Probiotics: A Review

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INTRODUCTION

The human gastrointestinal tract is colonized with a diverse population of microbial flora that not only provide digestive function but also contribute to intestinal epithelial homeostasis and innate immunity. Alteration of the microflora has been postulated in the pathogenesis of various diseases including infectious, inflammatory, allergic, and immunological conditions. Disruption of the normal commensals occurs from use of antibiotics and immunotherapy, stress, and dietary changes, thus leading to increased susceptibility to disease processes. A fuller understanding of the importance of intestinal microflora has generated much interest around the use of probiotics to promote and maintain health.

Probiotics, as defined by a group of experts convened jointly by World Health Organization and Food and Agriculture Organization of the United Nations, are “live microorganisms which when administered in adequate amounts confer a health benefit on the host.”¹ The history of probiotics goes back hundreds of years with their use in the regular diet in foods such as yogurt, cheese, and fermented foods. However, the health benefits of probiotics were first described a century ago by Russian Nobel Laureate Dr. Èlie Metchnikoff,² who postulated that the longevity of Bulgarian peasants was related to the consumption of sour milk, which contains lactic acid bacteria whose growth in the intestine displaces disease-producing organisms.

Most commonly used probiotics come from the genera Lactobacillus and Bifidobacterium. Others include Streptococcus thermophilus, nonpathogenic strains of Escherichia coli, Enterococcus, Bacillus, and yeasts such as Saccharomyces boulardii. However, the list of probiotics continues to grow. Dunne and colleagues outlined the following criteria that microbes must fulfill to be used as probiotics: they should be of human origin, non-pathogenic, resistant to processing, resistant to gastric acid and bile, able to attach to gut epithelial tissue, colonize the gastrointestinal tract, produce antimicrobial substances, modulate immune responses, and influence metabolic activities of the host.³ However, with the growing use of probiotics as topical agents, such as vaginal suppositories, colonization of the gastrointestinal tract may not be an essential requirement. Another important consideration is the need for survival of sufficient number of microbes in the probiotic throughout the shelf life of the product. This article reviews the mechanism of action, various health benefits, and adverse effects of probiotics.

MECHANISMS OF ACTION

There are various proposed mechanisms that describe how different probiotics work, and these vary depending on the particular strain of the probiotic. The effects of probiotics also depend upon the dosage and the route of administration. Thus, the mechanisms of action cannot be extrapolated...