Probiotics

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Probiotics are living microorganisms which, upon ingestion in certain numbers, exert health benefits beyond inherent general nutrition. (1) Elias Metchnikoff proposed in 1907 the idea that the presence of certain bacteria in the human intestinal tract could prolong life. The early investigations focused on infectious GI disorders and the science was weak, being mainly organized as descriptive studies. However, there is growing body of more recent literature which is clarifying the role of probiotics in the promotion of health.

Much of the recent investigations involving probiotics is nascent. There is slowly growing body of basic scientific research evaluating the mechanisms behind GI microbial flora "balance" and interactions with the gastrointestinal immune system. For example, anti-rotavirus IgA was increased in humans who were infected with the diarrhea causing rotavirus after being treated with live, oral Lactobacillus GG supplementation. In addition, anti-B-lactoglobulin IgA-secreting cells increased in patients suffering from Crohn's disease following treatment with live, oral Lactobacillus casei (2). Numerous animal models have also shown a variety of immune altering effects .

While these demonstrable effects of probiotic use in humans is intriguing and exciting, there remains a need for broader and larger studies to identify any real disease modifying benefits of probiotics. Well controlled human studies to this end are paltry, but numerous smaller studies have demonstrated benefit in a variety of disorders including antibiotic associated diarrhea (3-8), relapsing C. difficile infection (9-13), management of atopic eczema and cow's milk allergy (14), irritable bowel syndrome (15-17), traveler's diarrhea (18,19), remission maintenance in ulcerative colitis (20,21), chronic pouchitis (22,23), remission maintenance in Crohn's disease (24,25), prevention of Crohn's recurrence postop (26), and acute infectious diarrhea (27-35).

Multiple organisms have been studied for use as therapeutic agents in human. Not all strains have the same in vitro characteristics or observed in vivo behavior (e.g. ability of L. plantarum , L. rhamnosus, and L. reuteri to persist on jejunal and colonic mucosa 11 days after termination of administration [36]). In addition, some researchers suggest that the amount of probiotics is important in observing a benefit (i.e. need to ingest $>10^8$ bacteria) (37). Sorting out the nuances of the various probiotics will take much effort and time.

It is not at all clear if observed characteristics of microorganisms will translate to therapeutic potential; only properly randomized trials in humans can prove therapeutic benefits. However, given the low cost of probiotics, and given that the literature to date supports the safety of probiotic use in humans (at least for the organisms studied) (38), there appears to be great opportunity in selecting and tailoring probiotic mixtures which have both theoretical therapeutic potential and legitimate usefulness as suggested by published clinical data.

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