

Short communication Probiotics

F. Guarner^{a,*}, G.J. Schaafsma^b

for LABIP Workshop participants¹, ^a*Digestive System Research Unit, Hospital General Vall d'Hebron, 08035 Barcelona, Spain*
^b*TNO Nutrition and Food Research Institute, 3700 AJ Zeist, Netherlands*

Received 25 November 1997; accepted 27 November 1997

There is currently a growing interest in certain lactic acid bacteria strains that have been suggested or shown to provide specific health benefits when consumed as food supplements or as food components. However, opinions differ widely with respect to the requirements needed to substantiate a claim on a beneficial effect of a given bacterial strain, and there is no consensus on how to define and accredit a viable strain as a probiotic. On the other hand, putative risks of massive introduction of new live microorganisms in nutrition should also be envisaged, even if benefits were proven. The Lactic Acid Bacteria Industrial Platform (LABIP)² hosted a

workshop sponsored by the European Community to discuss these topics.³

Firstly, the workshop issued a consensus definition of probiotics: “oral probiotics are living micro-organisms, which upon ingestion in certain numbers, exert health benefits beyond inherent basic nutrition”. According to the new definition, probiotics may be consumed either as a food component or as a non-food preparation.

For the demonstration of probiotic activity of a certain strain, the group concluded that well-designed human studies (double blinded, placebo-controlled) are required. Several in vitro assays or animal studies such as tests on resistance to bile and acid, adhesion to the intestinal mucosa, effects on immunocompetent cells or antimutagenicity, are very useful in the preselection of bacterial strains. However, the proof of efficacy in humans should be granted by at least one well-designed human study. Preferentially, the study should be published in a peer-reviewed journal.

Based on these criteria, the group discussed and proposed to make a distinction between established beneficial effects of probiotics, and potential benefits that need further substantiation. For instance, several lines of evidence have established the benefits of

*Corresponding author.

¹List of LABIP Workshop participants: Dr. W. Boersma (Leiden, Netherlands), Prof. J.K. Collins (Cork, Ireland), Dr. M. Coste (Jouy-en-Josas, France), Dr. I. de Smet (Gent, Belgium), Dr. F. Guarner (Barcelona, Spain), Prof. W. Hammes (Stuttgart, Germany), Dr. T. Matilla-Sandholm (Helsinki, Finland), Prof. L. Morelli (Piacenza, Italy), Dr. B.L. Pool-Zobel (Karlsruhe, Germany), Dr. I.R. Rowland (London, UK), Prof. G.J. Schaafsma (Zeist, Netherlands), Prof. K.H. Schleifer (München, Germany), Dr. M. Tvede (Vibourg, Denmark), Prof. T. Wadstrom (Lund, Sweden), Dr. B. Weile (Gentofte, Denmark). Chairman: Dr. J.W. vd Kamp (Zeist, Netherlands). EU-representative: Dr. A. Aguilar (Brussels, Belgium).

²LABIP is an European Economical Association of companies involved in the use and production of lactic acid bacteria (LAB). Its goals are to promote R and D on LAB within the EU and to develop an opinion on research needs for LAB within the EU.

³The Workshop on Probiotics was held in Frankfurt (Germany) from 13 to 15 November 1995.

certain probiotics to reduce signs and symptoms of lactose intolerance (Sanders, 1993), prevention and treatment of certain diarrhoeal diseases (Biller et al., 1995; Kaila et al., 1995; Majamaa et al., 1995; Saavedra et al., 1994; Siitonen et al., 1990), reduction of bacterial enzyme activities (Sanders, 1993) and stimulation of the immune system (De Simone et al., 1993; Schiffrin et al., 1995). Potential benefits of the ingestion of probiotics can also be expected in other important fields such as modulation of blood cholesterol levels, competitive exclusion of intestinal pathogens, and cancer prevention.

The unlimited use of probiotics might have unwanted side-effects. Most likely, these effects would not affect the normal healthy population, but should be considered when used by specific subgroups of persons 'at risk'. For instance, infection and toxicity by probiotics has never been documented, but subjects with underlying disease conditions that predispose to infection might be exposed to a putative risk (Adams and Marteau, 1995). Likewise, unrestricted stimulation of the immune system by probiotics could be detrimental for patients suffering autoimmune diseases. The risk of transfer of antibiotic resistance properties from probiotics to virulent micro-organisms should also be evaluated.

Studies on probiotics that will reasonably expand our knowledge in this emerging field should be encouraged for active research in forthcoming years.

A copy of the full report of the Workshop is available from the participants.

References

- Adams, M.R., Marteau, P., 1995. On the safety of lactic acid bacteria from food. *Int J Food Microbiol* 27, 263–264.
- Biller, J.A., Katz, A.J., Flores, A.F., Buie, T.M., Gorbach, S.L., 1995. Treatment of recurrent *Clostridium difficile* colitis with *Lactobacillus GG*. *J Pediatr Gastroenterol* 21, 224–226.
- De Simone, C., Vesely, R., Bianchi Salvadori, B., Jirillo, E., 1993. The role of probiotics in modulation of the immune system in man and in animals. *Int J Immunotherapy* IX, 23–28.
- Kaila, M., Isolauri, E., Saxelin, M., Arvilommi, H., Vesikari, T., 1995. Viable versus inactivated *Lactobacillus* strain GG in acute rotavirus diarrhoea. *Arch Dis Child* 72, 51–53.
- Majamaa, H., Isolauri, E., Saxelin, M., Vesikari, T., 1995. Lactic acid bacteria in the treatment of acute rotavirus gastroenteritis. *J Pediatr Gastroenterol Nutr* 20, 333–338.
- Saavedra, J.M., Bauman, N.A., Oung, I., Perman, J.A., Yolken, R.H., 1994. Feeding of *Bifidobacterium bifidum* and *Streptococcus thermophilus* to infants in hospital for prevention of diarrhoea and shedding of rotavirus. *Lancet* 334, 1046–1049.
- Sanders, M.E., 1993. Summary of conclusions from a consensus panel of experts on health attributes of lactic cultures: significance to fluid milk products containing cultures. *J Dairy Sci* 76, 1819–1828.
- Schiffrin, E., Rochat, F., Link-Amster, H., Aeschlimann, J., Donnet-Hugues, A., 1995. Immunomodulation of blood cells following the ingestion of lactic acid bacteria. *J Dairy Sci* 78, 491–497.
- Siitonen, S., Vapaatalo, H., Salminen, S. et al., 1990. Effect of *Lactobacillus GG* yoghurt in prevention of antibiotic associated diarrhoea. *Ann Med* 22, 57–59.