

Chapter 1

An Overview of the Therapeutic Aspect of Living Drugs Probiotics

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ABSTRACT

The human body harbors ten times more bacterial cells than human cells. These bacterial cells form the human microbiome that plays a vital role in human health. An imbalance in the gut microbiome (i.e., dysbiosis) can result in various pathological conditions. This dysbiosis can be refurbished with the supplement of “probiotics.” Probiotics have thus been defined as non-pathogenic micro-organisms that, when ingested, exert a positive influence on host health or physiology. The most commonly used probiotic bacteria comes from two genera: Lactobacillus and Bifidobacterium. Various research findings have proposed a correlation between the alteration of microbiota (composition/activity/density) with disorders like infectious diarrhea, inflammatory bowel diseases, obesity, to name a few. The ultimate effect of administration of probiotics on health or physiology is either direct or indirect. This chapter summarizes the concept of probiotics, their therapeutic aspect along with possible mechanism of action.

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INTRODUCTION

Probiotics are non-pathogenic micro-organisms that, when ingested, exert a positive influence on host health or physiology by inhabiting in the gut microbiota. Various fermented food in our diet provide probiotics to human body. Interestingly, the useful microbial flora of the gut has been described as “Jataragni” (fire in the stomach) as the sustaining force of all living beings, while, “Takra,” *i.e.*, fermented milk, as “Amrita” or elixir in, CHARAKA SAMHITA. Much later, in 1907, Elie Metchnikoff, proposed the first scientific rationale for the role of *Lactobacilli* in maintaining health and longevity. WHO defines “Probiotics” as live microorganisms which, when administered in adequate amounts, have a beneficial effect on the health of the host (FAO/WHO, 2002). Lactic acid bacteria (LAB) and *bifidobacteria* were the first identified probiotics (Ouweland, Salminen, & Isolauri, 2002). The impact of modulation in gut microbiota has been implicated in a variety of diseases conditions. Due to the involvement of gut microbiota in regulation of numerous physiological pathways, it can be presumed to be a full-fledged organ. Various research findings have proposed a correlation between the alteration of microbiota (composition/activity/density) with disorders like., infectious diarrhea, inflammatory bowel diseases, obesity, oral health, hypertension, hypercholesterolemia, to name a few. The ultimate effect of administration of pharmaceutical formulations containing live health-beneficial bacteria (probiotics) on health or physiology is either direct or indirect, via, alteration of the immune response. This chapter summarizes the concept of probiotics in conjunction with therapeutic aspect of probiotics in different disease conditions along with possible mechanism of action.

GUT MICROBIOTA

Human gut microbiota is a fascinating, unexplored ecosystem. Gut microbiome is a ‘mini-ecosystem’ created by a collection of microbes inhabiting the human gastrointestinal (GI) tract. The intestinal lumen harbors 500 to 1000 different species of living microbes. By an estimate, there are 10 times higher number of microbes than the cells in human body and collectively the genome of these microbes is 50 times larger than the human genome. The predominant bacterial phyla in the human gut, *Bacteroides* and *Firmicutes*, are obligate anaerobes. *Bacteroides* phylum include *B. fragilis* and *B. vulgates*. *Bacteroides* are involved in the digestion of carbohydrate resulting in lowering of intestinal pH that inhibit the growth of harmful bacteria.

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