

Preface

The neurobiological mechanisms involved in drug addiction have been investigated for several decades with a variety of pharmacological and biochemical approaches. These studies have associated several neuroanatomical and neurochemical mechanisms with different components of drug-addictive processes, and this has led to the identification of possible targets for new treatment strategies. Progress has been accelerated dramatically in the last few years by novel research tools that selectively remove or enhance the expression of specific genes encoding proteins responsible for the biological responses of these drugs. These new models, most of them obtained from the recent advances in molecular biology's technology, have provided definitive advances in our understanding of the neurobiological mechanisms of drug addiction. Classical behavioral, biochemical, and anatomical techniques have been adapted to take a maximum advantage of these new molecular tools. These recent studies have clarified the different molecular and intracellular mechanisms involved in addictive processes, as well as the interactions among these endogenous neurobiological mechanisms; and they have provided new insights toward identifying other genetic bases of drug addiction.

The main purpose of *Molecular Biology of Drug Addiction* is to offer an extensive survey of the recent advances in molecular biology and complementary techniques used in the study of the neurobiological basis of drug dependence and addiction. Ours is a multidisciplinary review of the most relevant molecular, genetic, and behavioral approaches used in this field. The definitive advances given by the new molecular and behavioral tools now available provide a unique opportunity for such an approach. Each chapter in this book is not simply a review of the research activities of the author's laboratory, but rather provides a critical review of the main advances in the corresponding topic. Sixteen different chapters organized in four parts have been included in the book. The first part is devoted to the advances in the knowledge of the neurobiological mechanisms of opioid addiction provided in the last few years using the new available techniques, and some of the new therapeutic perspectives now opening up in this field. The second part addresses the most recent findings on the molecular, genetic, and neurochemical mechanisms involved in psychostimulant addiction, which have changed some of the basic knowledge of the neurobiological substrate of these processes. The third part of the book is focused on cannabinoid addiction. New molecular tools have also been used recently to elucidate the biological substrate of cannabinoid dependence. The behavioral models now available, which allow evaluation of the different components of cannabinoid dependence, have

optimized results in this particular field. The last part addresses several molecular, genetic, and behavioral aspects of alcohol and nicotine addiction, which have provided decisive progress in our understanding of these addictive processes.

Molecular Biology of Drug Addiction addresses the main advances in understanding the molecular mechanisms involved in the complex physiological and behavioral processes underlying drug addiction and will, we hope, serve as a useful reference guide for a wide range of neuroscientists. This book also provides basic information of interest for scientists and clinicians interested in the new therapeutic approaches to drug addiction. The different sections of the book are presented by the most relevant scientific personalities for each area. I deeply thank the authors for their effort and expert contribution in the different chapters, and Elyse O'Grady at Humana Press for offering this rewarding opportunity. Finally, I thank Raquel Martín especially for help in manuscript preparation and administrative assistance and Dr. Patricia Robledo and Dr. Olga Valverde for scientific assistance and help in library research.

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