



## PROBIOTICS AND PREBIOTICS:

**W**e all know probiotics and prebiotics are substances that make scientists as well as the general public evince great interest even today. Literature on probiotics and prebiotics mention that they can restore the balance of bacteria in our digestive tract. While probiotics are beneficial bacteria that can be found in various foods, prebiotics are non-digestible foods that make their way through our digestive system and help good bacteria grow and flourish. Prebiotics keep beneficial bacteria healthy.

In Touch has been publishing articles of interest for our readers on a regular basis. On this popular subject, In Touch had published an article, in 2001 (Vol. 4 No. 1), titled 'Prebiotics and Probiotics - New Concepts in Nutrition & Health' by Dr A. Venkat Rao. Again in 2008, In Touch published 'Health Benefits of Probiotics' by Dr R. Hemalatha of NIN in (Vol.10 No.2). In the article, Hemalatha wrote that Professor Ilya Mechnikov was the first to promote the concept of good bacteria for healthy life in 1908. He observed unusually lengthy life spans of several communities that practiced eating fermented foods and special bacterial cultures called kefir. Metchnikoff proposed that consumption of fermented milk would "seed" the intestine with harmless lactic-acid bacteria and decrease the intestinal pH and that this would suppress the growth of proteolytic bacteria like clostridium.

Curd is a lactobacillus fermented product that has also been part of the diet in India for centuries which is considered a good source of probiotics.

Dr Shweta Rastogi (in this vol. 12 No. 4) has presented an article touching upon yet another facet, titled 'Role of Probiotics and Prebiotics in children'. She makes the article interesting with flow charts on Acquisition of gut flora in human infants, Mechanisms of action, Immunologic benefits, Non-immunologic benefits, and Clinical Applications in children. She deals with prebiotics separately, highlighting the 'Clinical Applications in children', particularly in G.I. infections, immunity, and in overall improvement in nutritional status.

I take this opportunity to wish all our readers a Happy and Prosperous 2011.



**N. THIRUAMBALAM**  
CHAIRMAN & MANAGING DIRECTOR,  
HEINZ INDIA PVT. LTD.

## Contents

### MESSAGES

MDs Message **Page 1**  
Dr. Amdekar's Message **Page 8**

### LEAD ARTICLE

ROLE OF PROBIOTICS AND  
PREBIOTICS IN CHILDREN  
By Dr. Shweta Rastogi  
**Page 2-6**

SNIPPETS COMPILED  
BY DR. J S PAI  
**Page 6-8**

## SCIENTIFIC COUNCIL MEMBERS (SCM)

### EDITORIAL BOARD

**DR. P. H. ANANTHANARAYANAN**  
Head, Department of Biochemistry, JIPMER,  
Puducherry

**DR. BHASKAR RAJU**  
HOD, Paediatric Gastroenterology  
Institute of Child Health, Chennai

**DR. UMESH KAPIL**  
Prof. Dept. of Nutrition, AIIMS, New Delhi

**DR. KAMALA KRISHNASWAMY**  
Retd. Dir., & Emeritus Medical Scientist (ICMR)  
NIN., Hyderabad

### RESEARCH SUB-COMMITTEE

**DR. N. K. GANGULY**  
Retd. Director General, ICMR, New Delhi

**DR. RAKESH TANDON**  
Retd. Prof. & Head Dept. of Gastroenterology  
AIIMS, New Delhi

**DR. ANAND PANDIT**  
Hon. Prof. & Director, Dept. of Paediatrics, KEM  
Hospital, Pune

**DR. J. S. PAI**  
Executive Director, PFNDI, Mumbai

### OTHER SCMS

**MR. V. MOHAN**  
Vice President/Director HR & Legal  
Heinz India Private Limited.

**DR. B. L. AMLA**  
Ex-Director, CFTRI, Mysore

**DR. GODADHAR SARANGI**  
Director, The Child, Cuttack.

**DR. B. N. MATHUR**  
Retd. Director,  
NDRI, Karnal

**DR. SARATH GOPALAN**  
Executive Director,  
CRNSS, New Delhi

**MR. P. P. ROY**  
Associate Vice President, R&D,  
Heinz India Private Limited

### EX-OFFICIO MEMBER

**DR. IDAMARIE LAQUATRA**  
Director, Global Nutrition, World Headquarters,  
H J Heinz Company, Pittsburg, USA

### TRUSTEES

**MR. N. THIRUAMBALAM**  
Chairman & Managing Director,  
Heinz India Pvt. Ltd.

**DR. Y. K. AMDEKAR**  
Retd. Hon. Prof. of Paediatrics,  
Institute of Child Health, Mumbai

**MR. NILESH PATEL**  
President,  
P.T. Heinz ABC, Indonesia

### MANAGING EDITOR

**P. JAGANNIVAS**  
Director,  
Heinz Nutrition Foundation India, Mumbai

## ROLE OF PROBIOTICS AND PREBIOTICS IN CHILDREN



BY DR. SHWETA RASTOGI

### INTRODUCTION

The growing awareness of the relationship between diet and health has led to an increasing demand for food products that support health besides providing basic nutrition. Food is digested and then metabolised by gut micro flora. Healthy intestinal flora may improve energy levels, strengthen immune system and improve overall health.

Probiotics and prebiotics are components present in foods or that can be incorporated into foods, which yield health benefits related to their interactions with the G.I. Such 'functional foods' are part of a dietary approach to prophylactically manage health disorders in a way that is both safe and cost effective. The health benefits and efficacy of probiotics and prebiotics are currently attracting much attention and research. They span a broad range, including improved gut performance,

immune function, and mineral bio-availability.

### HISTORY AND DEFINITION

The term 'probiotics' was first introduced in 1965 by Lilly and Stillwell; in contrast to antibiotics, probiotics were defined as microbially derived factors that stimulate the growth of other organisms. According to the definition by FAO of the UN and WHO, probiotics are live micro organisms that when administered in adequate amounts confer a health benefit on the host. In 1989, Roy Fuller emphasised the requirement of viability for probiotics and introduced the idea that they have a beneficial effect on the host. Most probiotics are bacteria similar to those naturally found in people's guts especially in those of breast fed infants (who have natural protection against many diseases). Most often the bacteria come from two

groups - *Lactobacillus acidophilus* and *bifidobacterium bifidus*) and within each species different strains/ varieties. Yeast *saccharomyces, cerevisiae bouldardi* species are also used as probiotics.

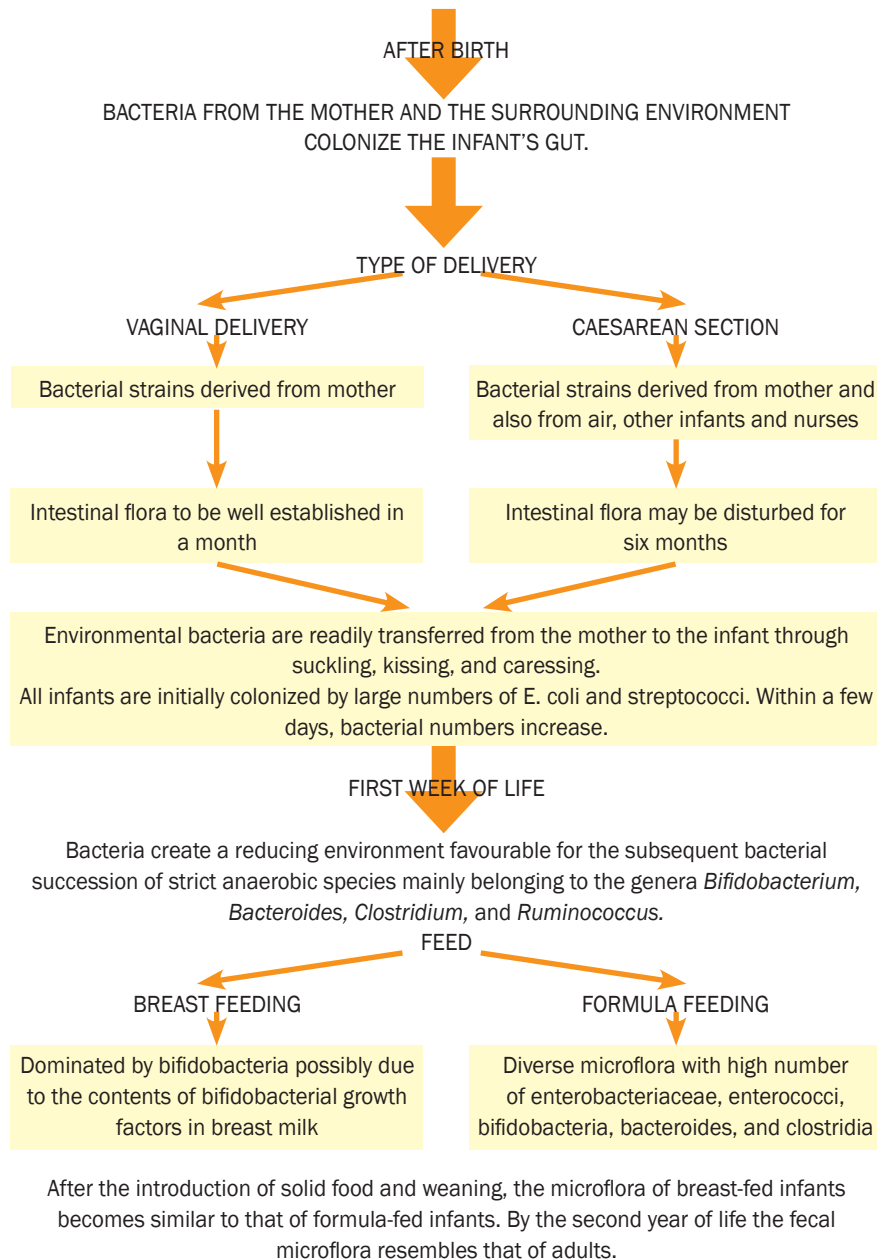
Synbiotics refer to nutritional supplements combining probiotics and prebiotics to form a symbiotic relationship.

### GUT FLORA IN HUMAN INFANTS

The colonization of the gut begins promptly after birth. It is affected by the mode of delivery, maternal gut microflora, and the early environment. After this initial colonization, diet affects the selection of bacterial strains. Breast milk contains plentiful indigestible oligosaccharides (prebiotic), which pass through the whole intestine and promote the growth and activity of commensal bacteria, mainly of *bifidobacteria* (probiotic). Refer Fig 1.

## FIG 1. ACQUISITION OF GUT FLORA IN HUMAN INFANTS

THE GASTROINTESTINAL TRACT OF A NORMAL FETUS IS STERILE



be categorized as:

### IMMUNOLOGIC BENEFITS

- Activate local macrophages to increase antigen presentation to B lymphocytes and increase secretory immunoglobulin A (IgA) production both locally and systemically
- Modulate cytokine profiles
- Induce hypo responsiveness to food antigens

### NON-IMMUNOLOGIC BENEFITS

- Digest food and compete for nutrients with pathogens
- Alter local pH to create an unfavourable local environment for pathogens
- Produce bacteriocins to inhibit pathogens
- Scavenge superoxide radicals
- Stimulate epithelial mucin production
- Enhance intestinal barrier function
- Compete for adhesion with pathogens
- Modify pathogen-derived toxins

### CLINICAL APPLICATIONS IN CHILDREN

Probiotic agents have been shown to have significant clinical beneficial effects in the prevention and management of gastrointestinal and non-gastrointestinal conditions as shown in Table 1.

These observations have led to work demonstrating that an important mechanism of these agents is their close interaction with the gut associated lymphoid tissue (GALT) and suggested immunomodulatory effects on systemic immune response. Some probiotic preparations have been used to prevent diarrhea caused by antibiotics, or as part of the treatment for antibiotic-related dysbiosis.

In mammals, including humans, the entero-mammary pathway for secretory IgA production is thought to be an important protective mechanism against infections in breast-fed children. Improved hygiene and decreased exposure of the immature immune system to microbes in early life are implicated in the increase in allergic diseases in developed countries during recent decades. Gut microbiota are the prerequisite for induction of oral tolerance, and in infants features of the microbiota might relate to the establishment of allergies and IgE antibodies.

Some of the studies conducted in infants and children are as follows:  
**WEIGHT GAIN:** Al Hosni et al. (2010) evaluated the effect of supplementing

J. PEDIATR. GASTROENTEROL. NUTR. 30 (1): 61-7; J. CLIN. GASTROENTEROL. 38 (6 SUPPL): S80-3; AM. J. CLIN. NUTR. 69 (5): 1035S-1045S.

### MECHANISMS OF ACTION

Probiotics affect the intestinal ecosystem by stimulating mucosal immune mechanisms and by stimulating non-immune mechanisms through antagonism/competition with potential pathogens. These phenomena are thought to mediate most beneficial effects, including reduction of the incidence and severity of diarrhoea, which is one of the most widely recognized uses for probiotics. The intestine is the body's most important immune function-

related organ; approximately 60 per cent of the body's immune cells are present in the intestinal mucosa.

The immune system controls immune responses against:

- Dietary proteins by preventing food allergies
- Pathogenic microorganisms like viruses (rotavirus, poliovirus), bacteria (*Salmonella*, *Listeria*, *Clostridium*, etc.) and parasites (*Toxoplasma*)

**BENEFITS:** The benefits of probiotics can

enteral feedings with probiotics in extremely premature infants who weighed 2 pounds and 2 ounces or less from three medical centers in U.S. 50 infants received 500 million units of probiotics while 51 infants received feedings with no probiotics. Results showed superior weight gain in infants who received the probiotics even though the average daily volume of the feedings was less than infants in the control group. No side effects were reported as a result of probiotic supplementation.

**REDUCTION IN ALLERGIC DISEASES:** The increase in allergic diseases is attributed to a relative lack of microbial stimulation of the infantile gut immune system. A study on 1223 pregnant women carrying high-risk children was conducted in which a probiotic preparation or a placebo was given to the subjects for 2 to 4 weeks before delivery. About half of the infants of the above subjects received the same probiotics plus galacto-oligosaccharides and rest of them were given for six months. At two years, the cumulative incidence of allergic diseases (food allergy, eczema, asthma, and allergic rhinitis) and IgE sensitization was evaluated. Probiotic treatment among infants was reported to have reduced eczema and atopic eczema. The results suggest an inverse association between atopic diseases and colonization of the gut by probiotics (Kukkonen et. al 2007).

**DIARRHOEA:** The use of probiotics has been shown to have a therapeutic as well as prophylactic effect on diarrhoeal illnesses of multiple aetiologies such as *Clostridium difficile* induced enteritis, traveller's diarrhoea as well as antibiotic associated diarrhoea. Several well-controlled studies have demonstrated that dietary supplementation with either bifidobacteria or lactobacilli will decrease the duration and/or severity of acute diarrhoeal disease in infants and children. Prospective studies have also shown that the incidence of acute diarrhoea can be decreased. Interestingly, however, the best documented effects in diarrhoeal disease both in animals and humans have been observed in cases of viral gastroenteritis. The supplementation with probiotics in infants with atopic dermatitis and cow's mild protein allergy has also shown positive outcomes. Numerous studies now suggest direct probiotic immunomodulation of the GALT, its humoral as well as its cellular immune component (Isolauri et al. 1995; Kaila et al, 1992; Marteau & Ceillier 1999; Perdigon et al, 1994).

**TABLE 1: ESTABLISHED AND PROPOSED PROBIOTIC HEALTH EFFECTS**

PROBIOTIC EFFECT	VALIDITY OF SCIENTIFIC KNOWLEDGE
Modulation of the autochthonous (usually intestinal) microflora	Well-established effect. However, because of methodological difficulties and complex interactions between regulatory mechanisms, the correlation with true health effects is not clear
Prevention and/or reduction of duration and complaints of rotavirus-induced diarrhoea	Effect well established by clinical studies and accepted by the scientific community
Prevention or alleviation of antibiotic-associated diarrhoea	
Alleviation of complaints caused by lactose intolerance	
Beneficial effects on microbial aberrancies, inflammation, and other complaints in connection with inflammatory diseases of the gastrointestinal tract, <i>Helicobacter pylori</i> infection, bacterial overgrowth	
Prevention and alleviation of unspecific and irregular complaints of the gastrointestinal tract in healthy subjects	Effects established in certain target groups. However, more studies are necessary to find out which section of the population may profit from a probiotic and under what conditions
Normalization of passing stool and stool consistency in subjects suffering from an irritable colon	Effects cannot be classified as well established and scientifically proven because of insufficient clinical and/or epidemiological data

J. NUTR. 137: 803S-811S, 2007

**SOURCES OF PROBIOTICS:** The most common forms for probiotics are dairy products and probiotic-fortified foods. However, tablets, capsules, and sachets containing the bacteria in freeze-dried form are also available. Probiotic containing foods are commonly found and consumed in Japan, Asia, Europe and U.S. Several probiotic and prebiotic containing foods have recently been introduced in Indian markets. Examples are yoghurt, fermented and unfermented milk, miso, tempeh and some juices and soy beverages. In probiotic foods and supplements, the bacteria may have been present originally or added during preparation.



The dose needed for probiotics varies greatly depending on the strain and product. Although many over-the-counter products deliver in the range of 1-10 billion cfu/dose, some products have been shown to be efficacious at lower levels, while some require substantially more. According to World Gastroenterology organization (2008), it is not possible to state a general dose that is needed for probiotics; the dosage has to be based on human studies showing a health benefit.

**PRODUCT SAFETY**

Some species of lactobacilli and bifidobacteria are normal residents of, or common transients through, the human digestive system and as such do not display infectivity or toxicity. Lactobacilli, or bifidobacteria and yeast have a long history of having been used in foods, moreover, the information obtained from epidemiological studies shows that there are no side effects in humans. Hence, experts have concluded that these groups of micro organisms are safe and do possess probiotic properties.

**PREBIOTICS**

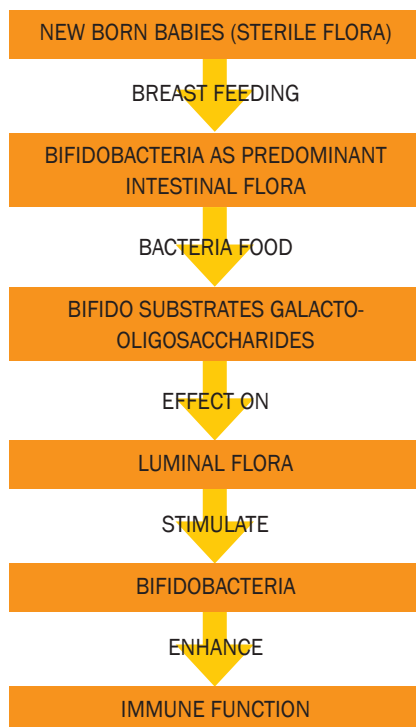
A prebiotic was originally defined in 1995 as a 'non-digestible food ingredient that beneficially affects the host by selectively

stimulating the growth and/or activity of one or a limited number of bacteria in the colon, and thus improves host health'. According to FAO (2007), a more recent definition stated that 'A prebiotic is a selectively fermented ingredient that allows specific changes; both in the composition and/or activity in the gastrointestinal microbiota that confers benefits upon host wellbeing and health'.

Common prebiotics in use include inulin, fructo-oligosaccharides (FOS), galactooligosaccharides (GOS), soya-oligosaccharides, xylo-oligosaccharides, pyrodextrins, isomalto-oligosaccharides and lactulose. The majority of studies so far have been focused on inulin, FOS and GOS. These saccharides now have a long history of safe use and are generally regarded as safe (GRAS), although there is some concern over increased gas production with some compounds, particularly when ingested in higher amounts or during the first few days of intake.

Prebiotics affect intestinal bacteria by increasing the numbers of beneficial anaerobic bacteria and decreasing the population of potentially pathogenic micro organisms. That's why, prebiotics are often referred to as 'food' for beneficial bacteria.

**FIG 2: SEQUENCE OF EFFECTS OF PREBIOTIC IN CHILDREN**



BRITISH JOURNAL OF NUTRITION (2002), 87, SUPPL. 2, S241-S246

Breast-fed infants carry bifidobacteria as their predominant intestinal flora, with wide variations amongst different populations. This native probiotic infant flora is maintained in the breast-fed infant in part via bifidogenic substrates galactooligosaccharides (refer Fig 2) contained in human breast milk and classically termed 'bifido factor'. This interplay between flora and breastmilk has drawn attention to the bifidogenic effect of nutritional supplements and bifidogenicity has become a hallmark of the prebiotic concept. Oligofructose and other oligosaccharides have a significant effect on the population of luminal flora, in particular, stimulating bifidobacterial populations. Bifidobacteria are present in high counts early in the infant faecal flora, but the number of these native organisms decreases significantly thereafter. Oligofructose as a prebiotic has shown specific bifidogenicity. Thus, it is likely that the immunological effects observed in probiotic studies could be demonstrated via the use of prebiotics, and that these agents may ultimately demonstrate similar clinical benefits as have been reported with probiotic bacteria.

### CLINICAL APPLICATIONS IN CHILDREN

The preliminary findings of several recent human clinical trials reviewed indicate that prebiotics may indeed prove to be a clinically beneficial dietary supplement in the context of novel nutritional strategies for the management of gastrointestinal and systemic conditions. Following studies support this statement:

**G.I. INFECTIONS:** A double masked, randomised controlled study was conducted to assess several clinical parameters related to common acute paediatric illnesses in infants and toddlers, supplemented with oligofructose. The gastro-intestinal tolerance to this oligofructose, a non-absorbable non-digested carbohydrate was also assessed. One hundred and twenty-three out of 140 subjects recruited completed the study. These healthy children, between the ages of 4 and 24 months were already consuming cereal prior to enrolment in the study and were all attending daycare in a large metropolitan area. The children were randomized to receive a commercially available infant cereal alone or the same cereal supplemented with oligofructose at a concentration of 0.55g per 15g of

dry cereal. During the entire study period, the supplemented group consumed a calculated daily average of 1.1g oligofructose/day. A significantly lower frequency of reported emesis, regurgitation (spitting up), and perceived discomfort with bowel movements was noted in the supplemented group. Highly significant differences were noted when comparing the groups for the occurrence of concurrent fever as an indicator of severity during diarrhoeal episodes (Saavedra et al. 1999; Tschernia et al. 1999).

**IMMUNITY:** Firmansyah et al. (2001) studied the effect of a cereal weaning food, supplemented with oligofructose on the immunological response to measles vaccine. In this double masked, placebo controlled trial, fifty healthy infants aged 7-9 months of age were randomised to receive a standard cereal or one supplemented with a mixture of oligofructose and inulin, added at a concentration of 1g per 25g of dry weight cereal. The supplemented group received 0.2g prebiotic per kg body weight per day. However a significant difference was noted when comparing anti measles IgG: initial levels were low and similar between groups at baseline, but a significant difference post-immunization was clearly detected above baseline (supplemented group: 6.6-fold increase vs. control: 4.2 fold increase). Anti measles IgM levels showed no inter-or intragroup significant differences throughout the study. The positivity rates for children with adequate IgG antibody response were 96 per cent and 88 per cent in the supplemented and control group, respectively.



**DIARRHOEA:** Another study using a synbiotic (the concurrent administration of a probiotic and a prebiotic) has shown significant effects. In a double masked trial (Ahmad et al. 2000), 58 healthy children with acute gastroenteritis were randomised to receive a low lactose formula with or without a combination of lactobacillus rhamnosus and oligofructose. The duration of diarrhoea was significantly shortened in the supplemented group.

#### IMPROVEMENT IN NUTRITIONAL

**STATUS:** A study conducted by Fisberg et al. (2000) was a multicentre, double masked controlled trial: 626 children, aged between 1 and 6 years with mild to moderate malnutrition were enrolled to receive a nutritional supplement with or without a synbiotic preparation (containing lactobacillus acidophilus, bifidobacterium infantis and oligofructose). The number of 'sick days' for subjects aged 3-5 years was significantly lower in the group receiving the synbiotic supplement. Overall the total number of 'sick days' decreased in both groups over the study time, as the nutritional status of these children improved.



**FOOD SOURCES:** The prebiotic oligofructose is found naturally in many foods, such as wheat, onions, bananas, honey, garlic, and leeks. Oligofructose can also be isolated from chicory root or synthesized enzymatically from sucrose. Unlike probiotics, most prebiotics are used as food ingredients—in biscuits, cereals, chocolate, spreads, and dairy products.

**BENEFITS OF PREBIOTICS:** Prebiotics have a number of beneficial effects. Some of them are listed below:

- Increasing the number of bifidobacteria in the colon
- Increasing calcium absorption

- Increasing fecal weight
- Shortening gastrointestinal transit time
- Possibly, lowering blood lipid levels
- Metabolic effects: production of short-chain fatty acids, fat metabolism, absorption of minerals (Ca, Fe, Mg)
- Enhancing host immunity (IgA production, cytokine modulation, etc.)

#### CRITERIA FOR PREBIOTIC CLASSIFICATION

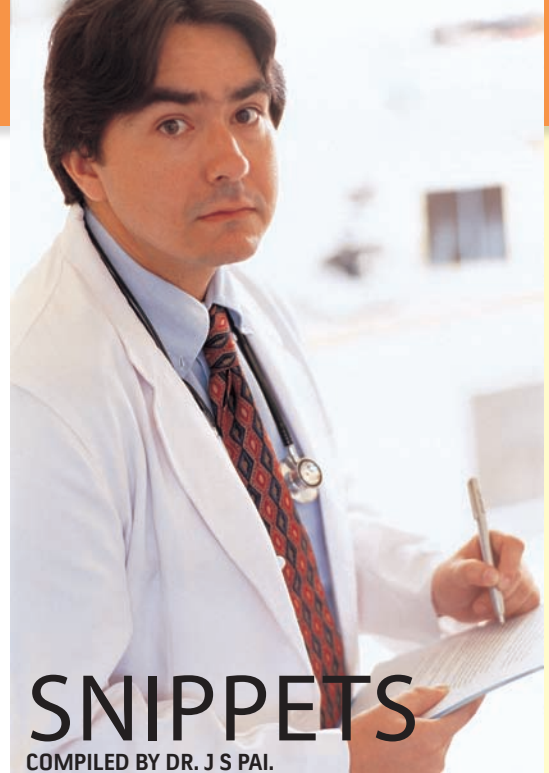
For the substrate to be classified as a prebiotic, four criteria should be satisfied:

- It must not be hydrolysed or absorbed in the stomach or small intestine.
- It must be selective for beneficial commensal bacteria in the colon by encouraging the growth/metabolism of the organisms.
- It will alter the microflora to a healthy composition.
- The substrate must induce beneficial luminal/ systemic effects within the host.

#### CONCLUSION

Micro organisms have a long history of use to produce foods, ingredients or food supplements. Prebiotics and probiotics have potential impact on the balance of the body's microflora and directly or indirectly in the enhancement of the function of the gut and systemic immune system thereby leading to health benefits. Although benefits vary depending on the type and amount of a prebiotic or probiotic consumed, experts agree that daily consumption of foods containing these functional components is beneficial.

By: Dr. Shweta Rastogi, Clinical dietician and Consultant lifestyle medicine, Guru Nanak Hospital and research centre.



## SNIPPETS

COMPILED BY DR. J S PAI.

### PROBIOTIC OR PLACEBO - WHICH TREATMENT IS EFFECTIVE IN MAINTAINING REMISSION IN ULCERATIVE COLITIS?

FROM: MEDICAL NEWS TODAY

20, APR 2010

Inflammatory bowel disease is a chronic recurrent disease, which mainly consists of ulcerative colitis and Crohn's disease, and whose causes are as yet unclear. Many clinical and research studies have indicated that intestinal flora dysbiosis contributes to the pathogenesis of ulcerative colitis. Probiotics are non-pathogenic beneficial flora, which have important effects on maintaining the balance of intestinal flora. Many studies have discussed the positive effects of probiotics for treating stomach and intestine diseases, including ulcerative colitis. However, the sample size has been relatively small, such that there is no definitive evidence as to whether probiotics are helpful.

A research team from China systematically evaluated probiotics' curative effects for treating ulcerative colitis based on existing random control trials. Their study was published on April 21, 2010 in the World Journal of Gastroenterology.

Through meta-analysis, they concluded that probiotics should be considered as an auxiliary medicine in the remission induction stage and maintenance stage of ulcerative colitis.

#### REFERENCE:

SANG LX, CHANG B, ZHANG WL, WU XM, LI XH, JIANG M. REMISSION INDUCTION AND MAINTENANCE EFFECT OF PROBIOTICS ON ULCERATIVE COLITIS: A META-ANALYSIS. WORLD J GASTROENTEROL 2010;16(15): 1908-1915



## PROBIOTICS HOLD FUTURE AS THERAPEUTIC TREATMENT AGAINST CHRONIC GASTRITIS

SOURCE: NUTRITION HORIZON  
12, APR 2010

**G**astritis produced by acetyl-salicylic acid (ASA) consumption is a common disorder worldwide. The use of probiotics has been proposed to ameliorate different gastrointestinal tract diseases such as inflammatory bowel disease, diarrhoea, irritable bowel syndrome, etc. However, little attention has been paid to the use of probiotics in gastric disease. The health-promoting effects ascribed to probiotic strains or fermented foods arise not only from bacteria themselves but also from the metabolites produced during fermentation such as exopolysaccharides (EPS). These polymers have been claimed to modulate the immune response and to display anti-ulcer activities.

A research article to be published on April 7, 2010 in the World Journal of Gastroenterology addresses this question.

The research indicates that the milk fermented with *S. thermophilus* CRL 1190 and/or its EPS was effective in the therapeutic treatment of chronic gastritis by modulating the immune response of the mice and by increasing the thickness of the gastric mucus gel layer. The fermented milk showed a similar protective effect to omeprazole constitutes a potential natural alternative for the prevention and treatment of ASA-associated gastric damage.

REFERENCE: RODRÍGUEZ C, MEDICI M, MOZZI F, FONT DE VALDEZ G. THERAPEUTIC EFFECT OF STREPTOCOCCUS THERMOPHILUS CRL 1190-FERMENTED MILK ON CHRONIC GASTRITIS. WORLD J GASTROENTEROL 2010; 16(13): 1622-1630 [HTTP://WWW.WJGNET.COM/1007-9327/FULL/V16/I13/1622.HTM](http://www.wjgnet.com/1007-9327/FULL/V16/I13/1622.HTM)

## PROBIOTICS HELP EXTREMELY PREMATURE INFANTS GAIN WEIGHT

SCIENCE DAILY (MAY 4, 2010)

**E**xremely low birthweight infants (ELBW) who received feedings supplemented with probiotics had better weight gain than infants who were not given the supplements, according to a randomised, controlled, double-blind



study presented May 1 at the Pediatric Academic Societies (PAS) annual meeting in Vancouver, British Columbia, Canada.

Probiotics, which means 'for life' in Latin, are healthy, live organism supplements that provide benefit to the host. Their effect on digestive health and immune function has been studied. However, the safety and efficacy of probiotic supplementation in ELBW infants has not been explored thoroughly.

In this study, Mohamad Al-Hosni, MD, and colleagues from three medical centers, in collaboration with Vermont Oxford Network, evaluated the effect of supplementing enteral (tube) feedings with probiotics in extremely premature infants who weighed two pounds, two ounces or less. They hypothesized that infants who received probiotic-supplemented feedings would tolerate larger volumes of feeding per day, grow faster and require fewer days of antimicrobial treatment than those in the control group.

Fifty infants received 500 million colony-forming units (CFU) of *Lactobacillus rhamnosus* GG and 500 million CFU of *Bifidobacterium infantis* in enteral feedings once a day until discharge or 34 weeks post-menstrual age. Fifty-one infants received feedings with no probiotics.

Results showed superior weight gain in infants who received the probiotics even though the average daily volume of their feedings was less than infants in the control group. There were no statistically significant differences in other complications of prematurity such as sepsis or necrotizing enterocolitis. In addition, no side effects were seen as a result of probiotic supplementation, according to Dr. Al-Hosni, an assistant professor of pediatrics at Saint Louis University School of Medicine in the division of neonatal-perinatal medicine at SSM Cardinal Glennon Children's Medical Center.

"These findings strongly suggest that probiotic supplementation to enteral feedings plays a major role in feeding tolerance and nutrient absorption," he said. "Improved tolerance of feedings and nutrient absorption lead to better weight gain in this extremely premature infant group."

Dr. Al-Hosni concluded that larger clinical trials are needed to demonstrate the safety and efficacy of probiotic supplementation to enteral feeding in this group of infants.



## PREBIOTIC POTENTIAL OF ALMONDS

SOURCE: EUREKALERT 27, JUNE 2010

**A**lmonds, as well as being high in vitamin E and other minerals, are also thought to have other health benefits, such as reducing cholesterol. Recently published work by the Institute of Food Research has identified potential prebiotic properties of almonds that could help improve our digestive health by increasing levels of beneficial gut bacteria.

Our digestive system maintains large population of bacteria that live in the colon. Prebiotics are non-digestible parts of foods that these bacteria can use to fuel their growth and activity. These 'good' bacteria form part of our body's defence against harmful bacteria and play a role in the development of body's immune system. The prebiotics work by stimulating the growth of these bacteria. However, in order to get to where they are needed prebiotics must be able to get through the upper part of the intestine without being digested or absorbed by the body.

Funded by the Almond Board of California, IFR scientists first used the Model Gut, a physical and biochemical simulator of the gastro-intestinal tract, to subject almonds to the same conditions experienced in the stomach and small intestine. They then added the digested almonds to an in vitro batch system to mimic the bacterial fermentation in the large intestine and monitored its effect on the populations of intestinal bacteria.

The study, published in Applied and Environmental Microbiology, found that finely ground almonds significantly increased the levels of certain beneficial gut bacteria. This effect was not seen when the fat content was removed from the almond preparation, suggesting that the beneficial

bacteria use the almond lipid for growth, and this is the basis for the prebiotic effect of almonds.

Previous studies have shown that the amount of available lipid is reduced if the almonds are not processed, for example by grinding, as in this study, or by chewing. The length of time the almond spends in the digestive system also affects the amount of available lipids and proteins. More detailed studies on the digestibility of almonds are now required, and the prebiotic effect of almond lipids needs to be tested in human volunteers.

## PROBIOTICS MAY PROTECT INFANTS FROM RESPIRATORY ILLNESS

FROM: NUTRAINGREDIENTSUSA.COM, 30TH SEP, 2010

**D**aily supplements of a probiotic may reduce the incidence of respiratory illness for infants during their first eight months of life, says a new study.

Researchers from the University of Turku in Finland and probiotics player Chr. Hansen report that only 65 per cent of infants who received daily doses of *Bifidobacterium animalis* subsp. *lactis* BB-12 experienced respiratory illnesses, compared with 94 per cent of infants in the control group.

The study, published in the *British Journal of Nutrition*, is said to be the first to administer the probiotics using a pacifier – with the results supporting this as an interesting delivery system for infants.

While pacifiers have been used before to deliver medicines and functional foods, most slow-release pacifiers are designed with a thick, hard base, which deliver the active ingredients via an opening in the front plate, said the researchers.

“Our soft and broad new slow-release

pacifier has been developed to contain a pouch in which the food supplement tablet can be inserted. The delivery method was tested before the study began: the BB-12-xylitol tablet and the control xylitol tablet dissolved from the pouch of the pacifier both slowly and completely during 7 to 15 minutes of sucking. Thus, the probiotic tablet could be delivered in a controlled way with the new pacifier,” they added.

### The wider implications of gut health

The common cold is a viral infection primarily caused by rhinoviruses. It is the most common infectious disease in humans, and responsible for about 500 million illnesses in the US every year. According to a study published in the *Archives of Internal Medicine*, the common cold and related diseases costs the US about \$40 billion every year (2003, Vol. 163, pp. 487-494.).

Probiotics, alone or in combination with prebiotics, have been reported to potentially reduce the incidence of upper respiratory track infections. Indeed, we have already reported on a study from probiotic player Probi, which found that daily supplements with probiotic *Lactobacillus* strains may reduce the incidence of acquiring the common cold by 12 percent (*European Journal of Nutrition*, doi: 10.1007/s00394-010-0127-6).

According to the FAO/WHO, probiotics are defined as “live microorganisms which when administered in adequate amounts confer a health benefit on the host”.

### Study details

Led by Turku University’s Teemu Taipale, the researchers recruited 109 one-month-old infants and randomly assigned them to receive either a daily probiotic BB-12-containing tablet or placebo twice a day up until the age of eight months.



While no significant differences were observed between the probiotic and placebo groups for gastrointestinal symptoms or use of antibiotics, a significant reduction in respiratory infections was observed in the probiotic-fed infants.

“Clinical trials with larger numbers of infants are required to corroborate the aforementioned findings,” concluded the researchers.

SOURCE: BRITISH JOURNAL OF NUTRITION



**DR. Y. K. AMDEKAR,**  
M.D., D.C.H.,  
HONORARY PROFESSOR  
OF PAEDIATRICS,  
INSTITUTE OF CHILD  
HEALTH, GRANT  
MEDICAL COLLEGE,  
MUMBAI.

## ALL ABOUT PROBIOTICS

**P**robiotics are friendly bacteria in intestinal tract that protect health. Prebiotics are indigestible oligosaccharides that promote growth of probiotics. Together, they are referred to as symbiotics. Probiotics are present in normal food such as dairy products and in abundance in breast milk. Prebiotics are present in food such as wheat, banana, onions, honey etc. They work through stimulation of intestinal immune mechanism and also through process of antagonism with pathogenic bacteria. This is the basis of using probiotics in case of diarrhea. Because of the immune effect exerted by probiotics, they are shown to have significant clinical benefits even in non-gastrointestinal diseases including allergic conditions. In this issue, Dr. Rastogi has lucidly discussed clinical application of probiotics and prebiotics based on scientific principles. It offers a comprehensive insight of this evolving issue to the readers.

Opinions expressed in In Touch are those of the authors and do not necessarily reflect the views of Heinz Nutrition Foundation India and Heinz India Pvt. Ltd. Material from In Touch may be reproduced without written permission, provided the source is acknowledged.

Correspondence is welcome. Please write to: Heinz Nutrition Foundation India, D-Shiv Sagar Estate, 7th floor, Dr. Annie Besant road, Worli, Mumbai 400 018.  
Tel.: (022) 40085555 Fax: (022) 40085551 E-mail: p.jagannivas@in.hjheinz.com

### IF YOU ARE NOT ON OUR MAILING LIST...

Complimentary copies of In Touch are available for healthcare professionals by writing to us at the address indicated above. Requests for any back-issues can also be made at the above mentioned address.

### HAVE YOU MOVED?

If your address has changed, please forward your new address, and if possible, a copy of the old to In Touch, at the address indicated above.