Preface

The study of drug addiction integrates research from a wide range of disciplines including psychiatry, psychology, sociology, neuroscience, pharmacology and genetics. Preclinical studies with behaving animals have been a critical part of this endeavour for close to 100 years. The rise of animal models in drug addiction research can be traced to the growth of pharmacology as an academic discipline in North America during the 1920s. The work was advanced in 1928 when the National Research Council of the USA appointed a Committee on Drug Addiction to seek a non-addicting substitute for morphine. This directiveled to the establishment of a behavioural pharmacology laboratory at the University of Michigan under the supervision of Charles W. Edmunds and Nathan Eddy. Early investigations by these researchers tested whether newly developed compounds could reduce withdrawal symptoms in a variety of animals following chronic administration of morphine. Addiction was viewed as "drug use that caused considerable harm to the individual" [1], with both researchers and clinicians equating the treatment of addiction with the treatment of withdrawal.

Our understanding of addiction and how it is treated has advanced remarkably since that time, with much of the progress related directly to animal research. This is true for both the behavioural aspects of drug use as well as the biological underpinnings of the disorder. Clinicians and researchers alike rely on knowledge gained in modern behavioural pharmacology labs to understand the etiology, development, and treatment of addiction. Most recently, the convergence of information from preclinical and clinical studies has led to a consensus that drug addiction is a progressive disorder: initial drug use is voluntary and controlled whereas the pathological state of drug addiction is characterized by compulsive and uninhibited drug intake. This depiction of drug addiction implies that the personal and environmental factors promoting initial drug intake are not the same as those controlling drug use in the chronically addicted state. Moreover, continued drug use itself may alter neural systems that underlie reward, learning, and self-control, thereby leading to further drug use. In this way, the cycle of drug addiction can be self-perpetuating and devastating.

The recognition that addiction represents a transition from controlled to uncontrolled drug use is manifested in the research community by the use of more complex behavioural paradigms to model different stages of this disorder. This book provides an up-to-date review of these paradigms and how each are used effectively to model the progression of drug addiction. The first half of the book describes the most common laboratory measures of addiction in animals, including intracranial self-stimulation (ICSS), drug self-administration, place conditioning and sensitization. The section concludes with recent and exciting developments in animal models of eating disorders, an area that is receiving increasing attention in health and research sectors as obesity is becoming a worldwide epidemic. The second half of the book describes how these paradigms are used to model the progression of drug addiction, providing insight into the clinical symptomatology of addiction from acquisition of drug use through compulsive drug taking to withdrawal and relapse. The book is aimed at a wide readership from students who are beginning to

explore this exciting field to established researchers who have already contributed to its success. Because it provides both methodological detail and a theoretical perspective, the book will appeal to readers who are, and are not, familiar with preclinical research on drug addiction. A major challenge in this field continues to be the translation of laboratory findings to therapeutic tools. My hope is that this book will provide a basis for future research that links the bench to the bedside in the treatment of drug addiction.

I am grateful to Tyson Baker, Katia Befort, Virginia Grant, Brigitte Kieffer, Bernard Le Foll and Thomas Tszechentke for constructive feedback on specific chapters in this book. I would also like to thank Richard Beninger, Hans Dringenberg, Eric Dumont and Janet Menard for ongoing discussions on related topics. Most importantly, I am indebted to a committed group of students whose enthusiasm and insight are a constant source of inspiration. My sincere appreciation to Scott Hayton, Matthew Lovett-Barron, Bonnie Lum, Sylvia Magrys, Megan Mahoney, Amanda Maracle, Apostolia Petropoulos and Ritu Sikka.

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http://www.springer.com/978-1-60761-933-8

Animal Models of Drug Addiction
Olmstead, M.C. (Ed.)
2011, XII, 484 p., Hardcover
ISBN: 978-1-60761-933-8
A product of Humana Press