Good bacteria

There is increasing scientific support for the role of probiotics in preventive medicine.

A RUSSIAN scientist first made the observation of the positive role played by some selected bacteria in 1907. Many years later, in 1960, the term "probiotic" (which means "for life") was coined for bacteria associated with beneficial effects for humans and animals.

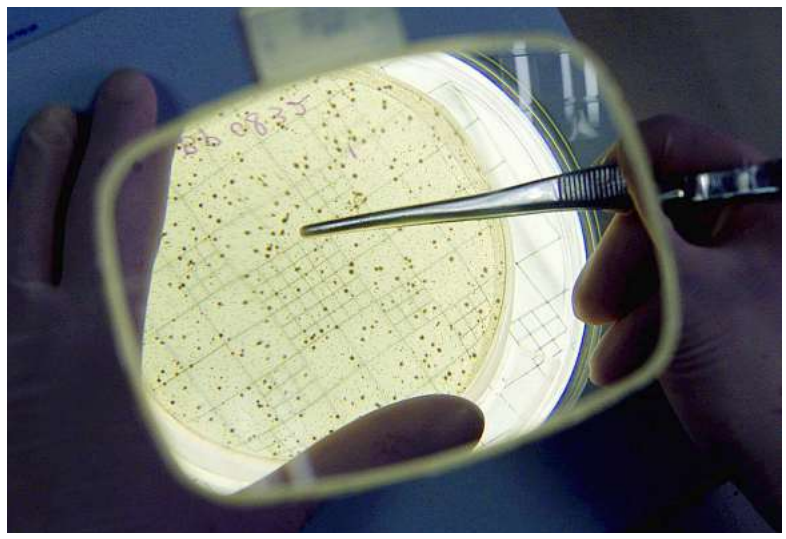
Probiotics are now generally recognised as live cultures of bacteria which, when consumed in appropriate amounts, confers health benefits to the host. They may augment the protection afforded by the indigenous flora through competitive interactions, direct antagonism of pathogens, and/or production of antimicrobial factors.

In the last 20 years, research in the probiotic area has progressed considerably and significant advances have been made in the selection and characterisation of specific probiotic cultures and substantiation of health claims relating to their consumption. Members of the genera *Lactobacillus* and *Bifidobacterium* are mainly used, but not exclusively, as probiotic microorganisms and a growing number of probiotic foods have now become available to the consumer.

Scientific evidence for the potential role of probiotics in various physiological functions, and health and medical conditions, were discussed in two scientific meetings recently in Tokyo. Japanese and international scientists presented updates in these meetings, namely the 6th Yakult Shirota Conference and the 19th Symposium on Intestinal Flora.

Awareness on probotics and their potential role in health promotion are rapidly increasing in Malaysia. Scientific studies have demonstrated that these probiotics can play an important role in immunological, digestive, and respiratory functions, and could have a significant effect in alleviating infectious disease in children.

I would like to share with readers some of the scientific data presented in these two meetings, focused on these main effects on health and disease. These scientific updates would be particularly useful to researchers and healthcare professionals in the country.



There's the bad, and there's the good ... the good bacteria in probiotics can benefit us in many ways.

Effects on respiratory symptoms

Prof Paul van Royen, University of Antwerp, Belgium, presented findings from a study designed to determine if intervention with *Lactobacillus casei* strain Shirota in elderly nursing home residents reduced their susceptibility to respiratory symptoms and improved their immune response to influenza vaccinations.

This was a large randomised, double-blind, placebo-controlled trial involving 737 healthy elderly people in 53 nursing homes in Antwerp. The experimental subjects were given two bottles of fermented milk containing the Shirota strain of *L. casei* for 176 days.

The results showed that daily consumption of the probiotic helps to protect against respiratory symptoms in the healthy elderly living in nursing homes; these people are particularly vulnerable to infections. Their response to vaccination also improved. The protective effect of the probiotic was found to have increased with length of duration of probiotic intake. This suggests that continual daily intake of the probiotic fermented milk would give the best effect in avoiding respiratory symptoms in elderly people.

Prolonged intense exercise is associated with a transient depression of immune function and a heavy schedule of training and competition can lead to immune impairment in athletes – this is associated with an increased susceptibility to upper respiratory tract infection.

Prof Micheal Gleeson, Loughborough University, UK, therefore examined the effects of daily oral ingestion of a probiotic fermented milk drink containing *L. casei* strain Shirota on infection incidence and selected markers of immune function in a cohort of university-based endurance athletes during a four-month period of winter training and competition. A total of 84 athletes were recruited for this randomised, placebo-controlled study.

It was observed that the consumption of the probiotic helped to maintain saliva IgA concentration during a period when some aspects of immune function were depressed. These positive clinical consequences provide evidence for the beneficial effects of daily *L. casei* (Shirota strain) ingestion in a group of highly physically active people and may be attributable to better maintenance of saliva IgA during training and competition stress.

In a different setting, Dr Paolo Boscolo, University G, d'Annunzio of Chieti-Pescara, Italy, evaluated the natural killer (NK) activity in Italian male smokers after intake of a powder preparation containing *L. casei* strain Shirota. In this placebo-controlled study lasting three weeks, 72 healthy blue-collar workers with smoking habits were the subjects of the investigation. These workers, comprising workers in factories, construction workers, workers in hospitals and craftsmen, had different levels of anxiety and occupational stress.

It was found that *L. casei* (Shirota strain) intake significantly improved NK cytotoxic activity. It also appears likely that the quality of the neuroimmune regulatory mechanisms was also improved. Thus, intake of this probiotic may be helpful in physiological immune functions in smokers with variable levels of job stress.

Role in gastrointestinal health

Assoc Prof Keiichi Mitsuyama, Kurume University School of Medicine, Fukuoka, Japan, presented findings from his studies on the beneficial effects of *L. casei* strain Shirota for inflammatory bowel disease and alcoholic liver disease. Ten patients who consumed the probiotic daily for eight weeks showed a decrease of the symptom score when compared with the baseline score and the score of the control group.

In a randomised prospective study, the effect of consumption of *L. casei* strain Shirota for four weeks was investigated in the patients with alcoholic liver disease. It was found that consumption of this probiotic resulted in improvement of the patients with this disease by normalisation of the intestinal flora.

These studies suggest that intake of the *L. casei* strain Shirota probiotic can be an effective and safe treatment for inflammatory bowel disease and alcoholic liver disease.

Another study on gastrointestinal effect and with important public health significance was presented by Dr Dipika Sur, National Institute of Cholera and Enteric Diseases, India. Recognising that acute diarrhoea is a major public health challenge in developing countries, these Indian researchers examined the role of a probiotic in the prevention of acute diarrhea.

A double-blind, randomised, controlled field trial involving almost 4,000 children aged one to five years was conducted in an urban slum community in Kolkata, India. Participants were given either a probiotic drink containing *L. casei* strain Shirota or a nutrient drink daily for 12 weeks. They were followed up for another 12 weeks.

The primary focus of this study was the occurrence of first episodes of diarrhoea. The level of protective efficacy for the probiotic was 14%. Findings from the study suggest that daily intake of a probiotic drink can play a role in prevention of acute diarrhoea in young children in a community setting.

Irregular bowel movements, such as diarrhoea and constipation, due to gastrointestinal dysfunction are a known complication of gastrectomy. Prof Teruaki Aoki, chairman of the Post-Gastrectomy Patients' Association "ALPHA CLUB", Japan, presented findings from a placebo-controlled double-blind study on the effects of continuous intake of a fermented milk beverage containing *L. casei* strain Shirota by gastrectomised subjects.

The intake of this probiotic-containing milk was shown to improve constipation in gastrectomised subjects suffering from constipation and also improved diarrhoea in gastrectomised subjects with diarrhoea. It was suggested that this probiotic could be beneficial for the control of irregular bowel movement as a routine medical treatment.

Probiotics in childhood

Prof Yuichiro Yamashiro, Juntendo University, Tokyo, Japan, discussed the role of *Bifidobacteriuun breve* as key components for management of preterm babies, and in children with cancer undergoing chemotherapy.

To prevent and/or alleviate infection and its clinical consequences, the enteral administration of *B. breve* was performed in very and extremely low birth weight infants, and in cancer patients on chemotherapy. The GI tract mucosal defence mechanisms are not fully developed in preterm babies, and is damaged in children undergoing chemotherapy for their malignancy.

Prof Yamashiro reported that the probiotic administration produced favourable results.

Breastfeeding is the preferred way to feed infants. Formula fed infants have more frequent infections (upper and lower respiratory tract, gastrointestinal tract) and cow's milk allergy than breastfed infants. Among many factors, prebiotics and probiotics are major determinants contributing to the differences in intestinal microbiota between breast- and formula fed infants. Breastfed infants have a gastrointestinal flora that is rich in *Bifidobacteria* (and to a smaller extent in *Lactobacilli*) compared to formula fed infants, who have a more diverse adult-like flora.

In his presentation, Prof Yvan Vandenplas, Universitair Kinderziekenhuis Brussels, Belgium, emphasised that a healthy intestinal microbiota results in the development of a balanced immune system. There is substantial clinical evidence that prebiotics (GOS, FOS and GOS/FOS mixtures) added to infant formula have health beneficial effects in term infants.

Several studies with probiotic bacteria added to infant formula indicate also a beneficial health trend. Some strains of *Bifidobacteria* or *Lactobacilli* have been shown to decrease the number of febrile episodes, number of episodes, and duration of diarrhoea. A limited number of studies with synbiotics (pre- and probiotcs) in term infants confirm the health benefit.

A novel synbiotic therapy has been developed by this research group from the Department of Pediatric Surgery and consisted of two kinds of probiotic bacteria, *B. breve*, Yakult strain, and *L. casei*, Shirota strain, together with one prebiotic, galacto-oligosaccharide. This new synbiotic therapy was applied to severely ill paediatric surgical patients.

This "use of synbiotics" effectively changed the abnormal intestinal microbiota into a population dominated by probiotic bacteria in the short term, finally resulting in microbiota dominated by commensal anaerobes. The nutritional status of the infants also improved.

This research team also applied this new synbiotic therapy and mother's milk to neonates with severe congenital anomalies in order to prevent them from acquiring abnormal intestinal microbiota. Using this approach of "prophylactic use of synbiotics", almost all neonates were protected from colonisation by pathogenic bacteria in the intestine. As a result, the patients' physical growth was quite good in spite of prolonged intensive care.

■ *NutriScene is a fortnightly column by Dr Tee E Siong, who pens his thoughts as a nutritionist with over 30 years of experience in the research and public health arena. For further information, e-mail starhealth@thestar.com.my.*