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New Therapeutic Approaches to Equine Protozoal Myeloencephalitis: Pharmacokinetics of Toltrazuril Sulfone Sodium Salt in the Horse

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Toltrazuril sulfone sodium salt is rapidly and fully absorbed after oral administration in horses, and this highly bioavailable salt formulation can be used for the treatment of equine protozoal myeloencephalitis. Authors' addresses: Department of Veterinary Biosciences, University of Illinois, College of Veterinary Medicine, 3830 VMBSB, 2001 South Lincoln Avenue, Urbana, IL 61802 (Dirikolu); and Department of Veterinary Science, The Maxwell H. Gluck Equine Research Center, University of Kentucky, Lexington, KY 40546 (Lehner, Hughes, Karpiesiuk, Tobin); e-mail: dirikolu@uiuc.edu.

1. Introduction

We had earlier identified triazine-based antiprotozoal agents for the treatment and prophylaxis of equine protozoal myeloencephalitis (EPM), and on this basis, we elected to develop a highly bioavailable oral formulation, namely toltrazuril sulfone sodium salt (TSSS), that can be used for the treatment and prophylaxis of EPM. This study also describes absorption, distribution, and elimination characteristics of TSSS in the horse.

2. Materials and Methods

TSSS (in medical grade dimethyl sulfoxide [DMSO]) was administered intravenously to four mature horses at a single dose of 1 mg/kg. In a separate experiment, TSSS was administered by direct application of 2.2 mg/kg of TSSS to the oral mucosa of four mature horses.

3. Results

In the present study, it was shown that TSSS orally applied was rapidly and fully absorbed by the horse. TSSS administered in this way had oral bioavailability of 56%. Relative bioavailability of TSSS in water compared with TSSS was 46%, indicating ~54% less bioavailability of TSSS in water after oral administration. The present study also showed that TSSS has potential to be used in feed additive formulations for the treatment of EPM and various other Apicomplexan diseases. Administration of TSSS with feed reduces the mean oral bioavailability of this salt formulation 4% relative to administration of TSSS directly to oral mucosa.

4. Discussion and Conclusion

Based on these data, repeated oral-mucosal administration of TSSS with or without feed will yield useful steady-state plasma and cerebrospinal fluid concentrations of toltrazuril sulfone for the treatment and prophylaxis of EPM.

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Research Abstract

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