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Editorial

Children have been demanding and eating many foods that need to be restricted. This has especially become important in urban areas not just in western world but also in India. There is a rapid increase in the obesity among children in cities like New Delhi and Mumbai. There are many factors responsible for that and diet being one of them.

Children are nowadays glued to their TV watching too much of it or surfing computer or playing games on it rather than spending time on playing fields. Their playgrounds have been encroached upon by various political, commercial and entertainment activities so they are also forced to find their own way to amuse themselves. However, by spending time sitting with TV or PC or even on their cell phones they become sedentary too long and do not spend the calories they consume. Also the lack of physical activity gets them out of shape so they do not feel like doing anything requiring physical movement.

Adding to that is their diet. They eat while they are watching TV or playing on PC, so they always tend to overeat. This has been shown to be true by several studies so these modern tools of entertainment become double curses. Enticing TV advertisements also may add to this.

Thus making children eat prudently is becoming more and more difficult. This certainly calls for some advice regarding how to plan nutritious foods for children especially when they are in pre-teens. The younger children could be persuaded by parents to have diets planned by them more easily than the pre-teens. The latter being more open to TV, PC and peer pressure and are likely to protest much more.

It is very important that the pre-teens and also all children eat nutritious diet as they are growing rapidly and their needs for specific nutrients is more at this stage of development. Many of the problems of later years have been seen to occur in this age if diets are not proper. Once problems like obesity, diabetes type II, hypertension and even cardio-vascular diseases are already set in their young bodies; it is very difficult to lead a very active and energetic life in later years.

We are bringing in this issue an article that discusses some of the problems of wrong foods in these years and how to select some of the healthful foods and products that would constitute a nutritious diet for pre-teens. This is not just the guide for these children and their parents, but also may be helpful for those who develop food products in selecting ingredients and designing healthy food products. We hope to bring nutrition awareness through these issues of Bulletin for all stakeholders including educators and students of food and nutrition.

We are planning many activities this year not just to create awareness of nutrition, but also for safety of food. The latter has been the mandate of the new food act and we sincerely hope that it will soon be enforced so we have safe and high quality nutritious food products in the market.

With season’s greetings,

Prof. Jagadish Pai
Executive Director (executivedirector@pfndai.org)

Nutrition For Your Pre Teen:
A No Pretence View At What Is On Your Child's Plate!

One of the most important laments of a parent is the distress of watching her "fabulous five" angel turning into the dreaded "terrible twelve". Nutritionalists the world over agree that the bracket of the early school years onto the preteens is critical in the holistic development of the child and has an emphatic impact on the overall development of the child and in fact the parent-child relationship. The psychosomatic aspects of this approach towards food and the socio-cultural factors which govern the child's behavior are both varied and interesting. In fact, they form the chief objective of many a research endeavor since a lot of the facts are still under wraps and need to be understood pragmatically as well as scientifically. It has been realized that this span of one's life is a significant bridge between childhood and adulthood and hence has to be addressed with grave seriousness and a large dose of creative élan and imagination.

The first and foremost aspect is to note that the child is now a person, someone with a viewpoint, someone with likes and dislikes and certainly someone with individuality. This is the first lesson to the mother, who has been used to govern the nutrition related part of her neonatal as the whole and sole decision maker! This shift of onus must be conducted with grace and with least resistance so that the issue does not assume the proportion of a war of egos.

Many parents of school-aged children express concern about their child's eating patterns, fussy eating, appetite and growth. Approximately one-third of children aged 4-7 years consume little or no fruit or vegetables, around 40% don't have milk products for breakfast, and there is a general decline in milk and fruit from 2 years to 11 years of age. During the primary years, an increasing proportion of meals are eaten away from home in the school setting, with a greater inclusion of high fat 'snack' foods. In an American study of approximately 16,000 children aged 9-14 years, the proportion of children eating dinner with their families declined during the primary years. However, children who ate family dinner every day consumed on average 0.8 more servings of fruit and vegetables than those who never ate family dinners or who did so on only some days. Consumption of fried foods and soft drinks was reported much less frequently by children who ate the family dinner, and more frequently by those children eating family dinners less often.

It turns out that the aspects of great concern include factors like:

- The child as a consumer
- Peer pressure
- Familial background and attitude
- Sensory and Organoleptic evaluation of food by the child
- Role of the school in the child's nutrition
- Dental caries
- Preaching by practice
- EQ enhancement through nutrition
- Food planning
- Self image and food

> *Strictly in the Indian context, the family fabric is traditionally strong and the practice of a regular family meal is very much in place both in rural and urban India. It follows, that the child would partake, at least once a day, an adaptation of the traditional Indian Thali, which is itself a balanced meal. It would be a good habit for the parent to include the child in the celebration of religious and social occasions so that the child gets used to conducting himself in a large scale gastronomical event like a wedding. This would help him to develop an adventurous palate as well as recognize the varied nuances of social food consumption.*

It is interesting to note that the consumer, by definition is really any person who can or has the capacity to purchase. Hence, it is important to realize the role of a child especially in the 5-12 year bracket as a consumer. The promoters of food products naturally often aim at enticing this age group and the prerogative to develop a discerning consumer in your own child definitely lies with the parent. Characteristics of these school children influencing their food intake include many meals consumed away from home, greater influence of peers, advertising and media on food choices, more

structured eating times due to school timetable and greater access to foods from school canteen or other student's lunches. Interestingly, nutritional messages more meaningful in relation to cognitive development of the child and food choices may be repetitive. Moreover, food likes and dislikes may be firmly entrenched and the child may now have small disposable income to purchase food.

Your child's nutrition is important to her overall health. Proper nutrition can also prevent many medical problems, including becoming overweight, developing weak bones, and developing diabetes. It will also ensure that your child physically grows to her full potential.

The best nutrition advise to keep your adolescent healthy includes encouraging her to:

- Eat a variety of foods
- Balance the food you eat with physical activity
- Choose a diet with plenty of grain products, vegetables and fruits
- Choose a diet low in fat, saturated fat, and cholesterol
- Choose a diet moderate in sugars and salt
- Choose a diet that provides enough calcium and iron to meet their growing body's requirements.

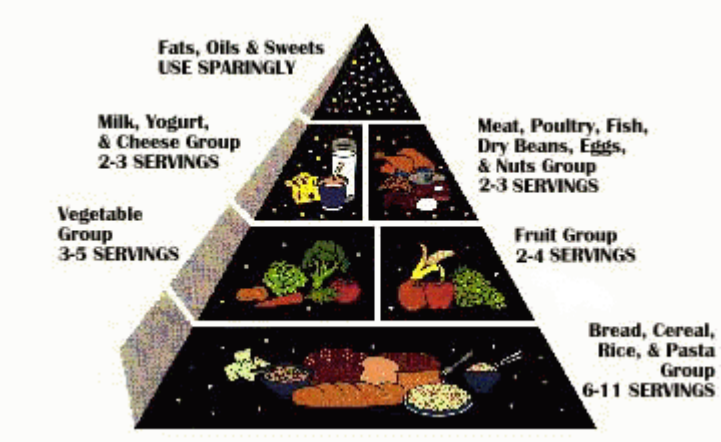
You can also help promote good nutrition by setting a good example. Healthy eating habits and regular exercise should be a regular part of your family's life. It is much easier if everyone in the house follows these guidelines, than if your child has to do it alone. You should also buy low-calorie and low fat meals, snacks and desserts, low fat or skim milk and diet drinks. Avoid buying high calorie desserts or snacks, such as snack chips, regular soft drinks or regular ice cream.

The Food Pyramid was designed by the US Dept. of Agriculture to promote healthy nutrition in children over two years of age. It is meant to be a general guide to daily food choices. The main emphasis of the Food Guide Pyramid is on the five major food groups, all of which are required for good health. It also emphasizes that foods that include a lot of fats, oils and sweets should be used very sparingly.

The Food Guide Pyramid shows a range of servings for each food group. How much you actually eat depends on your age and activity level. School age boys and girls require about 1600 to 2400 calories each day, depending on their age and activity level. Once they hit their growth spurt, girls require an additional 200 calories and boys 500 calories. **School age children will therefore require between the low and middle range of servings.** Children who are overweight and dieting should at least eat the lowest range of servings.

When determining how many servings to eat, it is important to look at the serving size. Larger portions should count as more than one serving, and smaller portions will count as only a part of a serving.

Food Guide Pyramid



Fats, Oils and Sweets

No more than 30% of your diet should come from fats. For a 1600 calorie diet, that would equal 53g of fat each day and for a 2200 calorie diet, 73g of fat each day. The type of fat that you eat is also important. **Saturated fats** in foods such as meats, dairy products, coconut, palm and palm kernel oil, raise cholesterol more than **unsaturated fats**, which are found in olive, peanut, and canola oils, or **polyunsaturated fats** in safflower, sunflower, corn, soybean and cottonseed oils. Limit saturated fats to no more than 10% of daily calories.

Sugars supply a large amount of calories, with little nutritional value. They include white sugar, brown sugar, corn syrup, honey and molasses and foods like candy, soft drinks, jams, and jellies.

Selection tips:

- use lean meats and skim or low fat dairy products
- use unsaturated vegetable oils and margarines that list a liquid vegetable oil as the first ingredient on the label
- read the nutrition label on foods to check for the amount and type of fat it includes
- limit foods that contain a large amount of saturated fats
- limit foods high in sugar and avoid adding extra sugar to your foods

Examples:		
Food	**Servings**	**Grams of Fat**
Butter, margarine	1 tsp.	4
Mayonnaise	1 tbs.	11
Salad dressing	1 tbs.	7
Sour cream	2 tbs.	6
Cream cheese	1 oz.	10
Chocolate bar	1 oz.	9

Milk, Yogurt and Cheese

Dairy products provide protein, vitamins and minerals and are an excellent source of calcium. Your school age child should have 2 to 3 servings of milk, yogurt and cheese each day.

Selection tips:

- Choose skim milk and nonfat yogurt
- Avoid high fat cheese and ice cream

Examples:		
Food	**Servings**	**Grams of Fat**
Skim milk, 1 cup	1	Trace
Nonfat yogurt, 8 oz.	1	Trace
Low fat milk, 1 cup	1	5
Whole milk, 1 cup	1	8
Chocolate milk, 2%, 1 cup	1	5
Low fat yogurt, 1 cup	1	4
Process cheese, 2 oz.	1	18
Mozzarella, part skin 1 - 1/2 oz	1	7
Cottage cheese, 1/2 cup	1/4	5

Ice cream, 1/2 cup	1/3	7
Ice milk, 1/2 cup	1/3	3
Frozen yogurt, 1/2 cup	1/2	2

Meat, Poultry, Fish, Dry Beans, Eggs and Nuts

Foods in this group provide protein, and vitamins and minerals, including B vitamins, iron and zinc. You should have 2 to 3 servings of foods from this group each day, including the equivalent of 5 to 7 ounces of lean meat.

Selection tips:

- A serving from this food group can include 2-3 ounces of lean meat, poultry or fish, which may be an average hamburger or medium chicken breast half.
- Choices with the least fat include lean meat, poultry without skin, fish, and dry beans and peas.
- Prepare meats in low fat ways, by trimming away fat, and broiling, roasting, or boiling rather than frying.
- Remember that nuts and seed are high in fat, and egg yolks are high in cholesterol, so you should eat them in moderation.

Examples:		
Food	**Servings**	**Grams of Fat**
Lean meat, poultry, fish	3 oz	6
Ground beef, lean	3 oz	16
Chicken, with skin, fried	3 oz	13
Bologna, 2 slices	1 oz	16
Egg, 1	1 oz	5
Dry beans and peas, 1/2 cup	1 oz	Trace
Peanut butter, 2 tbs.	1 oz	16
Nuts, 1/3 cup	1 oz	22
Servings = ounces of meat these items count as.		

Vegetables

Vegetables supply you with vitamins, including vitamin A and C, and folate, minerals, such as iron and magnesium, and fiber. Plus they are low in fat. You should have 2 to 4 servings of vegetables each day.

Selection tips:

- You should eat a variety of vegetables to provide you with all of the different nutrients that they supply, including dark green leafy vegetables, deep yellow vegetables, starchy vegetables (potatoes, corn peas), legumes (navy, pinto and kidney beans), and other vegetables (lettuce, tomatoes, onions, green beans).
- Do not add a lot of fat to the vegetables you eat, by avoiding added toppings, such as butter, mayonnaise, and salad dressings.

Examples:		
Food	**Servings**	**Grams of Fat**
Vegs, cooked, 1/2 cup	1	Trace
Vegs, leafy, raw 1 cup	1	Trace
Vegs, nonleafy, raw, 1/2 cup	1	Trace
Potatoes, scalloped, 1/2 cup	1	4

Potato salad, 1/2 cup	1	8
French fries, 10	1	8

Fruits

Fruits and 100% fruit juices provide Vitamin A and C and potassium. They are also low in fat and sodium. You should have 2-4 servings of fruit each day.

Selection tips:

- Eat fresh fruits and 100 % fruit juices and avoid canned fruit in heavy syrups and sweetened fruit juices. According to the American Academy of Pediatrics, 100% fruit juice may substitute for half of your child's recommended servings of fruit each day.
- Eat whole fruits.
- Eat citrus fruits, melons, and berries, which are high in Vitamin C.

Examples:		
Food	**Servings**	**Grams of Fat**
Whole fruit	1	Trace
Fruit, raw or canned, 1/2 cup	1	Trace
Fruit juice, unsweetened, 3/4 cup	1	Trace
Avocado, 1/4 whole	1	9

Bread, Cereal, Rice and Pasta

Foods from this group provide complex carbohydrates (starches) and provide vitamins, minerals, and fiber. You need at least 6 to 11 servings of foods from this food group each day.

Selection tips:

- Choose whole grain breads and cereals for added fiber.
- Choose foods that are low in fat and sugars.
- Avoid adding calories and fat to foods in this group by not adding spreads or toppings high in fat.

Examples:		
Food	**Servings**	**Grams of Fat**
Bread, 1 slice	1	1
Hamburger roll	2	2
Tortilla	1	3
Rice, pasta, 1/2 cup	1	Trace
Breakfast cereals, 1 oz	1	?
Pancakes, 2	2	3
Croissant, 1 large	2	12
Doughnut, 1 medium	2	11

Danish, 1 medium	2	13
Cake, frosted, 1 slice	1	13
Cookies, 2 medium	1	4

Calcium Requirements

Calcium is a mineral that is mostly present in your child's bones. Having a diet with foods that are high in calcium to meet daily requirements is necessary for the development of strong bones. It is also an important way to prevent the development of osteoporosis in adults.

School age children require about 800 mg of calcium each day. Once they begin puberty, their calcium requirements will increase to about 1200 mg each day. See the table below for the calcium content of common foods and check the nutrition label to choose foods high in calcium when you prepare your families diet. Also choose foods that are fortified with calcium.

Examples:		
Food	**Servings**	**Calcium Content**
Milk, whole or lowfat	1 cup	300 mg
White beans	1/2 cup	113 mg
Broccoli, cooked	1/2 cup	35 mg
Broccoli, raw	1 cup	35 mg
Cheddar cheese	1.5 oz	300 mg
Yogurt, lowfat	8 oz	300 mg
Orange juice, calcium fortified	1 cup	300 mg
Orange, medium	1	40-50 mg
Sweet potatoes, mashed	1/2 cup	44 mg

If the perspective has to be examined in the Indian context, it would be a useful exercise to examine some typical Indian dishes so that the meal cooked in common for the entire family would still provide the adequate dietary requirements for the child. As a parent it is a very vital practice to serve the child along with other members of the family and never in isolation except perhaps at lunchtime.

(Refer to table below)

Food	Portion (g)	Calories (Cal)	Carbo-hydrates (g)	Protein (g)	Total Fat (g)
Indian Vegetables / Curries					
Aloo- Baigan mixed Vegetable	100	103	32.3	1.3	4.7
Aloo-Beans Mixed Vegetable	100	134	34.3	2.4	8.7
Aloo Curry	100	105	14.4	1.2	5.0
Baigan ka Bharta	100	70	5.7	1.2	4.7
Bhindi (Okra)	100	161	12.1	3.9	10.7
Cabbage (Patta Gobi)	100	131	7.0	2.3	5.0
Chole (Chickpeas)	100	74	3.3	4.3	4.1
Curry Cuddy (Besan Khaddi)	100	100	15.0	2.9	5.1
Gate Ki Sabji	148	275	-	-	-
Methi Aloo	100	121	16.0	2.2	5.4
Mutter Paneer	100	147	10.7	8.5	8.1
Kaddu (Pumpkin Kashiphal)	100	67	6.7	1.6	3.8
Rajmah (Kidney Beans)	100	102	10.7	4.7	3.4
Shahi Paneer	100	283	-	-	-
Shimla Mirch-Aloo	100	93	12.8	1.5	3.4
Stuffed Tomato	100	85	11.0	2.1	3.4
Vegetable Jalfrani	98	159	-	-	-
Vegetable Kofta Curry	100	147	13.3	2.6	9.1
Vegetable Korma	100	88	8.7	1.4	5.3
Indian Dals (Dhals)					
Arhar Dal	100	53	8.0	2.8	1.2
Chana Dal	100	99	12.8	4.5	3.2
Dal Makhani; Low Fat	100	117	14.0	6.8	1.3
Maa ki Dal	146	92	-	-	-
Moong Dal	100	211	31.3	12.8	3.7
Masoor Dal	100	165	24.7	10.3	2.7
Urad Dal	100	107	14.0	6.0	3.0
Sambhar	100	5.0	2.6	15.0	1.8
Dal Dhokli	105	238	-	-	-
Indian Rice					
Boiled Rice	100	111	25.0	2.2	0.2
Pulao	100	119	19.0	3.2	3.4
khicchari	100	215	33.0	4.3	7.4
Indian Milk Items					
Milk (buffalo)	100	117	5.0	4.3	6.5
Milk (Cow)	100	67	4.4	3.2	4.1
Curd (Cow's milk)	100	60	3.0	3.1	4.0
Butter Milk	100	15	0.5	0.8	1.1
Skimmed Milk	100	29	4.6	2.5	0.1
Paneer (Cow's milk)	100	265	1.2	18.3	20.8
Paneer (Buffalo's Milk)	100	292	7.9	13.4	23.0
Khoa (whole milk)	100	421	20.5	20.0	25.9
Khoa (skimmed milk)	100	206	25.7	22.3	1.6
Cheese	100	348	6.3	24.1	25.1
Lassi	100	69	3.2	5.7	0.5
Samosa	1 no	369	48.1	6.3	17.6

Food	Portion (g)	Calories (Cal)	Carbo-hydrates (g)	Protein (g)	Total Fat (g)
Indian Desserts / Sweets*					
Besan Laddu	40	315	-	-	-
Carrot Halwa	135	460	-	-	-
Coconut Burfi	30	157	-	-	-
Kaju Rolls	14	83	-	-	-
Kheer Rice	150	345	-	-	-
Kulfi Malai	75	210	-	-	-
Kulfi Mango	70	147	-	-	-
Malpua	40	342	-	-	-
Naan Katai	45	150	-	-	-
Rasgulla	40	194	-	-	-
Sandesh	7	30	-	-	-
Shrikhand	105	465	-	-	-
Til Laddu	20	55	-	-	-
Miscellaneous Foods					
Boondi Raita	145	196	-	-	-
Coriander Chutney	25	72	-	-	-
Coconut Chutney	20	83	-	-	-
Dosa	1 no	145	21.5	2.8	5.2
Dosa Onion	1 no	157	-	-	-
Idli	1 no	69	15	1.2	0.2
Pakora Onion	58	315	-	-	-
Pakora Paneer	125	376	-	-	-
Potato Tikki	1 no	60	3.4	0.2	5
Rava Dosa with Chutney	1 no	97	-	-	-
Samosa	1 no	369	48.1	6.3	17.6

It is becoming increasingly difficult to provide children with healthy foods, especially for those school aged children. Providing nutrition at school has not become a hot topic and schools' are beginning to change menus, and provide more eating options for children. School's that provide breakfast and lunch have been hit hard with what they are feeding children at school. With childhood obesity increasing, many parents have become concerned about what kind of foods are being provided for school breakfast and lunch programs. And although good eating habits start within the home, nutrition at school is a big issue.

Good nutrition during the school aged years is a vital key to helping children grow and learn at their best. Nutritious eating and healthy food choices give children the energy they need to get through their day of academic and physical activities. Primary age school children are at a critical stage in their life as they will begin to start making their own food choices. As parents try to teach their children about nutrition, they expect the schools to do the same, by offering the children some healthy food choices; not just French fries and gravy. In understanding and implementing nutrition at school, you as a parent may have to take more of an active role than you might like to. In defense of a school's meal planners and cooks, it is extremely difficult to make healthy nutritious meals for hundreds and sometimes thousands of students. And some schools have seen that when they change their menu to something that may be a little healthier, kids won't eat it. It's a waste of money and food. So what about nutrition at

school? Is it possible?

It may not be possible (as a parent) to have much control over what the cafeteria is cooking, but you can definitely put in your two cents. If you have the time you can make some helpful suggestions to the school board or principal on how to provide the children with some healthy choices. You're not asking anyone to change the menu; you're just giving the kids a few extra choices. Let's start some breakfast basics as breakfast is the most important meal of the day. Most school's are concerned for the welfare of their students want to give them a good start; especially those who do not have a chance to eat breakfast before they get to school. Eating breakfast will help children meet many important nutritional needs that they will need to get through the day. Here are some suggestions you can make to help provide nutrition at school:

•Provide children with wholegrain bread instead of white as it has less sugar and more nutritional value to it. Bagels, toast, and English muffins are all healthier breakfast choices than cold cereal.

•Give children some choices of fruit or yogurt. Both provide nutrition for the body, and you could even mix them together to provide a healthy, yummy smoothie that kid's love.

•Breakfast wraps using eggs, peanut butter, or fruit slices are also another way to provide some nutrition in the morning.

•Suggest that they provide milk and water as well as some juices for children to drink. Most fruit juices have a lot of sugar, so drinking milk or water will give the body a better start; not just a hyperactive start.

There are two other areas where nutrition can be reinforced in the school; healthy snacking, and lunches. Many schools use to provide healthy snacks for kids during the day and this may be an opportunity for you to get your foot in the door. If you really want to make a change, volunteer yourself to bring in some healthy snacks for kids to try. Snacking gives kids the fuel they need between meals and prevents them from becoming so hungry that they eat way too much at lunch or dinner time. Always make sure it's ok with the principal first and you may even ask if they have the budget to help you, but providing healthy snack is a great way to bring nutrition into school.

Most school's do the best they can with what they're given and are usually open to suggestions on how to help their students perform at their best. Nutrition at school is one way of doing so, but it may take some extra effort and time to get the ball rolling.

What makes a good breakfast for children? One good example would be an egg, a slice of whole grain toast with nut butter, a piece of fruit and a glass of low-fat milk. Tofu, lean meat and whole grain cereals are also good choices at breakfast. The protein and fiber from the whole grains will keep your child satisfied until lunch time. Try to avoid giving your child sugary breakfast cereals, white-flour pancakes and syrup -- all of which will leave your child hungry and tired half way through the morning. If your child tends to get hungry in the middle of the morning no matter what, send an apple, whole grain crackers, nuts and cheese snacks rather than sugary cookies or white-flour crackers.

Most schools try to provide nutritious lunches for children, but a tour through your local school's cafeteria might show a lot of junk. Many schools offer fast food, greasy pizzas, French fries and other poor-quality foods alongside the usual lunch selections.

One high school in Appleton, Wisconsin replaced their regular poor-quality school lunches with healthy fresh foods at lunch with water as the main beverage. The changes resulted in improved behavior from the students and zero truancies.

Eating healthy at lunch will help keep your child's mind sharp and ready to learn all afternoon. Convincing schools to change their lunches might take a lot of effort, but there are other things you can do, such as teach your kids the importance of eating nutritious foods. Hopefully with your help they will choose healthier salads and vegetables instead of French fries, and water instead of soda. Another option is to send lunch with your kids. Hearty soups, salads, fruits, and sandwiches with whole grains can all be packed in insulated containers to stay hot or cold.

Even with a great breakfast and healthy lunch, a light after-school snack is nice to refuel a kid's body before play or study time. A handful of nuts and an apple is perfect, or maybe a snack tray of vegetables and dips.. Keep chips, sugary sodas, pastries and candy out of the house. As the Oxford study shows, sugary and high glycemic index foods just make kids hungrier.
Children who eat healthy foods will be more likely to make better food and nutrition choices as adults. Unfortunately, studies show that the opposite is also true -- overweight children tend to become overweight adults. Teach your children about healthy foods. Here are some tips to help:

- Read over the different food pyramids and ask your kids to pick out some favorite foods from each food group.
- Have them help you plan a meal that includes a healthy serving of protein, a vegetable or two, and a healthy fruit for dessert.
- For young kids, make a chart to keep track of all the fruits and vegetables they eat (we need at least five servings of fruits and veggies every day).
- Snack time can be more fun if you try different recipes and snack ideas together with your kids.

Teaching your children to how to have a healthy diet will have a bigger impact if you set the example. Eat right, get some exercise, and make a healthy lifestyle a family affair. Is good nutrition important for good learning? In a word, yes. Research has shown that children who regularly ate breakfast had better standardized test scores, better behavior, and were less hyperactive than children who skipped breakfast. When comparing low glycemic index (GI) breakfasts to high GI breakfasts eaten by 9- to 12-year-old children, research also shows that children who eat high GI breakfasts (sugary breakfasts) tend to eat more at lunch.

More than half of all Victorian primary school children seen by the School Dental Service have signs of dental decay, with around 80% of the dental decay experienced by 5 year olds left untreated. Dental caries occurs when the combination of bacteria in the mouth, foods useable by the bacteria and susceptible teeth are in contact long enough to allow bacterial by-products to attack the tooth structure.

The greatest potential for primary prevention of dental disease occurs in preschool children. Teaching good oral hygiene habits, access to fluoride as well as a healthy diet are important factors contributing to the prevention of dental caries. Unflavored milk and milk products, whole fruit and vegetables are less likely to cause decay than sucrose, sugar added to manufactured foods, fruit juices, honey, muesli bars and fruit straps

What motivates children?

Nutrition messages alone are not enough to motivate children to make healthy eating changes. Boys are

more likely to adopt healthy eating if the message is linked to physical attributes such as physical strength, sporting prowess and better performance. Girls are more likely to be motivated by their physical appearance. Appealing food packaging, perceived ‘filling’ quality, flavor and ‘ready to eat’ are also strong motivators.Suggested strategies to engage young children in nutrition education:

- Teach children from an early age about nutrition, foods, drinks and healthy eating and drinking
- Assist children develop an interest in learning about foods and drinks with encouragement and by modeling
- Keep nutrition messages simple; the delivery of clear, accurate information and consistent messages in a fun way is important for learning
- Provide children with opportunities to prepare foods and drinks; this gives them a sense of ownership of healthy choices, as well as assisting in skill development
- Acknowledge that all children can participate in making decisions about their health
- Involve children in setting goals for making healthy food and drink choices
- Help children understand the link between eating patterns and health
- Adults role-modeling healthy eating patterns are a positive influence on children’s eating patterns
- Involve everyone in the family to adopt healthy eating patterns Summing up, the preteen period of your child can be an extremely delightful and rewarding phase of parenthood which could spell out a gradual blooming of a nutritionally enlightened little kitchen helper and comrade-in arms.

“In the childhood memories of every good cook, there's a large kitchen, a warm stove, a simmering pot and a mom.”
Barbara Costikyan

By **Dr.Jyoti D.Vora, M.Sc.Ph.D.F.S.Sc,**
Head, Department of Biochemistry and Food Science and Quality Control, Ramnarain Ruia College,
Matunga, Mumbai 400 019.
9821154007/24143098-Ext.263.

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Regulatory News

Probiotic Food Likely to Come Under Clinical Trial Ambit

The probiotic food industry in the country may have to establish the safety and efficacy of their products through clinical trials just like drugs, if they wish to use the word "probiotic" on their label according to Indian Council of Medical Research (ICMR) draft guidelines. Even imported products, which may have already undergone requisite trials in other geographies, would have to be tested on Indian population before they are granted marketing approval, ICMR recommends.

"The commercial probiotic cultures currently used in India are of foreign origin. Inherent differences in gut flora of Indian population are known to occur, hence it is imperative to carry out efficacy studies in Indian population prior to their use in the country. Further, there is an urgent need for development of indigenous probiotic strains for expressing optimal functionality," the guidelines say. ICMR further advocates surveillance system containing multiple check-points, including trace-back and post marketing surveillance so that adverse events associated with probiotics food can be recorded.

The recommendation if implemented, could go a long way in reducing exaggerated, false and broad generalised claims that accompany probiotic food products in the country. The market size of probiotic product in the country was estimated to be around Rs. 120 crore in 2007, growing at the rate of 40% annually. The global probiotics industry is pegged at $14 billion with a compound annual growth rate of 13.7%, according to Frost and Sullivan estimate.

"After a public debate, once the draft is finalised, we would sent it to the Drug Controller General of India, department of Biotechnology, Food Authority of India. We have tried to harmonise the standards with international norms as large section of probiotic products produced in the country is also exported," said NK Ganguly, former director-general, ICMR. Although the guidelines would be voluntary initially, ICMR expects them to become part of stature eventually and see it becoming the guiding document to determine standards for the industry. Gregor Reid, former president, International Scientific Association for Probiotics and Prebiotics, who was recently in India, had insisted that any health claim made in a probiotic product must be supported through human clinical trials. The ICMR guidelines also advocate stringent labelling to prevent misleading the consumers. Warning against indiscriminate use of the term "probiotic", it says that the term should only be used on the labels of the products if physiological (health) benefit in humans is well established.

"There is lack of regulations in this area and it is important that guidelines for probiotic products are established in India to ensure product safety, quality, reliability for all companies introducing and producing probiotic food. The draft guidelines have a provision for assessment of efficacy, safety and health claims made by the probiotic foods that are being launched in India and defined parametres required for a strain/product to be classified as a probiotic," said Neerja Hajela, head-science at Yakult Danone India Private Ltd, a 50:50 joint venture between Yakult Honsha of Japan and Groupe Danone of France. Yakult Honsha is a leading global player in probiotics while Groupe Danone is a leading player in dairy products. She added that stringent labeling of the probiotic products mentioned in the draft would help consumers make informed choices.

From: Financial Express: Soma Das December 3, 2009

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Proposed standards developed for marketing food to children

The Federal Trade Commission (FTC) forum, "Sizing up Food Marketing and Childhood Obesity," took place in Washington on Dec. 15, at a time when food manufacturers have been facing increasing pressure over the kinds of foods they advertise during children's television programming. At the meeting, the Interagency

Working Group on Food Marketed to Children developed tentative proposed standards for marketing foods to children ages 2–17. Under Standard III, they have identified that foods marketed to children must not contain more than the following amounts of saturated fat, *trans* fat, sugar, and sodium:

- saturated fat: 1 g or less per Reference Amount Customarily Consumed (RACC)* and not more than 15% of calories
- *trans* fat: 0 g per RACC* (<0.5 g)
- sugar: No more than 13 g of added sugars per RACC*
- sodium: No more than 200 mg per portion (This level is interim and over time should be reduced to 140 mg per RACC*)

* For foods with a small RACC (≤30 g or ≤2 tbsp), the criteria refer to the amount per 50 g of food.

The FTC, together with the Commissioner of the Food and Drug Administration (FDA), the Director of the Centers for Disease Control and Prevention (CDC), and the Secretary of Agriculture established the Interagency Working Group on Food Marketed to Children in March 2009. The Working Group has been directed to conduct a study and develop recommendations for standards for the marketing of food when such marketing targets children who are 17 years old or younger or when such food represents a significant component of the diets of children. In developing such standards, the Working Group is directed to consider (1) positive and negative contributions of nutrients, ingredients, and food (including calories, portion size, saturated fat, *trans* fat, sodium, added sugars, and the presence of nutrients, fruits, vegetables, and whole grains) to the diets of such children; and (2) evidence concerning the role of consumption of nutrients, ingredients, and foods in preventing or promoting the development of obesity among such children. The Working Group will determine the scope of the media to which such standards should apply. The Working Group shall submit to Congress, not later than July 15, 2010, a report containing the findings and recommendations of the Working Group.

From: IFT Newsletter December 21, 2009

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EU Approves Chromium Picolinate for Use in Food

Chromium picolinate has been added to the approved list of ingredients permitted for use in food supplements in the European Union (EU).

Coinciding with this announcement, Nutrition 21, Inc., Purchase, NY, has reached an agreement with Ingredia Nutritionals, Arras, France, to distribute its Chromax chromium picolinate and Diachrome ingredients throughout the EU and selected markets in the Middle East, Africa and Asia.

The revised list of approved ingredients that can be used in EU food supplements, which now includes chromium picolinate, was published in the Official Journal of the European Union. Although the sale of chromium picolinate has been previously allowed in the UK, it can now be sold in all other EU countries.

Ingredia Nutritionals's parent company, The Ingredia Group, has three areas of focus: food ingredients, health and nutritional ingredients, and related manufacturing activities. Ingredia Nutritionals markets and distributes a select group of premium quality, innovative, and science substantiated ingredients throughout Europe, Asia and the Middle East.

William Levi, vice president, Ingredients and Special Markets, stated, "We are delighted to have signed a distribution agreement with Ingredia so that we may begin marketing Chromax and Diachrome throughout the European Union in coordination with chromium picolinate's formal EU approval. Ingredia has a highly competent and dedicated team of formulators, nutritional experts and sales professionals that are dedicated to helping their customers find innovative nutritional solutions."

Michael Zeher, president and CEO of Nutrition 21, Inc., concluded, "Our continuing effort to develop our international business has been immensely improved with the approval of Chromax and Diachrome in the EU, and our retention of Ingredia Nutrition as our sales and marketing partner. Ingredia Nutrition's vast international sales network—with commercial presence in more than 120 countries—will significantly benefit our long term international business growth plans."

From: Report by Sean Moloughney in Nutraceuticals World Breaking News December 3, 2009

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Research in Health & Nutrition

Regular Coffee, Decaf and Tea All Associated with Reduced Risk for Diabetes

Individuals who drink more coffee (regular or decaffeinated) or tea appear to have a lower risk of developing type 2 diabetes, according to an analysis of previous studies reported in the December 14/28 issue of Archives of Internal Medicine.

By the year 2025, approximately 380 million individuals worldwide will be affected by type 2 diabetes, according to background information in the article. "Despite considerable research attention, the role of specific dietary and lifestyle factors remains uncertain, although obesity and physical inactivity have consistently been reported to raise the risk of diabetes mellitus," the authors write. A previously published meta-analysis suggested drinking more coffee may be linked with a reduced risk, but the amount of available information has more than doubled since.

Rachel Huxley, D.Phil, of The George Institute for International Health, University of Sydney, Australia, and colleagues identified 18 studies involving 457,922 participants and assessing the association between coffee consumption and diabetes risk published between 1966 and 2009. Six studies involving 225,516 individuals also included information about decaffeinated coffee, whereas seven studies with 286,701 participants reported on tea consumption.

When the authors combined and analyzed the data, they found that each additional cup of coffee consumed in a day was associated with a 7 percent reduction in the excess risk of diabetes. Individuals who drank three to four cups per day had an approximately 25 percent lower risk than those who drank between zero and two cups per day.

In addition, in the studies that assessed decaffeinated coffee consumption, those who drank more than three to four cups per day had about a one-third lower risk of diabetes than those who drank none. Those who drank more than three to four cups of tea had a one-fifth lower risk than those who drank no tea.

"That the apparent protective effect of tea and coffee consumption appears to be independent of a number of potential confounding variables raises the possibility of direct biological effects," the authors write. Because of the association between decaffeinated coffee and diabetes risk, the association is unlikely to be solely related to caffeine. Other compounds in coffee and tea—including magnesium, antioxidants known as lignans or chlorogenic acids—may be involved, the authors note.

"If such beneficial effects were observed in interventional trials to be real, the implications for the millions of

individuals who have diabetes mellitus, or who are at future risk of developing it, would be substantial," they conclude. "For example, the identification of the active components of these beverages would open up new therapeutic pathways for the primary prevention of diabetes mellitus. It could also be envisaged that we will advise our patients most at risk for diabetes mellitus to increase their consumption of tea and coffee in addition to increasing their levels of physical activity and weight loss."

From: Nutrition Horizon 15 Dec 2009

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New Study Links DHA Type of Omega-3 to Better Nervous-System Function

The omega-3 essential fatty acids commonly found in fatty fish and algae help animals avoid sensory overload, according to research published by the American Psychological Association. The finding connects low omega-3s to the information-processing problems found in people with schizophrenia; bipolar, obsessive-compulsive, and attention-deficit hyperactivity disorders; Huntington's disease; and other afflictions of the nervous system.

The study, reported in the journal Behavioral Neuroscience, provides more evidence that fish is brain food. The key finding was that two omega-3 fatty acids – docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) – appear to be most useful in the nervous system, maybe by maintaining nerve-cell membranes.

"It is an uphill battle now to reverse the message that 'fats are bad,' and to increase omega-3 fats in our diet," said Norman Salem Jr., PhD, who led this study at the Laboratory of Membrane Biochemistry and Biophysics at the National Institute on Alcohol Abuse and Alcoholism.

The body cannot make these essential nutrients from scratch. It gets them by metabolizing their precursor, α-linolenic acid (LNA), or from foods or dietary supplements with DHA and EPA in a readily usable form. "Humans can convert less than one percent of the precursor into DHA, making DHA an essential nutrient in the human diet," added Irina Fedorova, PhD, one of the paper's co-authors. EPA is already known for its anti-inflammatory and cardiovascular effects, but DHA makes up more than 90 percent of the omega-3s in the brain (which has no EPA), retina and nervous system in general.

In the study, the researchers fed four different diets with no or varying types and amounts of omega-3s to four groups of pregnant mice and then their offspring. They measured how the offspring, once grown, responded to a classic test of nervous-system function in which healthy animals are exposed to a sudden loud noise. Normally, animals flinch. However, when they hear a softer tone in advance, they flinch much less. It appears that normal nervous systems use that gentle warning to prepare instinctively for future stimuli, an adaptive process called sensorimotor gating.

Only the mice raised on DHA and EPA, but not their precursor of LNA, showed normal, adaptive sensorimotor gating by responding in a significantly calmer way to the loud noises that followed soft tones. The mice in all other groups, when warned, were startled nearly as much by the loud sound. When DHA was deficient, the nervous system most obviously did not downshift. That resulted in an abnormal state that could leave animals perpetually startled and easily overwhelmed by sensory stimuli.

The authors concluded that not enough DHA in the diet may reduce the ability to handle sensory input. "It only takes a small decrement in brain DHA to produce losses in brain function," said Salem.

In humans, weak sensorimotor gating is a hallmark of many nervous-system disorders such as schizophrenia or ADHD. Given mounting evidence of the role omega-3s play in the nervous system, there is intense interest in their therapeutic potential, perhaps as a supplement to medicines. For example, people with schizophrenia have lower levels of essential fatty acids, possibly from a genetic variation that results in poor metabolism of these

nutrients.

More broadly, the typical American diet is much lower in all types of omega-3 than in omega-6 essential fatty acids, according to Salem. High intake of omega-6, or linoleic acid, reduces the body's ability to incorporate omega-3s. As a result, "we have the double whammy of low omega-3 intake and high omega-6 intake," he said.

From: Nutrition Horizon 17 Dec 2009 ---

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Diet High in Methionine Could Increase Risk of Alzheimer's

A diet rich in methionine, an amino acid typically found in red meats, fish, beans, eggs, garlic, lentils, onions, yogurt and seeds, can possibly increase the risk of developing Alzheimer's disease, according to a study by Temple researchers.

The researchers published their findings, titled "Diet-induced hyperhomocysteinemia increases Amyloid-β formation and deposition in a mouse model of Alzheimer's disease," in the journal Current Alzheimer Research.

"When methionine reaches too high a level, our body tries to protect itself by transforming it into a particular amino acid called homocysteine," said lead researcher Domenico Praticò, an associate professor of pharmacology in the School of Medicine. "The data from previous studies show — even in humans — when the level of homocysteine in the blood is high, there is a higher risk of developing dementia. We hypothesized that high levels of homocysteine in an animal model of Alzheimer's would accelerate the disease."

Using a seven-month old mouse model of the disease, they fed one group an eight-month diet of regular food and another group a diet high in methionine. The mice were then tested at 15 months of age — the equivalent of a 70-year-old human.

"We found that the mice with the normal diet had normal homocysteine levels, but the mice with the high methionine diet had significantly increased levels of homocysteine, very similar to human subjects with hyperhomocysteinemia," said Praticò. "The group with the high methionine diet also had up to 40 percent more amyloid plaque in their brains, which is a measurement of how much Alzheimer's disease has developed.

The researchers also examined capacity to learn a new task and found it diminished in the group with the diet high in methionine.

Still, Praticò emphasized, methionine is an essential amino acid for the human body and "stopping one's intake of methionine won't prevent Alzheimer's. But people who have a diet high in red meat, for instance, could be more at risk because they are more likely to develop this high level of circulating homocysteine," he said.

From: Nutrition Horizon 16 Dec 2009

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Moderate Fish Consumption May Lower Risk in Patients with a History of Heart Failure

Including fish in a balanced diet has long been associated with the prevention of heart disease, and scientists now believe that it can help preserve heart function in patients who have experienced heart failure. A new study in the Journal of Food Science reports that moderate fish consumption can help reduce the risk of left ventricular systolic dysfunction (LVSD) in post acute coronary syndrome (ACS) patients.

Researchers from the University of Athens in Greece focused on demographical, nutritional, lifestyle, and medical factors combined with the risk of developing left ventricular dysfunction after nonfatal heart failure. The study included nearly one thousand patients who were hospitalized after ACS. At the study's conclusion, researchers noted that consuming fish one to two times per week was independently associated with a considerable reduction of the odds of developing LVSD. However, a higher consumption of fish did not result in further protection from the occurrence of LVSD.

Lead researcher Dr. D. Panagiotakos states, "More research is necessary in this area, including the determination of the type of fish consumed as well as the type of the cooking method (boiling, baking, frying)." The authors cite a study that determined consumption of a wide variety of fish is best for minimizing mercury exposure and increasing omega-3 fatty acid intake.

From: Nutrition Horizon 18 Dec 2009

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Omega-3s May Help Protect the Eyes and Kidneys Along with the Heart

Start 2010 right: consume more seafood omega-3 fatty acids. Improvements or lower risks in age-related macular degeneration (AMD), chronic kidney disease and heart health have been reported in people with higher intakes of fatty fish or the omega-3s they contain. These and other benefits of omega-3s per current research are described in the December 2009 PUFA Newsletter and Fats of Life e-newsletters for health professionals and consumers, respectively.

One benefit that's clear to see is the link between fish omega-3s and a lower chance of developing advanced AMD – the leading cause of vision loss and preventable blindness in adults aged 60 or more. A 12-year study of people with intermediate AMD reported that those with the highest consumption of omega-3s were 30 percent less likely to progress to advanced AMD.

In other research, people with chronic kidney disease who consumed a high dose of fish omega-3s for eight weeks had significantly lower blood pressure, heart rate and blood triglycerides (24 percent drop) compared with control patients. The function of their large arteries also improved.

"Chronic kidney disease, which can lead to kidney failure, increases the likelihood of heart disease by two to 50 times," said Joyce Nettleton, D.Sc., editor of the PUFA Newsletter and Fats of Life. "Increasing one's intake of fish or omega-3s offers a simple, affordable strategy for lowering this risk."

Another study found that in people with acute coronary syndrome who ate fish often – seven portions a week – had an 83 percent lower chance of having heart problems during the first 30 days after hospital admission compared with patients who did not eat fish.

Other research linked higher levels of fish omega-3s with fewer neurologic symptoms in people with carotid artery narrowing. They also had fewer markers of inflammation.

Finally, recent research suggests that in older people with diabetes, who are at increased risk of heart disease, higher intakes of fish oils or omega-3s might be linked to a lower chance of heart failure.

"All of these findings suggest that people with chronic kidney disease, heart disease or diabetes can lower their chances of heart problems by increasing their intake of fish omega-3s," Nettleton concluded. "And they may see more clearly later in life."

From: Nutrition Horizon 22 Dec 2009

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Researchers Find Clues to Why Some Continue to Eat When Full

The premise that hunger makes food look more appealing is a widely held belief – just ask those who cruise grocery store aisles on an empty stomach, only to go home with a full basket and an empty wallet.

Prior research studies have suggested that the so-called hunger hormone ghrelin, which the body produces when it's hungry, might act on the brain to trigger this behavior. New research in mice by UT Southwestern Medical Center scientists suggest that ghrelin might also work in the brain to make some people keep eating "pleasurable" foods when they're already full.

"What we show is that there may be situations where we are driven to seek out and eat very rewarding foods, even if we're full, for no other reason than our brain tells us to," said Dr. Jeffrey Zigman, assistant professor of internal medicine and psychiatry at UT Southwestern and co-senior author of the study appearing online and in a future edition of Biological Psychiatry.

Scientists previously have linked increased levels of ghrelin to intensifying the rewarding or pleasurable feelings one gets from cocaine or alcohol. Dr. Zigman said his team speculated that ghrelin might also increase specific rewarding aspects of eating.

Rewards, he said, generally can be defined as things that make us feel better.

"They give us sensory pleasure, and they motivate us to work to obtain them," he said. "They also help us reorganize our memory so that we remember how to get them."

Dr. Mario Perello, postdoctoral researcher in internal medicine and lead author of the current study, said the idea was to determine "why someone who is stuffed from lunch still eats – and wants to eat – that high-calorie dessert."

For this study, the researchers conducted two standard behavioral tests. In the first, they evaluated whether mice that were fully sated preferred a room where they had previously found high-fat food over one that had only offered regular bland chow. They found that when mice in this situation were administered ghrelin, they strongly preferred the room that had been paired with the high-fat diet. Mice without ghrelin showed no preference.

"We think the ghrelin prompted the mice to pursue the high-fat chow because they remembered how much they enjoyed it," Dr. Perello said. "It didn't matter that the room was now empty; they still associated it with something pleasurable."

The researchers also found that blocking the action of ghrelin, which is normally secreted into the bloodstream upon fasting or caloric restriction, prevented the mice from spending as much time in the room they associated with the high-fat food.

For the second test, the team observed how long mice would continue to poke their noses into a hole in order to receive a pellet of high-fat food. "The animals that didn't receive ghrelin gave up much sooner than the ones that did receive ghrelin," Dr. Zigman said.

Humans and mice share the same type of brain-cell connections and hormones, as well as similar architectures in the so-called "pleasure centers" of the brain. In addition, the behavior of the mice in this study is consistent

with pleasure- or reward-seeking behavior seen in other animal studies of addiction, Dr. Zigman said.

The next step, Dr. Perello said, is to determine which neural circuits in the brain regulate ghrelin's actions.

From: Nutrition Horizon 29 Dec 2009

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New Weapon in Battle of the Bulge: Food Releases Anti-Hunger Aromas During Chewing

A real possibility does exist for developing a new generation of foods that make people feel full by releasing anti-hunger aromas during chewing, scientists in the Netherlands are reporting after a review of research on that topic. Such foods would fight the global epidemic of obesity with aromas that quench hunger and prevent people from overeating. Their article appears in ACS' *Journal of Agricultural and Food Chemistry.*

Rianne Ruijschop and colleagues note that scientists long have tried to develop tasty foods that trigger or boost the feeling of fullness. Until recently, that research focused on food's effects in stomach after people swallow it. Efforts now have expanded to include foods that release hunger-quenching aromas during chewing. Molecules that make up a food's aroma apparently do so by activating areas of the brain that signal fullness.

Their analysis found that aroma release during chewing does contribute to the feeling of fullness and possibly to consumers' decisions to stop eating. The report cites several possible applications, including developing foods that release more aroma during chewing or developing aromas that have a more powerful effect in triggering feelings of fullness.

From: **Science Daily (Dec. 17, 2009)**
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Movement Comes With Appetite

A body that is provided with food too often gets caught up in the maelstrom of a lack of exercise, obesity and ultimately diabetes. The trigger is a molecular switch that is controlled by insulin, a new study by scientists from ETH Zurich has revealed.

Eat breakfast like a king, lunch like a prince and dinner like a pauper. And nothing in between: no snacks, no sweets, not even anything we think of as healthy. For in order to stay healthy the body needs to fast between meals. At least this is what nutritionists would recommend were they to translate the results of a new study from ETH Zurich into practical terms. After all, the research group headed by Markus Stoffel, a professor from the Institute of Molecular Systems Biology at ETH Zurich, has discovered an important molecular mechanism that underlies a lack of exercise and therefore obesity.

The researchers present their findings in the current issue of the journal *Nature*.

Hunger makes you active

The key switch player in this is a transcription factor called Foxa2. Transcription factors are proteins that make sure other genes are activated and converted into proteins. Foxa2 is found in the liver, where it influences fatburning, but also in two important neuron populations in the hypothalamus -- the region of the brain that controls the daily rhythm, sleep, intake of food and sexual behavior. The control element for Foxa2 activity is insulin, in both the liver and the hypothalamus.

If a person or animal ingests food, the beta cells in the pancreas release insulin, which blocks Foxa2. When fasting, there is a lack of insulin and Foxa2 is active. In the brain, the scientists have discovered, Foxa2 assists the formation of two proteins: MCH and orexin. These two brain messenger substances trigger different behavior patterns: the intake of food and spontaneous movement. If mammals are hungry, they are more alert and physically active. In short, they hunt and look for food. "If you watch a cat or a dog before feeding it, you can see this very clearly," says Stoffel.

Explanation found for lack of movement

The researchers discovered a disorder in obese mice: in these animals, Foxa2 is permanently active, regardless of whether the animals are fasting or full. This explains a well-known but until now unaccountable phenomenon: the lack of movement in obese people and animals.

To prove this, the researchers used a genetic trick to breed mice, in the brains of which Foxa2 is always active, regardless of whether they have just eaten or are fasting. These mice produce more MCH and orexin and move five times more than normal animals, in which insulin deactivates Foxa2 after eating or which are obese. The genetically modified mice lose fatty tissue and form larger muscles. Their sugar and fat metabolism works flat out and their blood values are considerably improved.

Three meals a day suffice

For Stoffel, the study clearly shows that, "The body needs fasting periods to stay healthy." Moreover, you should make sure you have a good body weight. He therefore doesn't think much of eating many little meals spread out over the day; it is better to eat less frequently but well, and leave room in between to get hungry. After all, because insulin is released during every meal, thus suppressing Foxa2, the motivation to do physical exercise and burn sugar and fat visibly decreases.

From: Science Daily (Dec. 21, 2009)
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Is Nicotinamide Overload a Trigger for Type 2 Diabetes?

Facing the increasing prevalence of type 2 diabetes worldwide in the past few decades, one may ask what is wrong with humans. Geneticists tell us that the human genome has not changed markedly in such a short time. Therefore, something must be happening in our environment or diet. As a matter of fact, dietary pattern is known to be closely linked to the development of type 2 diabetes. The increasing prevalence of type 2 diabetes following worldwide food fortification with niacin suggests that type 2 diabetes may involve excessive niacin intake.

A research article to be published on December 7, 2009 in the *World Journal of Gastroenterology* addresses the association between nicotinamide overload and type 2 diabetes. The study revealed that diabetic patients have a slow nicotinamide metabolism and thus require a longer time to clear up excess nicotinamide metabolites within the body.

High nicotinamide intake may lead to an increase the generation of reactive oxygen species, and subsequent oxidative stress and insulin resistance, both being the major features of type 2 diabetes. Liver is the main organ responsible for nicotinamide detoxification. This study found that liver-injury-inducing drugs may reduce nicotinamide detoxification and thus impair glucose tolerance.

Most interestingly and importantly, this study demonstrates that sweating is an effective way for expelling excess nicotinamide from the body. The findings from this study may help explain a wide variety of well-

documented but poorly understood phenomena in diabetes, such as lifestyle-triggered diabetes, liver-disease-related abnormal glucose metabolism, post-burn insulin resistance, and seasonal diabetes.

Nowadays, the high prevalence of type 2 diabetes may be due to both too much niacin in our foods and too little excretion through our sweat glands. The so-called gene-environment interaction in type 2 diabetes may actually be the outcome of the association of excess niacin intake and relatively low detoxification and excretion from the body, says lead author Dr. Shi-Sheng Zhou, Professor of the Institute of Basic Medical Sciences of Dalian University.

Historically, niacin deficiency was restricted mainly to those with poor nutrition who performed heavy industrial labor. Hence, this study gives rise to an important social and public health issue whether foods need to be fortified with niacin any more, when the people in developed countries have already been living in an age of over-nutrition. The authors found that reducing nicotinamide intake and facilitating the excretion of nicotinamide metabolites may be a useful preventive and therapeutic intervention in type 2 diabetes.

The peer reviewers stated that it is an interesting study with human and experimental data, which investigated a clinically relevant issue, and gave an insight into the pathogenic mechanisms involved.

From: Science Daily (Dec. 24, 2009)

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Roe Seen as 'Best' Natural Omega 3 Source

The roe of hake, lumpsucker and salmon are the best dietary source of omega 3, according to a study carried out by researchers at the University of Almería (UAL).

The scientists analyzed the eggs, or roe, of 15 marine animals, and found all of these contained high levels of these fatty acids, which are essential to the human body. Until now there had been no precise understanding of the nutritional potential of the roe of marine animals, but a team of researchers from the UAL has now shown that this is one of the best natural sources of omega 3 fatty acids, which are essential for ensuring the correct development of a wide variety of metabolic functions in the human body.

"We have classified these eggs as unequivocal sources of omega 3, and have proven that this appears at high concentrations in all the species studies," said José Luis Guil Guerrero, director of this study and a researcher in the Food Technology Department of the UAL.

The results, published in the *European Journal of Lipid Science and Technology*, show that omega 3 fatty acids are present in all fish roe, but especially in the eggs of Atlantic bonito (Sarda sarda), mackerel (Scomber scombrus), squid (Loligo vulgaris), cuttlefish (Sepia sp.), lumpsucker (Cyclopterus lumpus), hake (Merluccius merluccius) and salmon (Salmo salar).

The team studied the fatty acid content in the eggs of 15 marine animals, focusing their research on EPA and DHA. More than 30% of the fatty acids found in these eggs were EPA and DHA.

The conclusions of the study also show that minimal consumption of lumpsucker, hake or salmon roe satisfies the human body's omega 3 essential fatty acid requirements, because of its levels of EPA and DHA. A lack of these compounds is associated with cardiovascular disease, hypertension, depression, diabetes, poor development of the nervous and reproductive systems and inflammatory diseases, such as Crohn's disease.

"Aside from their nutritional importance, we could also make use of roe to extract its oil, which is rich in PUFAs (polyunsaturated fatty acids) and can be used as a dietary supplement, since it has a higher omega 3 content than regular oils, for example salmon and tuna oil," explained Guil Guerrero.

From: Report by Sean Moloughney in Nutraceuticals World Breaking News December 14, 2009

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Dairy Products Lower Obesity Risk

People who consume a high-fat dairy diet tend to have a lower body mass index (BMI), smaller waistline and healthier lifestyle according to research presented at the “"Nutrition and Overweight: Theory and Practice. The role of Milk” symposium organized by the Dutch Dairy Organization in collaboration with the Dutch Association of Dietitians (NVD).

Professor Frans Kok, the head of the Department of Human Nutrition at Wageningen University reported that dairy greatly contributes toward a high-nutrient intake, particularly calcium, vitamin B2 and B12, protein and zinc. He also said milk contributes about 15 percent of energy intake. The nutrients combined with the relatively low-energy contribution may play a specific role in weight maintenance.
From: Food Product Design 12/14/2009
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Salt, CVD and Cancer

Sodium intake as a whole salt equivalent may not increase the risk of cancer but may increase that of cardiovascular disease (CVD); and in contrast, salted food intake may increase the risk of cancer, according to a study published in *The American Journal of Clinical Nutrition* (2009;DOI:10.3945/ajcn.2009.28587).During 1995 to 1998, a validated food-frequency questionnaire was administered to 77,500 men and women aged 45 to 74 years. During up to 598,763 person-years of follow-up until the end of 2004, 4476 cases of cancer and 2066 cases of CVD were identified.

Higher consumption of sodium was associated with a higher risk of CVD but not with the risk of total cancer: multivariate hazard ratios for the highest compared with lowest quintiles of intake were 1.19 for CVD and 1.04 for total cancer. Higher consumption of salted fish roe was associated with higher risk of total cancer, and higher consumption of cooking and table salt was associated with higher risk of CVD. Similar results were seen for the risk of gastric or colorectal cancer and stroke. Our findings support the notion that sodium and salted foods have differential influences on the development of cancer and CVD.
From: Food Product Design 12/18/2009

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Why We Eat Too Much

Hunger is not the only reason foods are appealing to us, because satiety doesn’t always stop us from eating. Animal studies by researchers at UT Southwestern have found that the so-called hunger hormone ghrelin might also cause the brain to tell some of us to keep eating enjoyable foods even when we are full.

“What we show is that there may be situations where we are driven to seek out and eat very rewarding foods, even if we’re full, for no other reason than our brain tells us to,” said Dr. Jeffrey Zigman, assistant professor of internal medicine and psychiatry at UT Southwestern and co-senior author of the study to be published in the journal *Biological Psychiatry*.

The researchers found that the behavior of the mice in the study is similar to pleasure- or reward-seeking behavior seen in other animal studies of addiction. An increased ghrelin level is thought to intensify pleasurable feelings one similar to the action of cocaine or alcohol and Zigman believes ghrelin might also increase

rewarding aspects of eating. “They give us sensory pleasure, and they motivate us to work to obtain them,” he said. “They also help us reorganize our memory so that we remember how to get them.”
From: Food Product Design 12/28/2009

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Omega-3 Fatty Acids May Reduce Risk of Colon Cancer: NIEHS Research

Press Release -- HOUSTON -- December 7, 2009 -- Long-chain omega-3 fatty acids, primarily found in fish and seafood, may have a role in colorectal cancer prevention, according to results presented at the American Association for Cancer Research Frontiers in Cancer Prevention Research Conference, held Dec. 6-9, 2009, in Houston.

"Experimental data have shown benefits of long-chain omega-3 fatty acids in colorectal carcinogenesis, ranging from reduced tumor growth, suppression of angiogenesis and inhibition of metastasis," said Sangmi Kim, Ph.D., a postdoctoral fellow at the National Institute of Environmental Health Sciences, Research Triangle Park, N.C. "Our finding of inverse association between dietary intakes of long-chain omega-3 fatty acids and distal large bowel cancer in white participants adds additional support to the hypothesis."

Although experimental and clinical data suggest that long-chain omega-3 fatty acids possess anti-neoplastic properties in the colon, epidemiologic data to date has been inconclusive.

Kim and colleagues studied the link between polyunsaturated fatty acid intake and distal large bowel cancer using data from a population-based control study. They recruited 1,509 white participants (716 cancer cases and 787 controls) and 369 black participants (213 cancer cases and 156 controls) using the State Cancer Registry and Division of Motor Vehicles records.

Nineteen polyunsaturated fatty acids were assessed using a validated food frequency questionnaire, which included 124 questions on food items. The researchers used the questionnaire to collect information on the frequency and amount of foods typically consumed in the past 12 months. Patients who consumed more long-chain omega-3 fatty acids had a reduced risk of distal large bowel cancer. Compared to the lowest quartile, fat intake in the highest quartile was linked with a 39 percent reduced risk of cancer.

The researchers detected these associations in white participants, but not in black participants.

"We were surprised that the association was not also observed among blacks," Kim said. "We considered several possible explanations but were not able to account for this difference with the data we had. This finding warrants future study, but we should be careful about drawing conclusions about potential racial differences in the benefit from long-chain omega-3 fatty acids from this study."

"An increase in dietary intake of long-chain omega-3 fatty acids, which mainly come from fish and seafood, may be beneficial in the prevention of distal large bowel cancer," Kim said.
From: Soya Tech e-News December 8, 2009

Soy Peptide Lunasin Has Anti-Cancer, Anti-Inflammatory Properties: University of Illinois Research

Two new University of Illinois studies report that lunasin, a soy peptide often discarded in the waste streams of soy-processing plants, may have important health benefits that include fighting leukemia and blocking the inflammation that accompanies such chronic health conditions as diabetes, heart disease, and stroke.

"We confirmed lunasin's bioavailability in the human body by doing a third study in which men consumed 50 grams of soy protein--one soy milk shake and a serving of soy chili daily--for five days. Significant levels of the peptide in the participants' blood give us confidence that lunasin-rich soy foods can be important in providing these health benefits," said Elvira de Mejia, a U of I professor of food science and human nutrition.

In the cancer study, de Mejia's group identified a key sequence of amino acids--arginine, glycine, and aspartic acid, (the RGD motif)--that triggered the death of leukemia cells by activating a protein called caspase-3. "Other scientists have noted the cancer-preventive effects of the RGD sequence of amino acids so it's important to find proteins that have this sequence," she said.

The scientists also verified lunasin's ability to inhibit topoisomerase 2, an enzyme that marks the development of cancer, and they were able to quantify the number of leukemia cells that were killed after treatment with lunasin in laboratory experiments.

In another study, the first to report lunasin's potential anti-inflammatory activity, they showed that lunasin blocked or reduced the activation of an important marker called NF-kappa-B, a link in the chain of biochemical events that cause inflammation. They also found statistically significant reductions in interleukin-1 and interleukin-6, both important players in the inflammatory process. The reduction in interleukin-6 was particularly strong, she said.

Although inflammation is linked in the public mind with chronic health problems such as heart disease, diabetes, and rheumatoid arthritis, de Mejia said it also plays a role in the development of cancer. "We know that chronic inflammation is associated with an increased risk of malignancies, that it's a critical factor in tumor progression," she said. "And we can see that daily consumption of lunasin-rich soy protein may help to reduce chronic inflammation. Future studies should help us to make dietary recommendations," she added.

Although the high cost of obtaining lunasin from soy waste limits its use for nutritional interventions, soy flour does contain high concentrations of the peptide, she said. And de Mejia utilized the USDA soybean germplasm collection housed at the U of I, studying 144 soy genotypes to learn which varieties contain the most lunasin. "Some genotypes contain very high concentrations of lunasin, others contain no lunasin, and some locations yield more lunasin-rich beans than others," she said.

De Mejia spoke recently about this work at the Latin American Congress of Food Science and Technology in Brazil, the Latin American Congress of Nutrition in Chile, and the Institute of Food Science and Technology at National Taiwan University.

The leukemia study was published in Molecular Nutrition and Food Research. Wenyi Wang and Vermont Dia are co-authors. Lunasin's anti-inflammatory effects were described in Food Chemistry. V. P. Dia, W. Wang, and V. L. Oh of the U of I and B. O. de Lumen of the University of California, Berkeley, were co-authors. Both studies were funded by the USDA Future Food Initiative. The plasma and genotype studies appeared in the Journal of Agricultural and Food Chemistry. The environmental conditions study was published in the Journal of AOAC International.

From: Soya Tech e-News December 3, 2009

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Food & Nutrition News

Digestive Health Market Shows Steady Growth

Growing consumer awareness of functional foods is fueling demand and boosting product availability for digestive health ingredients in the EU, according to a recent report from Frost & Sullivan titled “EU Digestive Health Ingredients Market.”

In 2008, digestive health was the largest product segment of the total EU-approved functional food market, accounting for 68% of sales. Rising product prices, coupled with the extension of application areas, will continue to enhance market prospects.
The market earned revenues of $245 million in 2008, and Frost & Sullivan estimates it will reach $536.5 million in 2015. The following market segments are covered in the research: prebiotics, probiotics and digestive enzymes.

"The European market for digestive health ingredients is at the growth stage and new product launches are frequent and numerous," noted Sridhar Gajendran, Frost & Sullivan industry analyst. "Products for digestive health are available in both the functional foods and the dietary supplement segments, with the former having a relatively larger share in terms of both volume and value in 2008."

Currently, functional foods for digestive health are available as dairy products, fortified beverages, baked foods, cereals and convenience foods. This category is poised for healthy growth in the coming years, primarily due to its significant potential to penetrate different application sectors, the report indicates.

Increased prices have positively impacted market revenues. The extension of applications to meat and fish categories has further stimulated growth.

For instance, the global leader of inulin and oligofructose, Beneo-Orafti, recently increased prices for its range of BENEO products. Hikes of 6% in the price of liquid products and 8% in the price of powdered products were introduced in late 2007, with a subsequent 25% increase following suit in November 2008. The company engaged in co-branding in meat products for the first time with its prebiotic ingredients in September 2008. In addition to its existing line of ingredients for meat-based products, it introduced new products, including canned fish in Germany and turkey steak in Spain, which both featuring Beneo-Orafti's ingredient branding for the first time.

Probiotic products are frequently priced higher than other nutraceutical products. The relatively high cost of probiotics may prove to be prohibitive, especially as EU consumers tighten their belts in response to the current economic meltdown.

"Nevertheless, the growing trend for digestive health and consumers' keenness to offset rising healthcare costs will likely counterbalance the negative effects of the economic recession," said Sridhar Gajendran. "Moreover, as demand and production volumes for probiotic products grow, manufacturing costs will decrease."

These cost savings can be passed onto the processors and eventually to consumers. Hence, high price is likely to act as a low-impact restraint, gradually having even less of an impact over the long term.

Another challenge relates to the high cost of clinical trials. As a result, only limited research has been conducted to date.

"Drawing attention toward informative marketing tactics to educate a wide range of consumers about the benefits of digestive health products will effectively boost consumption," advises Sridhar Gajendran. "At the

same time, all available opportunities should be assessed to make more expansive claims when marketing products with strong digestive health credentials."

In the future, the digestive health ingredients market will likely be driven by the prebiotics segment, which continues to grow steadily. Dairy, bakery and cereals remain the most successful sectors.

Dairy accounts for 50% of prebiotic products currently in the market. In addition, a growing number of breakfast cereal manufacturers use prebiotics as a way of promoting the "feel good factor" to the consumer or to add extra fiber to biscuits and breakfast products.

From: Report by Sean Moloughney in Nutraceuticals World Breaking News December 10, 2009

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Organic Farming Can Be Counter-Productive

Increased organic farming of wheat and paddy crops could be counter-productive for Punjab and could also jeopardise the national food security, according to a six-month study of organic as well as intensive farming systems in the state by the State Farmers Commission.

The report, which has been prepared after the release of a draft paper to prominent scientists as well as institutions, will be submitted to the state government shortly. It also calls for legislation to control burning of crop residues, saying rice straw worth Rs. 250 crore is being burnt in the state.

The report also has a message for farmers. Farmers Commission chairman GS Kalkat told the Tribune that farmers should take up organic farming of food grains on a contract basis only. "Otherwise it is not a paying proposition for the farmers involved", he added.

It also recommends the government provide funds to the Punjab Agricultural University (PAU), Ludhiana, so that new innovations reported in use by organic farmers in different parts of the country are collected and sorted out crop and region wise and tested for their application. "This is imperative as a lot of things being done do not seen to have scientific basis", Dr. Kalkat said while talking about different organic manures being prepared using cow dung, urine, and other products.

Meanwhile, the report says it is essential to provide requisite nutrients and also use insecticides to control pests. Citing a three-year experimental data of the PAU, it states that without chemical fertilisers, there would be a reduction in food grain production by 25 to 30 million tonnes and it would jeopardise the national food security.

Farmers Commission consultant PS Rangi said the fact that there was no residue content of weedicide (used during the initial phase) in food grains proved that intensive farming of both wheat and paddy was still the best option. Dr. Rangi said on the other hand the premium price of organic grain was the major determinant of the profitability of organic farming and thus had a limited scope.

The report notes that organic manures do start the process of improving the soil health, but it may not possible for the entire cropped area nor sustain high yields in all crop alternatives. Likewise, it says macro and micronutrients, if applied judiciously, would not deteriorate soil health. Use of both organic and intensive farming methods in combination could be the best option.

Those promoting organic farming say they are dismayed that people "who do not know anything about the process are passing judgement on it". Umendra Dutt of the Kheti Virasat Mission says PAU scientists are talking about yield reduction in case of organic farming but have not factored in the fact that yield revives once

the soil quality improves. Similarly, while talking about the viability of organic farming, one needed to calculate net profit and not yield.
From: Tribune News Service by Jangveer Singh December 31, 2009
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Dietitians Recommend Filling Diet 'Gaps' with Supplements

Eight in 10 registered dietitians view dietary supplements as important for maintaining health, according to the "Life...supplemented" 2009 Healthcare Professionals (HCP) Impact Study.

The study shows 81% of registered dietitians agree most people have gaps in their diets that can be filled with vitamins and other dietary supplements. Many include themselves in this group, with 76% agreeing that supplement use can address their own diet gaps. Registered dietitians' actions follow suit, with nine in 10 (96%) taking supplements and recommending them to their clients (97%).

Multivitamins are the most common supplement that registered dietitians are taking (84%). RDs also take specialty supplements (64% take at least one specialty supplement), such as omega 3 fish oils (47%), herbal or botanical supplements (46%) or fiber (22%). More than half of registered dietitians take supplements for improved bone health (58%) and overall health and wellness (53%).

"Registered dietitians know people's eating habits, and we know that people don't always eat correctly," said Leslie Bonci, RD, director of sports medicine nutrition for the Department of Orthopedic Surgery and the Center for Sports Medicine at the University of Pittsburgh Medical Center and advisor to the "Life...supplemented" campaign. "A healthy diet works in concert with exercise and responsible use of supplements for a wellness lifestyle. We're seeing RDs champion these three components to overall wellness."

Seven in 10 registered dietitians who recommend supplements to their clients report doing so for bone health (72%) and to fill nutrition gaps (69%).

According to Ms. Bonci the opportunity for registered dietitians to introduce the three pillars of health (healthy diet + dietary supplements + exercise) continues to grow as more consumers focus on wellness. Research shows the need for education about supplement use is significant. Less than one-quarter (23%) of RDs agree that their clients have a good understanding of the recommended daily intake of dietary supplements. "Registered dietitians can help fill the education gap for their clients," she said.

Results from the 2009 "Life...supplemented" HCP Impact Study went public in December 2009 and comprise three separate surveys: (300) nurse practitioners, (300) pharmacists and (300) registered dietitians. Seventy-four percent of RDs taking the study identified themselves as members of the American Dietetic Association, the world's largest organization of food and nutrition professionals.
From: Report by Sean Moloughney Nutraceuticals World Breaking News December 11, 2009
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Junk food fills children's lunchboxes

The infamous Turkey Twizzler may have disappeared from the school canteen, but children who eat packed lunches are still eating junk food – supplied by their parents – according to new research published today. British children eat 5.5bn packed lunches each year, but research from the University of Leeds shows that only 1% of their lunchboxes meet the tough nutritional standards that have been set for their classmates on school meals. The findings were described as "appalling" by children's health campaigners, who want all children to be given free, nutritious school meals.
About half of all children in England take a packed lunch to school. In the first study of its kind, the Leeds research team, commissioned by the government's food watchdog, the Food Standards Agency, found that 82% of their lunchboxes contained foods high in saturated fat, salt and sugar, with items chosen by parents including

crisps, sweets and biscuits. Only one in five packed lunches contained any vegetables or salad and about half included an item of fruit – yet in the overwhelming majority of cases, even these fell well below the standards demanded of school dinners.

The first statutory school meal standards were introduced in 2006 due to growing evidence linking poor health in adults with obesity or poor diet in childhood. They limit the amount of foods high in salt, sugar and fats that can be served and stipulate that school meals must provide a third of the daily requirement of every nutrient for health. And although the schools watchdog, Ofsted, says schools must have a policy on packed lunches, there is no legislative imperative for them to comply with the same nutritional standards that are applied in the canteen. Fewer than half of children's packed lunches met the government's 2008 nutrient standards, including levels of vitamin A, folate, iron and zinc. On average, girls tended to be given more healthy foodstuffs than boys, and children at schools with fewer pupils eligible for free school meals had healthier packed lunches. Overall, the food least likely to be eaten when provided was fruit, while that most likely to be eaten was confectionery.
The research is published online today, ahead of publication in the Journal of Epidemiology and Community Health. It was led by Charlotte Evans of the Leeds Institute of Genetics, Health and Therapeutics, who said: "The lack of equivalent food standards for packed lunches gives cause for concern that they will continue to lag behind the nutritional quality of school meals."

Even without legislation, there is plenty that schools, parents and manufacturers can do to improve the situation. Evans went on: "Our research has shown that some small steps in the right direction would make a big difference. Even if schools had a policy to provide water for children eating packed lunches, this would significantly reduce their sugar intake from sweetened drinks.

"It is important that schools support health-promotion programmes, and strategies are in place to help parents meet nutritional standards by encouraging them to include healthy foods such as protein-rich sandwiches and fruit and vegetables. Simply concentrating on restricting the junk content of lunchboxes can be counter-productive – children at schools where crisps are restricted, for example, end up with lunchboxes containing more confectionery."

Evans added: "We also need food manufacturers to offer better choices than the traditional high-salt, high-sugar products that busy families rely on to fill the school lunchbox on a daily basis."
Professor Janet Cade, head of the Nutritional Epidemiology Group at Leeds, added: "While we absolutely understand that many children prefer to take packed lunches to school, it is clear that they are not getting the same benefit from their midday meal as their classmates on school dinners. The poor quality of these meals could have serious implications for levels of childhood obesity and its long-term consequences."

The Children's Food Campaign coordinator, Jackie Schneider, commented: "Although these findings are appalling, we are not surprised. A whole industry has grown up around producing foods for lunchboxes, which can contain high levels of salt, fat or sugar. Parents are often misled by marketing for these lunchbox products, which make health claims like 'high in vitamins' but also turn out to be high in salt, fat or sugar as well."
Schneider concluded: "There is now an even stronger case for giving all children a free healthy school meal, which really will start to change our food culture."
From: Guardian, UK by Rebecca Smithers January 12, 2010

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Britannia chief Vinita Bali bags ET Woman of the Year award

In a recent development, Vinita Bali, managing director, Britannia Industries Limited, bagged the Economic Times Businesswoman of the Year. The award was given to Bali for her efforts and achievements in developing Britannia as a market leader food company. She joined the company in January 2005 as chief executive officer and was appointed as managing director on May 31, 2006.

The company has continued to achieve double-digit growth year on year over the past three years.

Bali followed a strategic vision and direction for the business and is leading the company into profitable growth and new business opportunities. Bali is a post-graduate in Business and Economics from the Michigan State University and has also been ranked 22nd among the world's 50 top business women compiled by the Financial Times. Today the Economics Times award reinstates her efforts to the company as Britannia is a vibrant company with right mix of brands, packs and price-points.

From: Image Foods 12 Jan 2010

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Coming Events

AAHAR 2010
March 10-14, 2010
Hall 6 Pragati Maidan, New Delhi
India Trade Promotion Organisation (ITPO)
Pragati Bhawan, N. Delhi
Tel: 011-2337 1965
Email: ni@itpo-online.com
Web: www.aaharinternationalfair.com

Interpack 2010
FOODTEK 2010
March 10-13, 2010
Bombay Exhibition Centre, Mumbai
Tel: 9820765030 Web: www.intelpack.in

Vitafoods International
May 18-20, 2010
Geneva Palexpo, Geneva Switzerland
Organisers: IIR EXHIBITIONS
T: (44) 20 – 7017 7019/7017 7108
F: 7344 3890

International Probiotic Conference
June 15-17, 2010
University City of Kosice, Slovakia
Contact: Organising Secretariat
Komenskeho 2656
02401 Kysucke Nove Mesto, Slovakia
T: +421 918 707371
F: +421 414 000123
E: norbert.bomba@probiotic-conference.net
W: www.probiotic-conference.net