Issues in Toxicology

Kevin Woodward

Toxicological Effects of Veterinary Medicinal Products in Humans

Volume 1

RSC Publishing

Toxicological Effects of Veterinary Medicinal Products in Humans

Volume 1

Kevin N. Woodward
TSGE, Concordia House, St James Business Park, Grimbald Crag Court, Knaresborough, North Yorkshire, HG5 8QB, UK
Email: Kevin.Woodward@TSGEurope.com

Issues in Toxicology No. 14

ISBN: 978-1-84973-417-2
ISSN: 1757-7179

A catalogue record for this book is available from the British Library

Published by The Royal Society of Chemistry,
Thomas Graham House, Science Park, Milton Road,
Cambridge CB4 0WF, UK

Registered Charity Number 207890

For further information see our website at www.rsc.org

Printed in the United Kingdom by CPI Group (UK) Ltd, Croydon, CR0 4YY, UK

Toxicological Effects of Veterinary Medicinal Products in Humans

Volume 1

Issues in Toxicology

Series Editors:
Professor Diana Anderson, *University of Bradford, UK*
Dr Michael D Waters, *Integrated Laboratory Systems, Inc., N Carolina, USA*
Dr Martin F Wilks, *University of Basel, Switzerland*
Dr Timothy C Marrs, *Edentox Associates, Kent, UK*

Titles in this Series:
1: Hair in Toxicology: An Important Bio-Monitor
2: Male-mediated Developmental Toxicity
3: Cytochrome P450: Role in the Metabolism and Toxicity of Drugs and other Xenobiotics
4: Bile Acids: Toxicology and Bioactivity
5: The Comet Assay in Toxicology
6: Silver in Healthcare
7: *In Silico* Toxicology: Principles and Applications
8: Environmental Cardiology
9: Biomarkers and Human Biomonitoring, Volume 1: Ongoing Programs and Exposures
10: Biomarkers and Human Biomonitoring, Volume 2: Selected Biomarkers of Current Interest
11: Hormone-Disruptive Chemical Contaminants in Food
12: Mammalian Toxicology of Insecticides
13: The Cellular Response to the Genotoxic Insult: The Question of Threshold for Genotoxic Carcinogens
14: Toxicological Effects of Veterinary Medicinal Products in Humans: Volume 1
15: Toxicological Effects of Veterinary Medicinal Products in Humans: Volume 2

How to obtain future titles on publication:
A standing order plan is available for this series. A standing order will bring delivery of each new volume immediately on publication.

For further information please contact:
Book Sales Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK
Telephone: +44 (0)1223 420066, Fax: +44 (0)1223 420247
Email: booksales@rsc.org
Visit our website at www.rsc.org/books

Preface

The term "veterinary medicinal product" describes those medicines developed specifically for use in animals. The development of these products involves an enormous amount of intellectual effort and physical labour as well as a considerable amount of financial investment in order to ensure that animals have available products that are of the appropriate quality and with the correct degree of effectiveness. These products also need to be safe for the animal patient as well as for the user, for the consumer of edible animal products and for the environment. On the other hand, the term "veterinary drug" is misleading, as the majority of drugs used in veterinary medicine, with very few exceptions, either are used in human medicine or have been used in the past in human medicine. As a consequence, we tend to know a considerable amount about the toxicity of veterinary drugs from their use in human medicine. We only know a little regarding the safety of veterinary medicinal products in humans from their use in animals.

This books attempts to bring together some of this knowledge and experience to assess the safety of veterinary medicinal products. As described in the pages that follow, this involves user safety and safety of those who consume products derived from animals treated with veterinary medicines, and for the most part this means examining their toxicological and pharmacological properties. However, some veterinary drugs are also microbiologically active, and this presents certain hazards that also need to be taken into account. Finally, like human drugs, these products also eventually find their way into the environment. As a result, to examine the potential hazards arising from veterinary medicine, we need to evaluate their toxicological and pharmacological properties, *and* we need to consider their microbiological properties and their eventual fate in the natural environment. This latter aspect is of concern not only because organisms might encounter the remnants of veterinary medicines as a result of environmental contamination, but also because of the potential effects for human health from the contamination of land and drinking

Issues in Toxicology No. 14
Toxicological Effects of Veterinary Medicinal Products in Humans: Volume 1
By Kevin N. Woodward

Published by the Royal Society of Chemistry, www.rsc.org

water. I have tried to reach a balance, and review the main issues that might impact on human safety arising from the use of veterinary medicinal products. It is not possible to cover every product or drug in a work of this nature, and I have made no attempt to do so. Some products are used infrequently, and some are only used in certain countries. Many others are human drugs that are used off-label in animals. I have attempted to cover the major drug classes as well as some individual drugs of interest. Some of these are now of historical interest as many have fallen out of use or have been replaced with more effective and safer alternatives. Nevertheless, it would be remiss to avoid discussion of these where they may have impacted human safety in the past, so I have included them here.

I would like to thank the authors who have invested significant efforts by providing chapters for this book – Dr Tim Marrs, Derek Renshaw and Professor Peter Silley. I would also like to thank my family – and dogs – for their forbearance and patience while I have been working on this project.

Kevin Woodward
Surrey

Contents

Volume 1

Issues in Toxicology No. 14
Toxicological Effects of Veterinary Medicinal Products in Humans: Volume 1
By Kevin N. Woodward

Published by the Royal Society of Chemistry, www.rsc.org

Volume 2

CHAPTER 1

Occupational Health and Safety Among Veterinarians and Veterinary Workers

1.1 Introduction

Many people use, and are therefore potentially exposed to, veterinary medicinal products. These include the pet-owning public, farmers, animal breeders and keepers, and, of course, veterinarians and other veterinary staff such as veterinary nurses and practice receptionists. The public may be intermittently exposed to veterinary medicinal products, apart from those with animals with chronic conditions such as epilepsy and diabetes where exposures may be more frequent. Farmers may be responsible for the administration of a wide variety of drugs and, occasionally, exposures have the potential to be significant, for example when dipping sheep and mixing or administering in-feed antimicrobial agents. Veterinarians and veterinary nurses are potentially exposed to a wide range of veterinary drugs including anaesthetics, euthanasia agents, anti-neoplastic agents and non-steroidal anti-inflammatory drugs. It is thus tempting to assume that these professionals are assailed on a daily basis by the combined actions of a number of pharmacologically and toxicologically active agents, and if these could be removed from veterinary practice, the world, or at least the veterinary world, would be a better place in which to live and work.

However, just as it would be wrong to assume that the industrial workplace is a chemophobe's nightmare, or a toxicologists dream, it is equally incorrect to think of the veterinary surgery or clinic as a toxicological playground. Although industry, especially the chemical industry, has had its fair share of chemical disasters, such as those involving asbestos, benzene, vinyl chloride

Issues in Toxicology No. 14
Toxicological Effects of Veterinary Medicinal Products in Humans: Volume 1
By Kevin N. Woodward

Published by the Royal Society of Chemistry, www.rsc.org