# Papers

# Evaluation of a human generic formulation of ciclosporin in the treatment of canine atopic dermatitis with in vitro assessment of the functional capacity of phagocytic cells

M. Kovalik, I. Taszkun, Z. Pomorski, M. Kozak, D. Pomorska, M. Szczepanik, P. Wilkolek, L. Palenik, D. J. Shaw, A. H. M. van den Broek, K. L. Thoday

**To compare the efficacy, tolerability and safety of a generic formulation of ciclosporin for human beings with prednisone in the treatment of canine atopic dermatitis), human generic ciclosporin A (hgCsA) (5 mg/kg daily) and prednisone (1 mg/kg daily for seven days, followed by 1 mg/kg every second day) were administered to 13 and seven dogs with atopic dermatitis, respectively, for 42 days. Skin changes were assessed using a modified canine atopic dermatitis extent and severity index (mCADESI-01) and a pruritus intensity scale system. The in vitro functional capacity of phagocytic cells was assessed using the tetrazolium reductase activity and zymosan-stimulated tetrazolium reductase activity tests, as well as measurements of the percentage phagocytic activity and the ingestion capacity of phagocytic cells. Haematological and biochemical parameters were also monitored. There was a greater than or equal to 50 per cent reduction from the baseline in mCADESI-01 scores in 84.6 and 100 per cent of dogs, and a greater than or equal to 50 per cent reduction from the baseline in pruritus scores in 76.9 and 85.7 per cent of dogs, treated with hgCsA and prednisone, respectively. No important adverse physical, haematological or biochemical effects occurred with either drug and no statistically significant changes were detected in any of the four tests assessing the functional activity of phagocytes. The generic formulation of ciclosporin was effective in reducing the severity of physical signs of canine atopic dermatitis and was well tolerated.**

Veterinary Record doi: 10.1136/vr.c7365

**M. Kovalik,** DrVetMed, PhD, MRCVS,
**M. Kozak,** MVD, PhD,
**L. Palenik,** DrVetMed, PhD, MRCVS,
University of Veterinary Medicine and Pharmacy in Košice, 041 81 Košice, Slovak Republic
**I. Taszkun,** DrVetMed, PhD,
**Z. Pomorski,** MVD, PhD,
**D. Pomorska,** DrVetMed, PhD,
**M. Szczepanik,** DrVetMed, PhD,
**P. Wilkolek,** DrVetMed, PhD,
Faculty of Veterinary Medicine, University of Life Science in Lublin, 20-612 Lublin, Poland
**D. J. Shaw,** BSc, PhD,
**A. H. M. van den Broek,** BVSc, PhD, DVR, FRCVS,
**K. L. Thoday,** BVetMed, PhD, DVD, DipECVD, MRCVS,
Veterinary Dermatology Unit, Division of Veterinary Clinical Sciences, Royal (Dick) School of Veterinary Studies and The Roslin Institute, Easter Bush Veterinary Centre, University of Edinburgh, Roslin, Midlothian EH25 9RG

Dr Kovalik is also at Veterinary Dermatology Unit, Division of Veterinary Clinical Sciences, Royal (Dick) School of Veterinary Studies and The Roslin Institute, Easter Bush Veterinary Centre, University of Edinburgh, Roslin, Midlothian EH25 9RG

E-mail for correspondence: mkovalikos@yahoo.com

Provenance: not commissioned; externally peer reviewed

IN human beings, ciclosporin A (CsA) was first used to reduce graft rejection but it soon became apparent that it was also effective in the management of severe atopic dermatitis (Zaki and others 1996). The initial formulation was in vegetable oil, available as a drinkable solution or as soft gelatin capsules (Sandimmune; Sandoz-Pharma). Subsequently, a microemulsified preparation (Neoral; Novartis) was designed to improve bioavailability (Zadrazil and others 2004).

The potential efficacy of CsA in the treatment of canine atopic dermatitis was first reported by Fontaine and Olivry (2001). Subsequent studies established that 5 mg/kg microemulsified CsA (Neoral oral solution 100 mg/ml) per day constituted an induction dose that controlled the physical signs of canine atopic dermatitis (Olivry and others 2002). Subsequently, a microemulsified formulation of CsA (Atopica; Novartis Animal Health), equivalent to the human formulation Neoral (Novartis), was licensed for use in dogs, but only in certain countries.

Recently, human generic formulations of CsA (hgCsA) for use in human beings have been developed and some of these are available commercially worldwide (see www.equoral.net/files/regulatory.html). Equoral (Teva Pharmaceuticals) is one such hgCsA microemulsified formulation. Studies comparing the bioequivalence and pharmacokinetic conversion of Neoral with that of Equoral have demonstrated that these drugs are bioequivalent and interchangeable in stable human patients (Andrysek and others 2003, Masri and oth-