Current Topics in Behavioral Neurosciences

Volume 32

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Neuropharmacology of New Psychoactive Substances (NPS)

The Science Behind the Headlines

Springer

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ISSN 1866-3370 ISSN 1866-3389 (electronic)
Current Topics in Behavioral Neurosciences
ISBN 978-3-319-52442-9 ISBN 978-3-319-52444-3 (eBook)
DOI 10.1007/978-3-319-52444-3

Library of Congress Control Number: 2017937529

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Drug abuse and addiction are persistent problems in modern society, and an alarming new trend is the nonmedical use of so-called "designer drugs" or "legal highs," more formally known as "new psychoactive substances" (NPS). By definition, NPS are drugs of abuse that are not controlled by the 1961 Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances, but which might pose a public health threat [1]. The chemical structures of many NPS are based on compounds extracted from the biomedical or patent literature, whereas others are analogs of illicit drugs or prescribed medications. In all cases, the substances are engineered to evade existing drug control laws. At the present time, there are NPS designed to mimic most major types of abused drugs – stimulants (e.g., bath salts), cannabinoids (e.g., spice), and hallucinogens (e.g., NBOMes). NPS produce subjective effects resembling those of their progenitors, but life-threatening adverse effects are well established and include tachycardia, hyperthermia, agitation, psychosis, violent behavior, coma, and even death. Most NPS are synthesized by Asian companies and are marketed for worldwide distribution via the Internet. The United Nations Office of Drugs and Crime (UNODC) reported that between 2008 and 2015, more than 600 NPS were identified by 102 countries and territories, and this number is expected to rise [2]. NPS represent a serious global public health threat, since there is no quality control in their manufacturing or packaging, and their biological effects are unknown when they first emerge into the recreational drug marketplace.

The purpose of this book is to provide the most up-to-date knowledge about the neuropharmacology, structure-activity relationships, and toxicology of NPS. The initial idea for the volume was based on a symposium entitled, "Bath salts, spice and related designer drugs: the science behind the headlines," held at the 2014 annual meeting of the Society for Neuroscience, in Washington DC [3]. The number of contributors for the book grew from the original symposium participants to include an international panel of experts in the field of NPS. Eighteen peer-reviewed chapters provide a rich source of information about the neurobiological effects of synthetic cathinones, cannabinoids, and hallucinogens. The topics

presented range from molecular mechanisms of action to behavioral effects and include preclinical and clinical findings. The collective data demonstrate that NPS can produce effects that are similar to the drugs they intend to mimic. However, higher potency, enhanced efficacy, and idiosyncratic metabolism can render certain NPS much more dangerous than traditional drugs of abuse. The editors are indebted to each of the principal authors, and their coauthors, who committed time and expertise to craft seminal chapters for the book; we are also grateful to Springer publishing for guidance and support throughout the publication process. Our understanding of NPS is only just beginning, yet we hope this volume provides useful information to scientists, clinicians, law enforcement agencies, and policymakers who are engaged in responding to the growing phenomenon of NPS. We believe that disseminating unbiased scientific information about NPS is a key first step for increasing public awareness about the risks associated with these substances, thereby decreasing demand and avoiding potential harms.

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