Preface

Veterinary drug delivery – Part IV

This Theme Issue of *Advanced Drug Delivery Reviews* is devoted to various applications of drug delivery to the area of animal health.

The opening critical review discusses the potential and problems associated with the development of transdermal patches for veterinary applications. Riviere and Papich describe the important aspects of dermal anatomy and physiology, and discuss interspecies differences in the context of their impact on transdermal drug flux. In addition, the characteristics of currently available transdermal patch technologies, as well as the factors which make patches different from veterinary liquid topical formulations, are presented and discussed by the authors.

In the second review, Roberts et al. continue the discussion on the potential for transdermal drug delivery to animals, by presenting a review of our current knowledge on penetration enhancers. Further, they describe the potential for skin penetration enhancement in animals. The authors outline some of the possibilities and problems associated with the use of chemical penetration enhancers as well as allometric issues and available formulations that have application in veterinary practice. This valuable review highlights the potential that penetration enhancers offer for the expansion of this route for drug delivery in animals.

In recent times aquaculture has become an expanding area within animal health. With this expansion, the aquacultural industry has become aware that quality pharmaceutical and biological products which exhibit successful clinical outcomes requires the use of modern formulations and novel drug delivery systems. The third review of this Theme Issue, written by Zezhi Shao, provides a general overview of important fish pathogens, fish diseases and control methods. New research efforts are also summarized. The author observes that in terms of pharmaceutical and biological products, the aquaculture arena is experiencing the introduction of products that utilize formulation and process technologies that were originally developed for human pharmaceuticals.

In the fourth review of this Theme Issue, Gruet et al. present a review of intramammary infections. These diseases represent a major feature in bovine pathology. The authors discuss the treatment of intramammary infections, and describe the therapeutic strategies that involve the administration of immediate release formulations during lactation and long-acting formulations during the dry period. The authors critical review concludes that current treatments are not very successful and cure rates are poor, especially towards *Staphylococcus aureus* which is responsible for chronic infections and huge economic losses. They include in their review a discussion on the new strategies that have recently been investigated including immunomodulators and novel formulations such as liposomes, microparticles and nanoparticles.

The penultimate review of this Theme Issue is written by W. Paul Cleland and is concerned with the opportunities and obstacles in veterinary dental drug delivery. Despite the fact that dental disease is common in dogs and cats, dentistry is a relatively new field in veterinary medicine. The obstacles to the development of dental treatments in animals are diverse and include the different dentition that exists between species, the difficulty in administration of oral treatments to small animals, the different presentations of oral disease and the cost of regulatory approval for each species. These factors are discussed by the author, who also describes the methods of dental hygiene for small animals, including new
adjunctive therapies, as well as new applications for existing drugs.

When drug intervention is used to control the estrous cycle of cattle, a thorough understanding of the endocrine and functional changes together with the reproductive behavior of the animals are essential. In the final review of this Theme Issue, Rathbone et al. describe our current knowledge on cattle reproductive endocrinology, physiology and behavior. In addition the methods of drug intervention used to control the estrous cycle of cattle are described. The review also describes current efforts to develop advanced drug delivery systems that deliver the drugs that control the estrous cycle of cattle.

We extend our sincere appreciation to the contributors of this issue, who, through their willingness to put pen to paper, have contributed further to our ever improving knowledge of the animal health area.

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