in healthy individuals"

Copp said there is a potential for antioxidants to reverse or partially reverse some of those changes that result from aging or disease. However, K-State's studies have shown that some of the oxidants in our

body, such as hydrogen peroxide, are helpful to increase blood flow. "We're now learning that if antioxidant therapy takes away hydrogen peroxide – or other naturally occurring vasodilators, which are compounds that help open blood vessels – you impair the body's ability to deliver oxygen to the muscle so that it doesn't work properly" Poole said.

Poole said antioxidants are largely thought to produce better health, but their studies have shown that antioxidants can actually suppress key signaling mechanisms that are necessary for muscle to function effectively. "It's really a cautionary note that before we start recommending people get more antioxidants, we need to understand more about how they function in physiological systems and circumstances like exercise" Poole said.

Hirai said the researchers will continue to explore antioxidants and the effects of exercise training. Their studies are looking at how these can help individuals combat the decreased mobility and muscle function that comes with advancing age and diseases like heart failure.

"The research we do here is very mechanistic in nature, and down the road our aim is to take our findings and make recommendations for diseased and aging populations" Copp said.

Source: Nutrition Horizon: 27 Jan 2010

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Childhood Obesity Alone May Increase Risk of Later Cardiovascular Disease

By as early as 7 years of age, being obese may raise a child's risk of future heart disease and stroke, even in the absence of other cardiovascular risk factors such as high blood pressure, according to a new study accepted for publication in The Endocrine Society's Journal of Clinical Endocrinology & Metabolism (JCEM).

"This new study demonstrates that the unhealthy consequences of excess body fat start very early," said Nelly Mauras, MD, of Nemours Children's Clinic in Jacksonville, Florida and senior author of the study. "Our study shows that obesity alone is linked to certain abnormalities in the blood that can predispose individuals to developing cardiovascular disease early in adulthood.

These findings suggest that we need more aggressive interventions for weight control in obese children, even those who do not have the co-morbidities of the metabolic syndrome."

The metabolic syndrome is a cluster of risk factors that raise the risk of developing heart disease, stroke and diabetes. It is being increasingly diagnosed in children as being overweight becomes a greater problem. Although debate exists as to its exact definition, to receive a diagnosis of metabolic syndrome, one must have at least three of the following characteristics: increased waist circumference (abdominal fat), low HDL ("good") cholesterol, high triglycerides (fats in the blood), high blood pressure and high blood glucose (blood sugar).

Mauras and her colleagues wanted to know if obesity could raise cardiovascular disease risk prior to the onset of the metabolic syndrome. Researchers therefore screened more than 300 individuals ages 7 to 18 years and included only those without features of the metabolic syndrome. They included 202 participants in the study: 115 obese children and 87 lean children as controls. Half of the children were prepubertal and the other half were in late puberty. Obese children had a body mass index (a measure of body fat)

above the 95th percentile for their sex, age and height.

To be eligible to participate in the study, the children and adolescents had to have normal fasting blood sugar levels, normal blood pressure and normal cholesterol and triglycerides. Lean controls also could not have a close relative with type 2 diabetes, high cholesterol, high blood pressure or obesity. The latter group proved very difficult to find.

All study participants underwent blood testing for known markers for predicting the development of cardiovascular disease. These included elevated levels of C-reactive protein (CRP), a marker of inflammation, and abnormally high fibrinogen, a clotting factor, among others. Obese children had a 10 fold higher CRP and significantly higher fibrinogen concentrations, compared with age- and sex-matched lean children, the authors reported. These abnormalities occurred in obese children as young as age 7, long before the onset of puberty.

The results were striking Mauras stated, as the children were entirely healthy otherwise. Although it is not yet known whether early therapeutic interventions can reverse high CRP and fibrinogen, she said it would be prudent for health care providers to advise more aggressive interventions to limit calories and increase activity in "healthy" overweight children, even before the onset of puberty.

"Doctors often do not treat obesity in children now unless they have other features of the metabolic syndrome," Mauras said. "This practice should be reconsidered. Further studies are needed to offer more insight into the effects of therapeutic interventions in these children.

From: Medical News Today January 27, 2010

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New Insights into Allergy-Related Disorders in Children

Allergies and asthma are a continuing health problem in most developed countries, but just how do these ailments develop over the course of a childhood? In a population-based study designed to help answer this question, researchers at the Norwegian University of Science and Technology (NTNU) found that 40 per cent – or two of five -- of nearly 5,000 two-year-olds had at least one reported allergy-related disorder. The most common symptom was wheezing, which was reported in 26 per cent of all children in the study, says Ingeborg Smidesang, a PhD candidate in the university's Faculty of Medicine, and the primary author of the study.

Researchers are careful to point out that there is no guarantee that children who wheeze at two years old will grow up with asthma. "One of the challenges here is that we don't know which wheezers will develop asthma", Smidesang says.

The findings are among the first to illustrate the scope of allergy-related problems in such a young group of children, and the challenges that these problems pose for both families and for public health systems overall. "If you think about something like moderate atopic eczema, which can involve quite a few doctor's visits, and a lot of work on the part of parents, it is quite a big deal", she says. "This can be quite a burden."

The study has been published in an online version of Pediatric Allergy and Immunology, a peer-reviewed academic journal. Among the findings reported is that fully 21 per cent of the 5000 children in the study,

or about 1000 children, had been tested for allergies. Roughly 60 per cent of these 1000 children were reported by their parents to have had a positive allergy test. However, when researchers randomly selected 390 children for allergy testing, only eight per cent had a positive test. The allergy-related disorders that were studied were eczema, asthma, asthma-like symptoms and hay fever. Researchers found that boys were more likely than girls to have an allergy-related disorder, Smidesang said.

Allergy-related disorders vary widely within countries and between countries. For example, children in northern Norway are more likely than children in southern Norway to have atopic dermatitis, Smidesang said, probably because the winters are longer in the north than in the south. Another comparison between Sweden and the UK in 2002-2003 showed that asthma symptoms in children were roughly 10 per cent in Sweden compared to 21 per cent in the UK. Researchers can make conjectures about what causes these variations, but the bottom line is that medical researchers really don't understand what causes children to develop allergies and what can be done to prevent them.

Smidesang's study is a part of a larger effort called PACT (Prevention of Allergy among Children in Trondheim), which began in 2000 to try to better understand how allergy-related symptoms develop in children and to investigate the effectiveness of risk-factor intervention, including increasing omega-3 fatty acid intake, reducing parental smoking and indoor dampness. A control group of 14 000 children, from which the current study is drawn, was established to track fluctuations in risk factor levels and to provide comparison data. A second group of roughly 3000 children was recruited for a proactive intervention effort. The programme started during pregnancy and continued until the children reached the age of 2. The 390 children who were randomly selected for skin prick allergy testing will be followed up when they are 6 years old.

From: Alpha Galileo 25 January 2010.

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Low-Carb Diet Effective at Lowering Blood Pressure

In a head-to-head comparison, two popular weight loss methods proved equally effective at helping participants lose significant amounts of weight. But, in a surprising twist, a low-carbohydrate diet proved better at lowering blood pressure than the weight-loss drug orlistat, according to researchers at Veterans Affairs Medical Center and Duke University Medical Center.

The findings send an important message to hypertensive people trying to lose weight, says William S. Yancy, Jr., MD, lead author of the study in the Jan. 25 Archives of Internal Medicine, and an associate professor of medicine at Duke. "If people have high blood pressure and a weight problem, a low-carbohydrate diet might be a better option than a weight loss medication." Yancy added, "It's important to know you can try a diet instead of medication and get the same weight loss results with fewer costs and potentially fewer side effects."

Studies had already indicated that a low-carbohydrate diet and prescription-strength orlistat combined with a low-fat diet are effective weight loss therapies. But the two common strategies had not been compared to each other, an important omission now that orlistat is available over-the-counter. In addition, few studies provide data on these treatments for overweight patients with chronic health issues.

That's what made these findings particularly interesting, says Yancy, a staff physician at the Durham VA where the research was conducted. The 146 overweight participants in the year-long study had a range of

health problems typically associated with obesity -- diabetes, high blood pressure, high cholesterol and arthritis. "Most participants in weight loss studies are healthy and don't have these problems," he said. "In fact they are often excluded if they do."

The average weight loss for both groups was nearly 10 percent of their body weight. "Not many studies are able to achieve that," says Yancy, who attributes the significant weight loss to the group counseling that was offered for 48 weeks. In fact, he says "people tolerated orlistat better than I expected. Orlistat use is often limited by gastro-intestinal side effects, but these can be avoided, or at least lessened, by following a low-fat diet closely. We counseled people on orlistat in our study fairly extensively about the low-fat diet."

In addition to achieving equal success at weight loss, the methods proved equally effective at improving cholesterol and glucose levels. But Yancy said it was the difference in blood pressure results that was most surprising.

Nearly half (47%) of patients in the low-carbohydrate group had their blood pressure medication decreased or discontinued while only 21 percent of the orlistat plus low-fat diet group experienced a reduction in medication use. Systolic blood pressure dropped considerably in the low-carbohydrate group when compared to the orlistat plus low-fat diet group.

"I expected the weight loss to be considerable with both therapies but we were surprised to see blood pressure improve so much more with the low-carbohydrate diet than with orlistat," says Yancy, who says the mechanism is unclear. "While weight loss typically induces improvements in blood pressure, it may be that the low-carbohydrate diet has an additional effect." That physiologic effect may be the subject of future studies.

The bottom line, says Yancy, is that many diet options are proving effective at weight loss. But it's counseling patients on how to best follow the options that appears to be making the biggest impact. "It is clear now that several diet options can work, so people can be given a choice of different ways to lose weight. But more importantly, we need to find new ways to help people maintain their new lifestyle."

Source: Nutrition Horizon: 26 Jan 2010

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Milk Has no Influence on Bioavailability of Antioxidants – Study

There is a lot of scientific interest in the antioxidants in coffee, and their potential benefits on human health. However, the bioavailability of coffee antioxidants, the extent to which they are available to the body, in the presence of milk, or sugar and nondairy creamer has not been studied until now. Scientists from the Nestlé Research Centre in Switzerland have just published a new study showing that these antioxidants are as bioavailable in coffee with or without milk.

The lead author, Dr Mathieu Renouf said, "Up until now there has been very little known about how proteins, especially from milk, influence the bioavailability and efficacy of coffee antioxidants. Our study is the first to show that coffee antioxidants are just as bioavailable in coffee with milk, as they are in black coffee." The authors also found that the overall bioavailability of coffee antioxidants is not influenced by the addition of milk or of nondairy creamer and sugar.

Chlorogenic acids (CGA) are antioxidants found in coffee. They are becoming of interest for their health-promoting effects, but bioavailability in humans is not well understood. The researchers hypothesized that adding whole milk or sugar and nondairy creamer to instant coffee might modulate the bioavailability of coffee phenolics.

Nine healthy participants were asked to randomly drink, in a crossover design, instant coffee (Coffee); instant coffee and 10% whole milk (Milk); or instant coffee, sugar, and nondairy creamer already premixed (Sugar/NDC). All 3 treatments provided the same amount of total CGA (332 mg). Blood was collected for 12 h after ingestion and plasma samples treated using a liquid-liquid extraction method that included a full enzymatic cleavage to hydrolyze all CGA and conjugates into phenolic acid equivalents. Hence, the researchers focused liquid chromatography-Electrospray ionization-tandem MS detection and quantification on caffeic acid (CA), ferulic acid (FA), and isoferulic acid (iFA) equivalents.

Compared with a regular black instant coffee, the addition of milk did not significantly alter the area under the curve (AUC), maximum plasma concentration (Cmax), or the time needed to reach Cmax (Tmax). The Cmax of CA and iFA were significantly lower and the Tmax of FA and iFA significantly longer for the Sugar/NDC group than for the Coffee group. However, the AUC did not significantly differ. As a conclusion, adding whole milk did not alter the overall bioavailability of coffee phenolic acids, whereas sugar and nondairy creamer affected the Tmax and Cmax but not the appearance of coffee phenolics in plasma.

Source: Nutrition Horizon: 22 Jan 2010

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High Vitamin D Levels Linked to Lower Risk of Colon Cancer

High blood levels of vitamin D are associated with a lower risk of colon cancer, finds a large European study published on bmj.com. The risk was cut by as much as 40% in people with the highest levels compared with those in the lowest. Several previous studies have already suggested a link between vitamin D and colorectal cancer, but the evidence has been inconclusive with limited information from European populations. So, researchers from across Europe set out to examine the association between circulating vitamin D concentration as well as dietary intakes of vitamin D and calcium with colorectal cancer risk in Western European populations. Colorectal cancer is the combination of colon and rectal cancer cases.

Their findings are based on the European Prospective Investigation into Cancer Study (EPIC), a study of over 520,000 subjects from 10 Western European countries. Between 1992 and 1998, participants completed detailed dietary and lifestyle questionnaires and blood samples were collected. The subjects were then tracked for several years, during which time 1,248 cases of colorectal cancer were diagnosed and these were matched to 1,248 healthy controls.

Participants with the highest levels of blood vitamin D concentration had a nearly 40% decrease in colorectal cancer risk when compared to those with the lowest levels. However, some recent publications have suggested maintenance of blood vitamin D levels at 50 nmol/l or higher for colorectal cancer prevention. Thus, the authors also compared low and high levels of blood vitamin D concentration to a mid-level of 50-75 nmol/l. This comparison showed that while levels below the mid-level were associated with increased risk, those above 75 nmol/l were not associated with any additional reduction in colon cancer risk compared to the mid-level.

Although the results support a role for vitamin D in the etiology of colorectal cancer, the authors caution that very little is known about the association of vitamin D with other cancers and that the long term health effects of very high circulating vitamin D concentrations, potentially obtained by taking supplements and/or widespread fortification of some food products, have not been well studied.

With respect to colorectal cancer protection, it is still unclear whether inducing higher blood vitamin D concentration by supplementation is better than average levels that can be achieved with a balanced diet combined with regular and moderate exposure to outdoor sunlight, they say.

The findings of previous randomised trials have been inconsistent. As such, new trials should be carried out to evaluate whether increases in circulating vitamin D concentration can effectively reduce colorectal cancer risk without inducing serious adverse events, they conclude. Currently, the best recommendation to reduce ones risk of colorectal cancer is to stop smoking, increase physical activity, reduce obesity and abdominal fatness, and limit intakes of alcohol and red and processed meats.

From: Eurekalert 21 January 2010.

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Food Scientists Find Mango Effective in Preventing, Stopping Certain Colon, Breast Cancer Cells

Mango fruit been found to prevent or stop certain colon and breast cancer cells in the lab. That's according to a new study by Texas AgriLife Research food scientists, who examined the five varieties most common in the U.S.: Kent, Francine, Ataulfo, Tommy/Atkins and Haden. Though the mango is an ancient fruit heavily consumed in many parts of the world, little has been known about its health aspects. The National Mango Board commissioned a variety of studies with several U.S. researchers to help determine its nutritional value.

"If you look at what people currently perceive as a superfood, people think of high antioxidant capacity, and mango is not quite there," said Dr. Susanne Talcott, who with her husband, Dr. Steve Talcott, conducted the study on cancer cells. "In comparison with antioxidants in blueberry, acai and pomegranate, it's not even close." But the team checked mango against cancer cells anyway, and found it prevented or stopped cancer growth in certain breast and colon cell lines, Susanne Talcott noted.

"It has about four to five times less antioxidant capacity than an average wine grape, and it still holds up fairly well in anticancer activity. If you look at it from the physiological and nutritional standpoint, taking everything together, it would be a high-ranking super food," she said. "It would be good to include mangoes as part of the regular diet."

The Talcotts tested mango polyphenol extracts in vitro on colon, breast, lung, leukemia and prostate cancers. Polyphenols are natural substances in plants and are associated with a variety of compounds known to promote good health. Mango showed some impact on lung, leukemia and prostate cancers but was most effective on the most common breast and colon cancers.

"What we found is that not all cell lines are sensitive to the same extent to an anticancer agent," she said. "But the breast and colon cancer lines underwent apotosis, or programmed cell death. Additionally, we found that when we tested normal colon cells side by side with the colon cancer cells, that the mango polyphenolics did not harm the normal cells." The duo did further tests on the colon cancer lines because a

mango contains both small molecules that are readily absorbed and larger molecules that would not be absorbed and thus remain present in a colon.

"We found the normal cells weren't killed, so mango is not expected to be damaging in the body," she said. "That is a general observation for any natural agent, that they target cancer cells and leave the healthy cells alone, in reasonable concentrations at least." The Talcotts evaluated polyphenolics, and more specifically gallotannins as being the class of bioactive compounds (responsible for preventing or stopping cancer cells). Tannins are polyphenols that are often bitter or drying and found in such common foods as grape seed, wine and tea.

The study found that the cell cycle, which is the division cells go through, was interrupted. This is crucial information, Suzanne Talcott said, because it indicates a possible mechanism for how the cancer cells are prevented or stopped. "For cells that may be on the verge of mutating or being damaged, mango polyphenolics prevent this kind of damage," she said.

The Talcotts hope to do a small clinical trial with individuals who have increased inflamation in their intestines with a higher risk for cancer. "From there, if there is any proven efficacy, then we would do a larger trial to see if there is any clinical relevance," she said. According to the National Mango Board, based in Winter Park, Fla., most mangoes consumed in the U.S. are produced in Mexico, Ecuador, Peru, Brazil, Guatemala and Haiti. Mangoes are native to southeast Asia and India and are produced in tropical climates. They were introduced to the U.S. in the late 1800s, and a few commercial acres still exist in California and Florida.

From: Physorg.Com January 11, 2010.

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Herbal Science Organization Clarifies New Ginkgo Study

New research findings published this week on a standardized Ginkgo biloba extract are very limited and the public should focus on the well-documented cognitive and cardiovascular benefits of ginkgo, said the American Botanical Council (ABC), an independent nonprofit research and education organization.

A new study of previously published data being published in this week’s issue of the Journal of the American Medical Association (JAMA) has reported that a leading ginkgo extract did not reduce the decline in cognitive impairment in older adults.

“There are many significant limitations of this study”, said Mark Blumenthal, ABC founder and executive director.

First, the data being published this week are drawn from a previous clinical trial which was not designed to determine the decline in cognition.3 Second, about 40% of the subjects dropped out over the 6-year duration of the trial; the statistics reported in the study include the dropouts for which no final data are available. Further, the subjects in the study were not monitored for certain cognitive parameters until several years after the trial began, creating difficulty in determining accurately whether they experienced a decline in cognition or not. Also, the age of the subjects is quite advanced, at an average of 79 years at the beginning of the trial. This age group is not typical of the age of both healthy people and those with mild cognitive impairment who use ginkgo for improving mental performance.

Further, ABC noted that another weakness of this trial is the lack of an active control, i.e., a potential third arm of the trial (i.e., besides the patients on ginkgo or placebo) in which patients would have used a pharmaceutical medication with presumed efficacy, to determine to what extent the particular population being tested would respond. This was not possible for this trial since no conventional pharmaceutical drug has ever demonstrated the ability to prevent the onset of dementia or diminish its progression.

ABC also stated that several recent publications have demonstrated an improvement in cognitive performance in subjects using the same German gingko extract.

The new publication, by Beth E. Snits, Ph.D., a neuropsychologist associated with the University of Pittsburgh, and other colleagues, analyzed outcomes from the Ginkgo Evaluation of Memory study (GEM, published in 2008 in JAMA) to determine if ginkgo extract slowed cognitive decline in older adults who had either normal cognition or mild cognitive impairment at the beginning of the study.

The GEM study previously found that ginkgo extract was not effective in reducing the incidence of Alzheimer dementia or dementia overall. This large, randomized, double-blind, placebo-controlled, multi-centered clinical trial included 3,069 community-dwelling subjects (aged 72 to 96 years) who received either a dose of 120 mg of ginkgo extract twice daily or an identical-appearing placebo. The trial was conducted at 6 academic medical centers in the United States between 2000 and 2008, with a median follow-up of 6.1 years. Change in cognitive function was evaluated by various tests and measures.

ABC emphasized that the original GEM trial was designed to determine whether taking ginkgo would prevent the onset of dementia. What this new publication has done is attempted to analyze the possible decline in levels of cognitive function – not a primary outcome measure of the GEM study.

“This trial is not conclusive nor should it in any way detract from ginkgo’s reputation as a useful dietary supplement to help support and improve cognitive function and enhance peripheral circulation – conditions for which it has been reported to be effective in numerous clinical trials,” reminded Blumenthal.

At least 16 controlled clinical trials have evaluated various ginkgo extracts for healthy, non-cognitively impaired adults. A systematic review has shown that in 11 of these trials, the ginkgo increased short-term memory, concentration and time to process mental tasks.

“The results of this new trial must be viewed in proper perspective,” noted Blumenthal. “There is a vast body of pharmacological and clinical research supporting numerous health benefits for ginkgo extracts, particularly for improving various symptoms and conditions associated with declining cognitive performance and poor circulation.”

ABC also emphasized that this publication, and the one published in 2008 on which it is based, both underscore the relative safety of ginkgo extract: the amount of adverse events were basically the same in both the ginkgo and placebo groups, particularly no serious adverse effects, e.g. no statistically significant incidence of coronary heart disease, stroke of any type, and major bleeding.

From: American Botanical Council: Press Release December 29, 2010.

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Obesity Ups Cancer Risk, and Here's How

Obesity comes with plenty of health risks, but there's one that's perhaps not so well known: an increased risk of developing cancer, and especially certain types of cancer like liver cancer. Now, a group of researchers reporting in the January 22nd issue of the journal Cell, a Cell Press publication, have confirmed in mice that obesity does indeed act as a "bona fide tumor promoter." They also have good evidence to explain how that happens.

"Doctors always worry about our weight, but the focus is often on cardiovascular disease and type 2 diabetes, both of which can be managed pretty well with existing drugs," said Michael Karin of the University of California, San Diego. "However, we should also worry about elevated cancer risk. If we can reduce cancer deaths by as many as 90,000 per year, that's a lot of people -- a lot of lives."

Karin's team shows that liver cancer is fostered by the chronic inflammatory state that goes with obesity, and two well known inflammatory factors in particular. The findings suggest that anti-inflammatory drugs that have already been taken by millions of people for diseases including rheumatoid arthritis and Crohn's disease may also reduce the risk of cancer in those at high risk due to obesity and perhaps other factors as well, Karin said.

The epidemiological studies reported earlier showed that obese people have about a 1.5-fold increase in their risk of cancer overall. That may not necessarily sound like a lot, Karin said, but it equates to about 90,000 extra cancer deaths per year in the United States alone. When it comes to liver cancer, the study showed obese people have a 4.5-fold greater risk.

Given the apparent connection between obesity and liver cancer in particular, Karin's team decided to investigate in mice prone to develop hepatocellular carcinoma (HCC). The mice are typically given HCC either by exposure to a chemical carcinogen, known as DEN, when they are two weeks old, or by exposure to that same carcinogen at three months of age followed by the tumor-promoting chemical phenobarbitol.

In the new study, the researchers gave two-week-old mice DEN and then divided them into two groups -- one fed a normal, relatively low-fat food and the other fed on high-fat chow. "It was clear that the mice on the high fat diet developed more liver cancer," Karin said.

To further confirm the link, they gave DEN to two-week-old mice that were fed a normal diet but carried a gene that made them obesity-prone. Those mice, too, developed more liver cancers, evidence that it wasn't the high-fat diet that led to cancer, but rather something about the animals obese state.

But Karin said perhaps the biggest surprise came in studies of mice on a high-fat diet who were given DEN a little later in life, when they were three-months-old. Normally, mice on the standard diet given the chemical at that age really don't develop liver cancer unless DEN exposure is followed up with phenobarbitol, Karin explained. But the obese mice developed the disease without that extra push.

"We expected to see more cancer in our first experiments, but I was stunned to see here that only the mice who were obese developed the cancer," Karin said. "Obesity appears to be as strong as phenobarbitol; we can conclude, at least in mice, that obesity is a real tumor promoter."

His team was able to trace the source of obesity's tumor-promoting effect to a rise in two inflammatory factors known as IL-6 and TNF. Obese mice lacking either the TNF receptor or IL-6 don't show the same rise in liver cancer.

Those treatments also led the mice to accumulate less fat in their livers, he said. "They still get fat, but the distribution of the fat is different," he said. "The fat goes to other places, but not to the liver."

Karin suggests that clinical studies of people who are already taking anti-TNF drugs should be done, to find out if their livers are less fatty and cancer-free.

From: Science Daily (Jan. 25, 2010)

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The "Chocolate Cure" For Emotional Stress

There may well be another important reason for giving your sweetheart sweets for Valentine's Day besides the traditional romantic one: The "chocolate cure" for emotional stress is now getting new support from a clinical trial published online in ACS' Journal of Proteome Research. It found that eating about an ounce and a half of dark chocolate a day for two weeks reduced levels of stress hormones in the bodies of people feeling highly stressed. Everyone's favorite treat also partially corrected other stress-related biochemical imbalances.

Sunil Kochhar and colleagues note growing scientific evidence that antioxidants and other beneficial substances in dark chocolate may reduce risk factors for heart disease and other physical conditions. Studies also suggest that chocolate may ease emotional stress. Until now, however, there was little evidence from research in humans on exactly how chocolate might have those stress-busting effects.

In the study, scientists identified reductions in stress hormones and other stress-related biochemical changes in volunteers who rated themselves as highly stressed and ate dark chocolate for two weeks. "The study provides strong evidence that a daily consumption of 40 grams [1.4 ounces] during a period of 2 weeks is sufficient to modify the metabolism of healthy human volunteers," the scientists say.

Source: Medical News Today 23 Jan 2010
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Eating Your Greens Could Save Your Life

The age old reminder to always eat your greens isn't just for kids anymore. Not only are the vitamins and minerals good for you, but eating greens could also save your life, according to a recent study invoving scientists from Lawrence Livermore National Laboratory (LLNL).

LLNL researchers Graham Bench and Ken Turteltaub found that giving someone a small dose of chlorophyll (Chla) or chlorophyllin (CHL) - found in green leafy vegetables such as spinach, broccoli and kale - could reverse the effects of aflatoxin poisoning. Aflatoxin is a potent, naturally occurring carcinogenic mycotoxin that is associated with the growth of two types of mold: Aspergillus flavus and Aspergillus parasiticus. Food and food crops most prone to aflatoxin contamination include corn and corn products, cottonseed, peanuts and peanut products, tree nuts and milk.

Bench and Turteltaub, working with colleagues from Oregon State University and an industry partner, Cephalon Inc., found that greens have chemopreventive potential.

Aflatoxins can invade the food supply at anytime during production, processing, transport and storage. Evidence of acute aflatoxicosis in humans has been reported primarily in developing countries lacking the resources to effectively screen aflatoxin contamination from the food supply. Because aflatoxins, particularly aflatoxin B1 (AFB1), are potent carcinogens in some animals, there is interest in the effects of long-term exposure to low levels of these important mycotoxins on humans.

The study used AMS to provide aflatoxin pharmacokinetic parameters previously unavailable for humans, and suggest that chlorophyll and chlorophyllin co-consumption may limit the bioavailability of ingested aflatoxin in humans, as they do in animal models, according to Bench. Exposure to environmental carcinogens has been estimated to contribute to a majority of human cancers, especially through lifestyle factors related to tobacco use and diet. Notable examples are the tobacco-related carcinogens; heterocyclic amines produced from sustained, high-temperature cooking of meats; and the fungal food contaminants aflatoxins.

The team initially gave each of three volunteers a small dose of carbon 14 labeled aflatoxin (less than the amount that would be found in a peanut butter sandwich.) In subsequent experiments the patients were given a small amount of Chla or CHL concomitantly with the same dose of carbon 14 labeled aflatoxin.

By using LLNL's Center for Accelerator Mass Spectrometry, the team was able to measure the amount of aflatoxin in each volunteer after each dosing regimen and determine whether the Chla or CHL reduced the amount of aflatoxin absorbed into the volunteers. "The Chla and CHL treatment each significantly reduced aflatoxin absorption and bioavailability," Bench said.

"What makes this study unique among prevention trials is, that we were able to administer a microdose of radio-labeled aflatoxin to assess the actions of the carcinogen directly in people. There was no extrapolation from animal models which often are wrong," Turteltaub said.

From: Medical News Today 26 Jan 2010
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Omega 3s May Affect Aging Process

In a recent study, researchers investigated the ability of omega 3 fatty acids to prolong the survival of coronary heart disease patients. To test their theory they looked at omega-3 fatty acid blood levels and compared them with temporal changes in telomere length, an emerging marker of biological age. Scientists believe as telomeres shorten over time that the eventual result is cell death.

According to lead author Ramin Farzaneh-Far, MD, an assistant professor of medicine at the University of California San Francisco, who was quoted in an article on *WebMD*, this new study shows an entirely new effect of omega-3 fatty acids to slow down the biological aging process in patients with coronary heart disease,

The prospective cohort study, which was published in *JAMA*, examined 608 ambulatory outpatients in California with stable coronary artery disease who were recruited from the Heart and Soul Study between September 2000 and December 2002 and followed up to January 2009.

Researchers measured leukocyte telomere length at baseline and again after five years of follow-up. What

they found was that individuals in the lowest quartile of DHA+EPA experienced the fastest rate of telomere shortening, whereas those in the highest quartile experienced the slowest rate of telomere shortening.

Among this cohort of patients with coronary artery disease, researchers found an inverse relationship between baseline blood levels of marine omega-3 fatty acids and the rate of telomere shortening over five years.

From: Report by Becky Wright in Nutraceucals World Breaking News January 20, 2010

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Regulatory News

Calorie Information From Restaurants, Packaged Foods Examined By Study

As a growing number of fast food and chain restaurants display the calorie content of their dishes on websites and menus, a study suggests some of this information may be unreliable.

Researchers at Tufts University analyzed the calorie content of 18 side dishes and entrees from national sit-down chain restaurants, 11 side dishes and entrees from national fast food restaurants and 10 frozen meals purchased from supermarkets. They compared their results to the calorie content information provided to the public by the restaurants and food companies. "Because we analyzed a relatively small sample of food, additional research testing more foods will be needed to see if this is a nation-wide problem," says senior author Susan B. Roberts, PhD, a professor at the Friedman School of Nutrition Science and Policy at Tufts University.

On average, the calorie content information provided by the restaurants was 18 percent less than the researcher's calorie content analysis. Two side dishes exceeded the restaurant's reported calorie information by nearly 200 percent. The calorie content information reported by packaged food companies averaged 8 percent less than the researchers' analysis. "If people use published calorie contents for weight control, discrepancies of this magnitude could result in weight gain of many pounds a year," Roberts says.

Writing in the January issue of the Journal of the American Dietetic Association, the authors attribute the smaller 8 percent discrepancy between their results and the calorie content information from the frozen food companies to Food and Drug Administration (FDA) oversight of Nutrition Fact information labels. Current FDA rules are more lenient towards underreporting calories than over reporting them.

"We tested frozen foods straight out of their packages. For the restaurant foods we first calculated calorie content based on the portion we were served," Roberts says. "When we went one step further and calculated calorie content based on the portion size listed on the restaurant's nutrition literature, the discrepancies between our results and the restaurant's results decreased, which suggests oversized portions were part of the problem."

Five restaurants offered free side dishes which were not factored into the calorie information provided for

the entrees. The authors observed that, on average, the side dishes contained more calories than the entrées they accompanied.

"Restaurant menus and websites should be as clear as possible," Roberts says. "For example, listing the calorie contents of free side dishes on separate pages from entrees may mislead customers about how much they are eating and may prevent them from making informed decisions between different side dish choices."

The authors also note recent municipal initiatives asking restaurants to publicize nutrition information. "If the goals of these polices are to encourage a healthier society and weight loss, inaccurate calorie content information could well hamper these efforts," Roberts says.

This work was supported by the National Institutes of Health (NIH) and the U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture.

Lorien E. Urban, Gerard E. Dallal, Lisa M. Robinson, Lynne M. Ausman, Edward Saltzman, and Susan B. Roberts. "The Accuracy of State Energy Contents of Reduced-Energy, Commercially Prepard Foods." Journal of the American Dietetic Association .Janury 2010; 110 (1): 116-123.

Source: Report by Andrea Grossman in Medical News Today 08 Jan 2010

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At Last Food Composition Explained!

This new guide on food composition data explains the issues and pitfalls in sourcing and using data on food. Information on the composition of foods is vital for a wide range of people, including health professionals, regulators, caterers and those working in the food industry. For example, you can see this in the nutrition information provided on food packaging, and it is important in determining the recommendations about what we eat and drink given by government bodies.

'Food composition explained' which is published in the September issue of the journal Nutrition Bulletin is intended to help those new to the field to navigate the complexity surrounding data on our food. This guide was completed on behalf of the EC funded Network of Excellence EuroFIR (European Food Information Resource), and is the seventh in a series of Synthesis Reports from the project, including others on ethnic foods, plant bioactives and health claims.

Susan Church, an independent public health nutritionist with nearly 20 years experience in working with food composition data, who wrote the guide said "Getting accurate data on our food is increasingly important in many different fields. However, it is a complex area and there are many issues to consider when working with information on the composition of foods. This guide aims to help new users of food composition data understand the important areas to be aware of when sourcing and using these data".

The report begins by outlining the importance of food composition databases, and goes on to describe how they are produced, outlining the issues with each method of getting information on food composition.

The considerations when using food composition data are then described, including dealing with missing values, different sources of data and calculating the nutrient content of composite dishes. Throughout the guide, practical examples and problems are highlighted to bring the subject to life.

Dr Peter Hollman, from the RIKILT Institute of Food Safety in the Netherlands, who runs training courses and e-learning modules on food composition, said "The area of food composition can be a daunting one for those new to the field. This is a very useful and practical guide for those just embarking on a career in nutrition or food science"

From: Alpha Galileo January 13, 2010

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Ignore Expiration Dates

"Best by," "Sell by," and all those other labels mean very little.

There's a filet mignon in my fridge that expired four days ago, but it seems OK to me. I take a hesitant whiff and detect no putrid odor of rotting flesh, no oozing, fetid cow juice—just the full-bodied aroma of well-aged meat. A feast for one; I retrieve my frying pan. This is not an isolated experiment or a sad symptom of my radical frugality. With a spirit of teenage rebellion, I disavow any regard for expiration dates.

The fact is that expiration dates mean very little. Food starts to deteriorate from the moment it's harvested, butchered, or processed, but the rate at which it spoils depends less on time than on the conditions under which it's stored. Moisture and warmth are especially detrimental. A package of ground meat, say, will stay fresher longer if placed near the coldest part of a refrigerator (below 40 degrees Fahrenheit), than next to the heat-emitting light bulb. Besides, as University of Minnesota food scientist Ted Labuza explained to me, expiration dates address quality—optimum freshness—rather than safety and are extremely conservative. To account for all manner of consumer, manufacturers imagine how the laziest people with the most undesirable kitchens might store and handle their food, then test their products based on these criteria.

With perishables like milk and meat, most responsible consumers (those who refrigerate their groceries as soon as they get home, for instance) have a three–to-seven-day grace period after the "Sell by" date has elapsed. As for pre-packaged greens, studies show that nutrient loss in vegetables is linked to a decline in appearance. When your broccoli florets yellow or your green beans shrivel, this signals a depletion of vitamins. But if they haven't lost their looks, ignore the printed date. Pasta and rice will taste fine for a year. Unopened packs of cookies are edible for months before the fat oxidizes and they turn rancid. Pancake and cake mixes have at least six months. Canned items are potentially the safest foods around and will keep five years or more if stored in a cold pantry. Labuza recalls a seven-year-old can of chicken chunks he ate recently. "It tasted just like chicken," he said.

Not only are expiration dates misleading, but there's no uniformity in their inaccuracy. Some manufacturers prefer the elusive "Best if used by," others opt for the imperative "Use by," and then there are those who litter their goods with the most unhelpful "Sell by" stamps. (I'm happy my bodega owner is clear on when to dump, but what about me?) Such disparities are a consequence of the fact that, with the exception of infant formula and some baby foods, package dates are unregulated by the federal government. And while some states do exercise oversight, there's no standardization. A handful of states,

including Massachusetts and West Virginia, and Washington, D.C., require dating of some form for perishable foods. Twenty states insist on dating for milk products, but each has distinct regulations. Milk heading for consumers in Connecticut must bear a "Sell by" date not more than 12 days from the day of pasteurization. Dairies serving Pennsylvania must conform to 14 days.

That dates feature so prolifically is almost entirely due to industry practices *voluntarily* adopted by manufacturers and grocery stores. As America urbanized in the early 20th century, town and city dwellers resorted more and more to processed food. In the 1930s, the magazine *Consumer Reports* argued that Americans increasingly looked to expiration dates as an indication of freshness and quality. Supermarkets responded and in the 1970s some chains implemented their own dating systems. Despite the fact that in the '70s and '80s consumer groups and processors held hearings to establish a federally regulated system, nothing came of them.

These dates have no real legal meaning, either. Only last year, 7th Circuit Judge Richard Posner reversed the conviction of a wily entrepreneur who'd relabeled 1.6 million bottles of Henri's salad dressing with a new "Best when purchased by" date. Posner decided that the prosecutor had unjustly condemned the dressing as rancid, rotten, and harmful, when in fact there was no evidence to suggest that the mature product posed a safety threat.

Expiration dates are intended to inspire confidence, but they only invest us with a false sense of security. The reality is that the onus lies with consumers to judge and maintain the freshness and edibility of their food—by checking for offensive slime, rank smells, and off colors. Perhaps, then, we should do away with dates altogether and have packages equipped with more instructive guidance on properly storing foods, and on detecting spoilage. Better yet, we should focus our efforts on what really matters to our health—not spoilage bacteria, which are fairly docile, but their malevolent counterparts: disease-causing pathogens like salmonella and Listeria, which infect the food we eat not because it's old but as a result of unsanitary conditions at factories or elsewhere along the supply chain. A new system that could somehow prevent the next E. coli outbreak would be far more useful to consumers than a fairly arbitrary set of labels that merely (try to) guarantee taste.

From: Report by Nadia Arumugam in Slate on Feb. 17, 2010

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Australian Bonsoy Brand Soymilk Recalled Over Very High Levels of Iodine

Food Standards Australia New Zealand has advised people not to consume Bonsoy soy milk. Coffee shops, retail and other outlets should also not use this product.

This follows a cluster of nine adults aged from 29 to 47, and one child, who have recently presented in NSW with thyroid problems. These individuals all reported consuming Bonsoy soy milk. Subsequent testing of samples of Bonsoy soy milk revealed unusually high levels of iodine. This brand of soy milk is enriched with “Kombu” which is a seaweed product. A consumer-level recall for the Bonsoy soy milk is being voluntarily instigated by the importer today.

The levels of iodine in the Bonsoy soy milk were at a level that is likely to exceed tolerable daily intakes for iodine when as little as 30ml (one eighth of a cup) is consumed per day by an adult.
Iodine is needed for the thyroid gland to produce thyroid hormones. A healthy daily iodine intake is about 80–150 micrograms with a recommended safe upper limit of 1,100 micrograms per day for adults, and

from 200 micrograms for 1-3 year olds to 900micrograms for 14 year-olds.

Daily consumption of a cup of Bonsoy soy milk could lead to a daily iodine intake of more than 7,500 micrograms at the levels tested. Chronic consumption of high levels of iodine may affect the thyroid and cause people to feel generally unwell. Anybody consuming Bonsoy soy milk product over a prolonged time who feels generally unwell should consult their doctor.

The body excretes iodine, so when a source of high iodine ceases, levels in the body will decrease over time. The only soy milk product identified through testing to have high levels of iodine to date is Bonsoy soy milk.

From: Soya Tech eNews December 28, 2009

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Health Canada to Create a Friendlier Market for Fortified Foods

According to an article on Canada.com, Health Canada, Canada's main regulatory agency, is making a move to allow food companies to add vitamins and minerals to more products—in part because so many companies are already using Natural Health Product regulations to get their fortified snacks and drinks onto store shelves.

Canada.com claims the head of nutritional sciences at Health Canada's Food Directorate recently sent a letter to industry executives and public-health advocates putting them on notice that the government is working to give food companies greater flexibility to add supplements to more foods.

Health Canada is making this move because it is already swamped with food companies looking to get their products onto the market via a natural health product license. The problem is that the hundreds of applications seeking approval of food products using the natural health product channel are causing some confusion among consumers and authorities, which don't necessarily view them as foods or natural health products. Therefore, in order to move forward with approval of most of these applications, Health Canada will have to adjust the rules for fortified foods.

Canada.com cites a backlog of natural product license applications as a major problem for the regulatory agency. More specifically, it says, last year there were nearly 500 juice and water products, about 150 energy drinks and 25 candy products sitting on the natural health products wait-list.

On the table now is a policy that institutes new fortification rules. Experts, however, remain divided about the new policy. Some don't want to see nutritional ingredients added to junk foods, such as soda and chips, while others believe consumers could benefit from a healthier food supply.

From: Nutraceuticals World Breaking News January 22, 2010

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China Set to Become First Country to Sow Genetically Modified Rice Cleared for Commercial Sale

CHINA could become the first country to allow the commercial cultivation of genetically modified rice, which could go on sale as early as next year.

Field trials of two GM varieties, called Huahui 1 and Bt Shanyou 63, are under way after they received official safety clearance in November. Both contain "Bt" proteins from the Bacillus thuringiensis bacterium to protect them against the rice stem borer, the most serious rice pest in China.

Precisely how long the final tests will take is not known, but Jikun Huang, director of the Center for Chinese Agricultural Policy in Beijing, expects large-scale production in Hubei province in 2011, followed by rapid commercial approval elsewhere in the country. He rejects the suggestion that the GM varieties may damage trade by contaminating exports, pointing out that exports account for less than 1 per cent of the country's total rice production.

Previous trials of GM rice varieties in China, including the two now poised for commercialisation, showed that they benefited poor farmers and decreased their exposure to harmful pesticides.

Bob Zeigler, director of the non-profit International Rice Research Institute (IRRI) in Los Baños, the Philippines, says GM rice can deliver unique traits that are otherwise unobtainable. Farmers in India and the Philippines have this year begun receiving a flood-tolerant rice developed at the IRRI which is non-GM but was developed using knowledge from GM studies.

Soya Tech eNews January 16, 2010

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