INTESTINAL MICROBIOTA
PROBIOTICS AND PREBIOTICS

COMPREHENSIVE TEXTBOOK
FOR HEALTH PROFESSIONALS

Edited by
Rok Orel
»Life’s a Piece of Shit, When You Look at It.«

Monty Python
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### Emerging Fields of Probiotic and Prebiotic Use

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Awareness of the importance of intestinal microbiota for human health and disease, and of the possibilities of influencing its composition and function with probiotics and prebiotics, is growing. In western communities, the idea of modifying the intestinal microbiota to promote good health, and prevent or even cure different diseases, faded away after the first few decades of the 20th century despite the research and interest of pioneers. Until its renaissance in late 80s and 90s, this field was only covered by a few enthusiasts. Thereafter, interest increased through nutritional sciences and the food industry rather than through medical sciences and pharmaceutical companies. Professionals in the latter were very skeptical about the field. Despite the results of numerous high quality clinical studies over the last two decades showing that specific probiotic strains and prebiotic substances undoubtedly have significant effects on certain clinical conditions, a number of health professionals remain skeptical for several reasons. Some companies with an interest in the pre and probiotic business effectively “bombarded” both health professionals and end consumers with often misleading information, which resulted in reservation in professional communities. Due to lenient legislation and poor quality control, many products on the market were of questionable quality and were not backed up by sufficient clinical evidence. In order to regulate this sector, the European Food Safety Authority (EFSA) produced a series of policies; however, these were unsuccessful at protecting consumers. As a result, the EFSA has virtually banned the use of health claims for probiotics, even though the efficacy of some strains is supported by a level of evidence comparable with that needed for registering drugs. As health claims cannot be made about food supplements, finding information about the efficacy of a particular product is difficult. This represents another missed opportunity to develop a meaningful instrument to help both health professionals and end consumers to make decisions about which pro or prebiotic products to use and for which condition.

Another reason is that without fully knowing or understanding about the substances, reasonable decisions cannot be made. From the initial concept of using “good” bacteria, or probiotics, to improve health and prevent disease, we came to understand that the effects of probiotics are strain specific and dose dependent. We can only partially predict the utility of a specific strain when we know its specific mechanisms of action but have no clinical evidence of its efficacy. Moreover, we realized that there is no such thing as a “universal” probiotic that is efficient for all indications. Even strains that show a very high level of efficacy in some conditions may be completely ineffective
in the others. While quality and comprehensive information is relatively easy to find through specified meetings and journals by dedicated experts on this field, they are not so readily accessible to the majority of professional users. A lack of such information in professional groups not only results in less use of pre and probiotic products in general, but also in the wrong choice of product for a specific purpose. Both of these are detrimental to patients.

The basic idea behind this textbook is to provide health professionals, such as medical doctors, pharmacists and nutritionists/dietitians, with comprehensive, understandable, user friendly, up to date information on the intestinal microbiota, probiotics and prebiotics. It focuses on a basic understanding of their mechanisms of action and the level of evidence to support their clinical efficacy in improving health and treating diseases. The main mission of this textbook, however, is to change health professionals from being “believers” or “nonbelievers” to being more knowledgeable about the field. As editor, I invited selected authors who are considered to be among the most prominent experts in the world to write about their fields in dedicated chapters. I want to thank them all for their invaluable contribution to the comprehensiveness and quality of the book. The authors of the individual chapters were requested to specify those probiotic strains, prebiotic substances and their combinations that have been proven to be efficient in specified indications. Whenever possible, specific recommendations were made based on available literature of clinical trials, meta-analyzes, systematic reviews and positional papers from expert groups. I believe we have written a book that is both interesting and understandable to the readership. Moreover, I sincerely hope that information in this book will help different health professionals in their everyday practical work with patients.

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• Overview of the Human Intestinal Microbiota
• The Immune System and Intestinal Microbiota
• Dysbiosis – the Concept of Dysfunctional Intestinal Microbiota
• Probiotics – Historical Overview, General Concepts and Mechanism of Action
• Breast Milk: a Source of Bacteria for the Infant Gut
• Probiotics and Prebiotics in Infant Formula
• Probiotics and Prebiotics in the Prevention of Respiratory Tract Infections
• Probiotics and Prebiotics in Treatment and Prevention of Gastrointestinal Infections
• Antibiotic-Associated Diarrhea and *Clostridium difficile*-Associated Diarrhea
• *Helicobacter pylori* Infection – What Place Does Probiotic Use Have in Its Treatment?
• Probiotics and Prebiotics in Inflammatory Bowel Disease
• Probiotics and Prebiotics in Prevention and Therapy of Allergy
• Intestinal Microbiota, Probiotics and Prebiotics in Functional Gastrointestinal Disorders
• Probiotics in Functional Gastrointestinal Disorders of Infancy
• Emerging Fields of Probiotic and Prebiotic Use