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Editor

Recent Advances in Cannabinoid Physiology and Pathology

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Introduction

The physiological effects of cannabis use represent one of the most rapidly growing, yet controversial, areas of research. Although recreational and therapeutic use of marijuana has been practiced by mankind for centuries, scientific advancement of the field is being fueled by recent discoveries in cannabinoid chemistry and pharmacodynamics. Inspired by these findings, this book examines current topics in cannabinoid research and medicinal use at different levels of resolution.

Many recent discoveries in cannabinoid research would not be possible without a thorough understanding of endocannabinoid system component distribution and function in living organisms. Thus, the book begins with an introduction to the topic of endocannabinoid system and the role of this system in ontogenesis. The "ABCs" of cannabinoids would not be complete without a detailed overview of the interaction of phyto- and endocannabinoids and synthetic cannabinoids with their protein targets. Such understanding arises from the growing number of high-resolution structural data that depict cannabinoid-protein interactions at the atomic resolution. Stemming from the progress in modern crystallography and rapidly emerging cryogenic electron microscopy, high-resolution structural data are reviewed in a separate chapter of this book.

Several chapters within this book capitalize on cannabinoid-protein interactions by focusing on the prevalent health disorders, such as cancer and cardiovascular disease. These chapters describe in detail the role of endocannabinoid system and the potential use of cannabinoid-related compounds to combat these pathologies. However, cannabinoids have the potential for abuse and dependence. The book addresses this topic with two chapters. One presents a discussion of a cross talk between the endocannabinoid system and neuronal circuits that enable alcohol use disorders. The theme of drug abuse is further developed in a chapter that reviews current knowledge on candidate genes that may drive marijuana use and dependence.

The book concludes at the most integrative level with a chapter that considers cannabinoids as lead compounds in the development of pharmacotherapies against pain, epilepsy, and neurodegenerative disorders.

The unique feature of this book is that the content is presented by researchers and clinical scientists at different stages of their careers. While some chapters are contributed by well-recognized researchers, others are prepared by young investigators emerging in the dynamic field of cannabinoid research and medicinal use. These diverse contributions reflect rapid growth, diversity,

and many promising pharmacological leads in the field of cannabinoid research. I hope that the book will spark the reader's interest, enthusiasm, and commitment toward advancing knowledge of cannabinoid-related physiology and pathology.

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Contents

About the Editor

Anna N. Bukiya, Ph.D., is an associate professor at the Department of Pharmacology, College of Medicine, The University of Tennessee Health Science Center and a member of Biophysical Society, American Society for Pharmacology and Experimental Therapeutics, Research Society on Alcoholism, and International Drug Abuse Research Society. Her scientific interests lie in the field of lipid modulation of ionic currents and cerebral artery sensitivity to drugs of abuse starting from in utero development and spanning into the adulthood. These studies employ an array of computational, biochemical, electrophysiological, and integrative approaches.