



# PROBIOTICS: GOOD FOR THE BONES AND SO MUCH MORE!

By: Dr. Lynn Toohey, Ph.D

Over the years, many have heard people lecture and expound on the benefits of probiotic supplementation, but did you know they were good for the bones? Probiotics not only help bones, they can help heart health, inflammation, leaky gut, food allergies, infant allergies, autoimmune conditions, and many more health concerns. Lactobacillus reu-teri in small doses has been shown to lower cholesterol.<sup>1</sup> They have even been shown to boost the immune systems of healthy people!

## PROBIOTICS AND BONES

Probiotics increases the efficiency of phytoestrogens by rendering them bioavailable and by expediting conversions, and since "Phytoestrogens are effective in preventing and treating osteoporosis",<sup>2</sup> probiotics can also be effective.

Evidence exists that probiotics are effective for bone support, both alone and in conjunction with phytoestrogens. A 6-wk study with 50 birds was conducted to investigate the effects of a dietary supplemental probiotic on parameters associated with the tibia. At the end period of the study, thickness of the medial and lateral wall of the tibia, tibiotarsal index, percentage ash, and potassium content were all significantly improved by the probiotic.<sup>3</sup>

Also, since substances "that can modulate the intestinal microflora could affect the bioavailability of iso-flavones", pre-biotics such as frustooligosaccharides (FOS) also possess the ability to be effective, and in fact, have "effectively improved tibial microarchitectural properties by enhancing tra-becular number and lowering tra-becular separation compared with ovariectomized (rat) controls". The FOS (attracts probiotics to the intestinal milieu) exerted this influence on bone alone, when given without the iso-flavones/phytoestrogens. However, in terms of microarchitecture, the combination of the phytoestrogens and FOS had a greater effect in reversing the loss of certain microarchitectural parameters of bone such as tibial tra-becular number, separation, and thickness.<sup>4</sup>

## Other Mechanisms of Action Include:

1. **Competitive Exclusion:** Probiotics compete with microbial pathogens for a limited number of receptors present on the surface of the gut.
2. **Immunomodulation:** Probiotics can modulate the immune system and/or stimulate an immune response of gut associated lymphoid and epithelial cells.
3. **Antimicrobial Activity and Suppression of Pathogen Growth:** Probiotics actively fight foreign invaders.
4. **Enhancement of Barrier Function:** Increases the integrity of the gut lining and plugs "leaks".
5. **Regulates Autoimmune Responses:** Probiotics can promote the induction of T cell apoptosis in the mucosal immune compartment.

In fact, “The unraveling of these mechanisms of action has led to new support for the use of probiotics in the management of clinical inflammatory bowel diseases”.<sup>5</sup>

### **THE IMMUNE SYSTEM:**

Probiotics are not just for replacing imbalances caused by antibiotic drugs, they can be proactive in strengthening the immune system! A recent study verifies this, and suggests that even the immune systems of healthy adults benefit from probiotic supplementation.

In a pilot study involving 10 healthy adults between the ages of 24 and 54 years, daily intake of a 4-species probiotic supplement was found to enhance innate immune function. A significant increase in the percentage of phagocytosing monocytes and neutrophils was observed over the intervention period. Thus, the authors of this study concluded, “...nutritional supplementation with probiotics has the potential to improve innate immune function in healthy adults”.<sup>6</sup>

### **HEART DISEASE, ETC:**

Research shows that probiotics may be helpful in heart disease. “Probiotics are devoid of side effects and do not cause accumulation of toxic substances in the body. They are administered for therapeutic, prophylactic and nutritional purposes both in humans and in animals. Interest into probiotics has been spurred on by the growing abundance of civilization disorders such as Atherosclerosis, Heart Disease, Hypertension, Neoplasms, and HIV Infection. Probiotics are potentially capable of annihilating these disorders”.<sup>7</sup>

### **GASTROINTESTINAL DISORDERS:**

In a randomized, placebo-controlled pilot trial involving 72 subjects with symptoms of functional gastrointestinal disorders (FGID), subjects given a nutrient combination subsisting mostly of probiotics experienced “clinically notable improvements”.<sup>8</sup>

### **INFLAMMATION:**

Researchers have determined that probiotics are considered among the nutrients that have the ability to modulate immune response and counter inflammatory processes (beyond the gut), and may even “have the potential to protect against cancer development and progression (when related to inflammation). We suggest that immuno-nutrition may provide a less invasive alternative may provide a less invasive alternative to immunotherapy in protection against cancers associated with chronic inflammation”.<sup>9</sup>

### **LEAKY GUT/FOOD ALLERGY:**

Researchers suggest that probiotic bacteria may promote endogenous barrier mechanisms in patients with atopic dermatitis and food allergy, and by alleviating intestinal inflammation, may act as a useful tool in the treatment of food allergy.<sup>10</sup>

## INFANT ALLERGIES:

“Over the last two decades the incidence of allergic diseases has increased in industrialized countries, and consequently new approaches have to be explored. The potential of probiotics to control allergic inflammation at an early age was assessed in a randomized double-blind placebo-controlled study” ...Conclusions of the study were that probiotics modified the changes related to allergic inflammation, and furthermore that probiotics may counteract inflammatory responses beyond the intestinal environment. The same researchers also suggested that probiotics would guide infants through the weaning period, when sensitization to newly encountered antigens is initiated. “The probiotic approach may thus offer a new direction in the search for future foods for allergy treatment and prevention strategies”.<sup>11</sup>

Research is consistently showing that probiotics are good for a whole host of different health conditions. As we consider “hosting” those in our large intestine for health benefits, nutritional probiotic supplements can help build up one of our best immune defenses.

### References

1. Taranto MP. *Methods Mol Biol.* 2004; 268:417-22
2. Zhang J, Wang YJ, Xu JL. *Zhongguo Zhong Xi Yi Jie He Za Zhi.* 2004 Mar;24(3):241-3.
3. Mutus R, et al. *Poult Sci.* 2006 Sep;85(9):1621-5.
4. Devareddy L, et al. *Menopause.* 2006 Jul-Aug; 13(4):692-9
5. Fedorak RN, Madsen KL. *Inflamm Bowel Dis.* 2004 May; 10(3):286-99.
6. Berman SH, Eichelsdoerfer P, et al, *Nutr Res.*, 2006; 26(9): 454-59.
7. Ochmanski W, Barabasz W. *Przegl Lek.* 1999;56(3):211-5.
8. Kim LS, Hilli L, et al, *Dig Dis Sci*, 2006 Nov 1.
9. Philpott M, Ferguson LR. *Mutat Res.* 2004 Jul 13;551(1-2):29-42.
10. Majamaa H, Isolauri E. *J Allergy Clin Immunol.* 1997 Feb;99(2):179-85.
11. Isolauri E, Arvola T, Sutas Y, Moilanen E, Salminen S. *Clin Exp Allergy.* 2000 Nov;30(11):1604-10