liver cysts that occurred with mebendazole were not reported. In the second phase, 2 patients suffered anaphylactic shock as a result of rupture of a lung cyst and a cyst in the abdominal cavity. These 2 patients were withdrawn from mebendazole treatment, as were another 4 patients as a consequence of their adverse reactions, although in 3 the withdrawal was only temporary.

Although albendazole is preferred to mebendazole in the treatment of echinococcosis, if either drug is used there should be constant medical supervision with regular monitoring of serumtransaminase concentrations and of leucocyte and platelet counts. Patients with liver damage should be treated with reduced doses of benzimidazole carbamates, if at all.2

- 1. Davis A, et al. Multicentre clinical trials of benzimidazolecarbamates in human echinococcosis. *Bull WHO* 1986; **64:** 383–8.
- 2. Davis A, et al. Multicentre clinical trials of benzimidazolecarbamates in human cystic echinococcosis (phase 2). Bull WHO 1989: 67: 503-8.

Overdosage. Respiratory arrest and tachyarrhythmia associated with continuous convulsions were reported in an 8-week-old infant after accidental poisoning with mebendazole. Treatment by exchange transfusion and anticonvulsants was successful.

el Kalla S, Menon NS. Mebendazole poisoning in infancy. Ann Trop Paediatr 1990; 10: 313–14.

Precautions

Patients given high doses of mebendazole, such as those with echinococcosis, should be supervised closely with blood counts and liver function being monitored; such high-dose therapy may be inappropriate in those with hepatic impairment (see under Incidence of Adverse Effects, above).

Monitoring drug concentrations. In a retrospective analysis of patients given high doses of mebendazole for echinococcosis, no relationship was found between dose and plasma concentration of mebendazole and considerable intra- and interindividual variation in plasma concentrations was observed, emphasising the need for repeated monitoring. Several patients appeared to have what were considered to be subtherapeutic plasma concentrations.

1. Luder PJ, et al. Treatment of hydatid disease with high oral doses of mebendazole: long-term follow-up of plasma mebendazole levels and drug interactions. Eur J Clin Pharmacol 1986; 31:

Pregnancy. Mebendazole is teratogenic in rats and there are no adequate and well controlled studies in human pregnancy. Mebendazole is therefore usually contra-indicated during pregnancy. However, it was noted that in a survey of a limited number of pregnant women who had inadvertently taken mebendazole during the first trimester, the incidence of malformation and spontaneous abortion was no greater than that observed in the general population.

Interactions

Antiepileptics. Phenytoin or carbamazepine have been reported to lower plasma-mebendazole concentrations in patients receiving high doses for echinococcosis, presumably as a result of enzyme induction; valproate had no such effect.1

Luder PJ, et al. Treatment of hydatid disease with high oral doses of mebendazole: long-term follow-up of plasma mebendazole levels and drug interactions. Eur J Clin Pharmacol 1986; 31:

Histamine H₂-antagonists. Plasma concentrations of mebendazole have been raised when the enzyme inhibitor cimetidine was also given, and this has resulted in the resolution of previously unresponsive hepatic hydatid cysts.

1. Bekhti A. Pirotte J. Cimetidine increases serum mebendazole concentrations: implications for treatment of hepatic hydatid cysts. *Br J Clin Pharmacol* 1987; **24:** 390–2.

Pharmacokinetics

Mebendazole is poorly absorbed from the gastrointestinal tract and undergoes extensive first-pass elimination, being metabolised in the liver, eliminated in the bile as unchanged drug and metabolites, and excreted in the faeces. Only about 2% of a dose is excreted unchanged or as metabolites in the urine.

Mebendazole is highly protein bound.

Uses and Administration

Mebendazole, a benzimidazole carbamate derivative, is an anthelmintic with activity against most nematodes and some other worms; activity against some larval stages and ova has also been demonstrated. It inhibits or destroys cytoplasmic microtubules in the worm's

intestinal or absorptive cells. Inhibition of glucose uptake and depletion of glycogen stores follow as do other inhibitory effects leading to death of the worm within several days.

Mebendazole, being poorly absorbed from the gastrointestinal tract, is used principally in the treatment of the intestinal nematode infections ascariasis (roundworm infection), enterobiasis (pinworm or threadworm infections), hookworm (ancylostomiasis and necatoriasis), and trichuriasis (whipworm infection); it is useful in mixed infections. During treatment with mebendazole, migration of worms with expulsion through the mouth and nose has occurred in some patients heavily infected with Ascaris. Mebendazole is also used in the treatment of capillariasis and trichostrongyliasis and has been used in strongyloidiasis. Other nematode infections which may respond to mebendazole are infection with the filarial nematode Mansonella perstans, and the tissue infections toxocariasis and trichinosis. Mebendazole has also been tried in high doses in the treatment of echinococcosis (hydatid disease). For discussions of these infections and their treatment, see under Choice of Anthelmintic, p.134, and under the individual headings below.

Mebendazole is given orally. The usual dose for adults and children aged over 2 years with enterobiasis is 100 mg as a single dose, repeated if necessary after 2 to 3 weeks; for ascariasis, hookworm infections, and trichuriasis the usual dose in adults and children over 1 year is 100 mg twice daily for 3 days, although a single dose of 500 mg may be effective.

Angiostrongyliasis. Mebendazole was formerly used for the treatment of angiostrongyliasis (p.134) but current opinion is that there is no convincing evidence to support its use.

Capillariasis. Mebendazole in a dose of 200 mg twice daily for 20 days has been used for the treatment of capillariasis (p.135).

1. Abramowicz M, ed. Drugs for parasitic infections. 1st ed. New Rochelle NY: The Medical Letter, 2007.

Echinococcosis. Mebendazole has been used 1-9 in echinococcosis (p.136), but albendazole is generally preferred. The usual dose of mebendazole in cystic echinococcosis is 40 to 50 mg/kg daily for at least 3 to 6 months.8 A similar dose is used as an adjuvant to surgery. For alveolar echinococcosis, the dose is adjusted after 4 weeks to produce a plasma concentration of at least 250 nanomoles/litre (74 nanograms/mL), although adults should not be given more than 6 g daily. Treatment is continued for at least 2 years after radical surgery, or indefinitely in inoperable cases.

- 1. Ammann RW, et al. Recurrence rate after discontinuation of long-term mebendazole therapy in alveolar echinococcosis (preliminary results). *Am J Trop Med Hyg* 1990; **43:** 506–15.
- 2. Messaritakis J, et al. High mebendazole doses in pulmonary and hepatic hydatid disease. Arch Dis Child 1991; 66: 532-3.
- 3. Teggi A, et al. Therapy of human hydatid disease with mebenda and albendazole. Antimicrob Agents Chemother 1993; 37:
- 4. Göcmen A, et al. Treatment of hydatid disease in childhood with mebendazole. Eur Respir J 1993; 6: 253-7.
- 5. Ammann RW, et al. Effect of chemotherapy on the larval mass and the long-term course of alveolar echinococcosis. *Hepatology* 1994: **19:** 735–42.
- 6. Erdinçler P, et al. The role of mebendazole in the surgical treatment of central nervous system hydatid disease. Br J Neurosurg 1997: 11: 116-20.
- 7 Vutova K et al. Effect of mehendazole on human cystic echinococcosis: the role of dosage and treatment duration. *Ann Trop Med Parasitol* 1999; **93:** 357–65.
- 8. WHO Informal Working Group on Echinococcosis. Guidelines for treatment of cystic and alveolar echinococcosis in humans. Bull WHO 1996; **74:** 231–42.
- 9. Smego RA, et al. Percutaneous aspiration-injection-reaspiration drainage plus albendazole or mebendazole for hepatic cystic echinococcosis: a meta-analysis. Clin Infect Dis 2003; 37:

Giardiasis. For mention of the use of mebendazole for the treatment of giardiasis, see p.824.

Mansonella infections. Mebendazole is one of the drugs that has been suggested for the treatment of infections with Mansonella perstans (p.137). Some patients have responded to mebendazole with levamisole, 1,2 diethylcarbamazine, 3 or to meben-

- 1. Maertens K, Wery M. Effect of mebendazole and levamisole on Onchocerca volvulus and Dipetalonema perstans. *Trans R Soc Trop Med Hyg* 1975; **69:** 359–60.
- Bernberg HC, et al. The combined treatment with levamisole and mebendazole for a perstans-like filarial infection in Rhodesia. Trans R Soc Trop Med Hyg 1979; 73: 233–4.

- 3. Bregani ER, et al. Comparison of different anthelmintic drug regimens against Mansonella perstans filariasis. Trans R Soc Trop Med Hyg 2006; 100: 458–63.
- 4. Wahlgren M. Frolov I. Treatment of Dipetalonema perstans in fections with mebendazole. Trans R Soc Trop Med Hyg 1983; 77:

Strongyloidiasis. Mebendazole has been used for the treatment of strongyloidiasis (p.138), but needs to be given for longer periods than albendazole to control auto-infection, so that, of the two, albendazole is preferred.1-3

- 1. Wilson KH, Kauffman CA, Persistent Strongyloides stercoralis in a blind loop of the bowel: successful treatment with mebendazole. *Arch Intern Med* 1983; **143**: 357–8.
- 2. Mravak S, et al. Treatment of strongyloidiasis with mebendazole, Acta Trop (Basel) 1983; 40: 93-4.
- 3. Pelletier LL, Baker CB. Treatment failures following mebenda zole therapy for chronic strongyloidiasis. J Infect Dis 1987; 156:

Syngamosis. Mebendazole has been used successfully to treat syngamosis (p.138).

1. Timmons RF, et al. Infection of the respiratory tract with Mammomanogamus (Syngamus) laryngeus: a new case in Largo, Florida, and a summary of previously reported cases. Am Rev Respir Dis 1983; 128: 566-9

Toxocariasis. Mebendazole has been used in the treatment of toxocariasis (p.139). In comparative studies, mebendazole has been reported to produce similar improvements to those obtained with tiabendazole1 and with diethylcarbamazine,2 in each case with a lower incidence of adverse effects.

- 1. Magnaval JF, Charlet JP. Efficacité comparée du thiabendazole et du mébendazole dans le traitement de la toxocarose. *Therapie* 1987: 42: 541-4
- 2. Magnaval J-F. Comparative efficacy of diethylcarbamazine and mebendazole for the treatment of human toxocariasis. *Parasitol*ogy 1995; **110:** 529–33.

Trichinosis. Mebendazole is used for the treatment of trichinosis (p.139) in some countries.

1. Levin ML. Treatment of trichinosis with mebendazole. Am J Trop Med Hyg 1983; 32: 980-3.

Preparations

USP 31: Mebendazole Tablets.

Proprietary Preparations (details are given in Part 3)

Proprietary Preparations (details are given in Part 3)

Arg.: Dazomet; Helmint; Mebutar; Nemasole; Tesical; Austral.: Chemists
Own De Worm; Combantrin-I with Mebendazole; Vermox; Austria: Pantelmin; Belg.: Docmebenda; Vermox; Broz.: Ascariobel†; Averpan†; Bendrax†; Crisdazol†; Divermil†; Ductelmin; Eraverm†; Feller†; Geophagol;
Gran-Verm†; Ibdazol†; Kindelmin; Mebental†; Mebiosol†; Medazol; Menbel;
Moben; Multielmin†; Multizol; Necamin; Neo Mebend; Novelmin; Panfugan;
Pantelmin; Panverm†; Paraverm†; Pentazole†; Pluriverm; Plurivermil†; Polidazol†; Probendazol; Quintelmin†; Sifben†; Sirben; Tetrahelmin†; Trotil†;
Vermiben; Verminon†; Verminax†; Vermoplex; Vermoral; Verzol; Zoldaben†; Ganda.: Vermox; Gr.: Vermox; Horne; Tetrahelmin†; Trotil†;
Vermoda.: Vermox; Gr.: Vermox; Hong Kong: Elmetin†; Vermox;
Hung: Vermox; India: Mebex; Wormin; Indon.: Gavox; Vermox; India: Vermox; Ratl.: Vermox; Malaysia: Quemox; Thelmox;
Vermox; Mex.: Amatol; Bensolmin; Bestelar; Carbatil†; Daben; Diazoler,
Lumbicid; M-Bentabs†; Meb-Overoid; Mebelmin; Mebendicin; Mebensole;
Mebentiasis; Mebentral; Nemapres; Panvermin; Paranzol†; Prodazol†; Profenzol; Revapol; Soltric†; Vermico; Vermidi (Vermin)-Bazol; Vermox; Vertex†; Vertizole; Neth.: Anti-Worm; Kruidvat Anti-worm; Madicure; Trekpleister Anti-Worm†; Vermox; Mermox; Morm; Vermox; Norma; Vermox; Norma; Pola: Pantelmin;
Toloxim; Rus.: Vermox (Bepsonck); Wormin (Bopsuri): S.Afr:. AdcoWormex; Gipex; D-Worm; Rioworm; Rolab-Anthex; Vermox; Vormgo;
Wormstop; Spain: Bantenol†; Lomper; Mebendan; Oxitover†; Sufit; Wormstey, **Spain:** Bartenol†; Lomper; Mebendan; Oxitover†; Sufli; **Swed.**: Vermox; **Switz.**: Vermox; **Thai.**: Benda†; Big-Ben; Drivermide; Fugacar; Masaworm-I; Meba†; Mebenda-P†; Medazole; Noxworm†; Vagaka†; Warca; **Turk.**: Vermazol; Versid; **UAE**: Mebzol; **UK** Boots Threadworm Tablets 2 Years Plus; Ovex; Pripsen; Vermox; **USA**: Vermox; **Venez**: Bendacor; Bendamen; Eprofil; Flemdazole†; Pantelmin†; Pival†; **Tablenot**; Vermelop. Tamixan†; Vermalor

Multi-ingredient: Arg.: Aduar; Helmint Compuesto; Mebutar Compuesto; Tru Compuesto; Braz.: Eraverm-T†; Exelmin†; Forverm; Helmi-Bed†; Helmib†; Helmiben; Helmidrax†; Josverm†; Metiaben†; Neovermin; Octelmin†; Poliben†; Prolim; Prohelmin†; Vermol†; Zoles†; India: Mebex Plus; Mex.: Amibriz†; Amoebriz; Mebeciclo; Vermox-Plus.

Melarsomine (rINN)

Melarsomina; Mélarsomine; Melarsominum. Bis(2-aminoethyl) p-[(4,6-diamino-s-triazin-2-yl)amino]dithiobenzenearsonite.

Меларсомин

 $C_{13}H_{21}AsN_8S_2 = 428.4.$ CAS = 128470-15-5. ATC Vet - OP5 I AD06.

Melarsomine is a trivalent arsenical derivative used in veterinary practice for the control of canine heartworm (dirofilariasis).

Metrifonate (BAN, rINN)

Bayer-L-1359; DETF; Metrifonaatti; Metrifonat; Metrifonat; Metrifonatas; Métrifonate; Metrifonato; Metrifonatum; Metriphonate; Trichlorfon (USAN): Trichlorphon, Dimethyl 2.2.2-trichloro-1-hydroxyethylphosphonate.

Метрифонат

 $C_4H_8CI_3O_4P = 257.4.$ CAS — 52-68-6.

ATC - PO2BBOI.

ATC Vet - QP52AB01; QP53AF02.

Pharmacopoeias. In Eur. (see p.vii), Int., and US.

Ph. Eur. 6.2 (Metrifonate). A white or almost white, crystalline powder. M.p. is between 76° and 81°. Freely soluble in water, in alcohol, and in acetone; very soluble in dichloromethane. Protect

USP 31 (Metrifonate). A white crystalline powder. M.p. about 78° with decomposition. Freely soluble in water, in alcohol, in acetone, in chloroform, in ether, and in benzene; very soluble in dichloromethane; very slightly soluble in hexane and in pentane. Decomposed by alkali. Store at a temperature not exceeding 25°.

Adverse Effects, Treatment, and Precautions

Metrifonate is generally well tolerated, but may cause nausea, vomiting, abdominal pain, diarrhoea, headache, dizziness, and weakness.

It is an organophosphorus compound and because of its anticholinesterase properties depresses plasmacholinesterase concentrations. For a description of the toxic effects of organophosphorus compounds and the treatment of acute poisoning, see Organophosphorus Insecticides, p.2047. Atropine has been used to relieve cholinergic adverse effects without affecting metrifonate's activity against Schistosoma haematobium.

Anticholinesterase effects. Metrifonate depresses cholinesterase activity and there has been the occasional report of severe cholinergic adverse effects.1 However, it does not usually give rise to troublesome effects at doses normally used, even though there may temporarily be almost complete inhibition of plasma cholinesterase and considerable inhibition of erythrocyte cholinesterase² (but see also under Alzheimer's Disease, below).

The environmental aspects of metrifonate usage have been considered by WHO.3

- 1. Jamnadas VP, Thomas JEP. Metriphonate and organophosphate poisoning. Cent Afr J Med 1979; 25: 130.
- Pleština R, et al. Effect of metrifonate on blood cholinesterases in children during the treatment of schistosomiasis. Bull WHO 1972: 46: 747-59
- 3. WHO. Trichlorfon. Environmental Health Criteria 132. Geneva: WHO, 1992. Available at: http://www.inchem.org/documents/ehc/ehc/ehc132.htm (accessed 16/07/08)

Handling, Bulk metrifonate is very toxic when inhaled, swallowed, or spilled on the skin. It can be removed from the skin by washing with soap and water. Contaminated material should be immersed in a 2% aqueous solution of sodium hydroxide for sev-

Pregnancy. WHO reported¹ that metrifonate had not shown embryotoxicity or teratogenicity, but did not recommend the use of metrifonate in pregnant patients unless immediate intervention was essential. There has been a report of an infant born with massive hydrocephalus and a large meningomyelocele whose mother had been treated twice with metrifonate during the second month of pregnancy.2 A possible link between congenital abnormalities and the use of metrifonate to eradicate fish parasites has also been postulated.3

- WHO. The control of schistosomiasis: second report of the WHO expert committee. WHO Tech Rep Ser 830 1993. Available at: http://libdoc.who.int/trs/WHO_TRS_830.pdf (accessed
- Monson MH, Alexander K. Metrifonate in pregnancy. Trans R Soc Trop Med Hyg 1984; 78: 565.
- 3. Czeizel AE, et al. Environmental trichlorfon and cluster of congenital abnormalities. Lancet 1993; 341: 539-42.

Interactions

Patients treated with metrifonate should not be given depolarising neuromuscular blockers such as suxamethonium for at least 48 hours. The use of metrifonate should be avoided in those recently exposed to insecticides or other agricultural chemicals with anticholinesterase activity.

Pharmacokinetics

Metrifonate is absorbed after oral doses and some is converted to dichlorvos which is considered to be the active moiety. Plasma concentrations of dichlorvos are about 1% of those of metrifonate with peak concentrations of both substances occurring within 2 hours. Excretion is via the kidney, mainly as glucuronides.

◊ References.

- 1. Nordgren I, et al. Plasma levels of metrifonate and dichlorvos during treatment of schistosomiasis with Bilarcil. Am J Trop Med Hyg 1980; 29: 426–30.
- 2. Nordgren I, et al. Levels of metrifonate and dichlorvos in plasma and erythrocytes during treatment of schistosomiasis with Bilarcil. Acta Pharmacol Toxicol (Copenh) 1981; **49** (suppl V):
- Pettigrew LC, et al. Pharmacokinetics, pharmacodynamics, and safety of metrifonate in patients with Alzheimer's disease. J Clin Pharmacol 1998; 38: 236–45.

Uses and Administration

Metrifonate is an organophosphorus compound and is converted in the body to the active metabolite dichlorvos (p.2040), an anticholinesterase.

Metrifonate has anthelmintic activity against Schistosoma haematobium and has been given orally as an alternative to praziquantel in the treatment of schistosomiasis due to S. haematobium. It has usually been given in three doses of 7.5 to 10 mg/kg at intervals of 2 weeks.

Metrifonate has also been used as an insecticide and as a parasiticide in fish and domestic animals.

Alzheimer's disease. Metrifonate, like a number of other cholinesterase inhibitors, has been tried in the treatment of Alzheimer's disease (see Dementia, p.362). Clinical studies^{1,2} produced modest benefits but research was stopped after reports of muscle weakness, sometimes requiring respiratory support.

- 1. Becker RE, et al. Effects of metrifonate on cognitive decline in Alzheimer disease: a double-blind, placebo-controlled, 6-month study. *Alzheimer Dis Assoc Disord* 1998; **12**: 54–7.
- 2. Morris JC, et al. Metrifonate benefits cognitive, behavioral, and global function in patients with Alzheimer's disease. *Neurology* 1998; **50**: 1222–30.

Schistosomiasis. While praziquantel is now the main treatment for schistosomiasis (p.138), metrifonate is an alternative for infection due to Schistosoma haematobium. Cure rates with standard doses in schistosomiasis control programmes range from 40 to more than 80%, with a reduction of more than 80% in egg counts among those not cured, but a comparison with praziquantel has shown praziquantel to be the more effective drug. 1 In addition, metrifonate's dosage schedule of 3 doses at intervals of 2 weeks has caused problems of patient compliance;2 giving 5 mg/kg three times in one day has produced similar results to a standard dosage schedule.3

- 1. Squires N. Interventions for treating schistosomiasis haematobium. Available in The Cochrane Database of Systematic Reviews; Issue 3. Chichester: John Wiley; 1997 (accessed 16/05/05).
- 2. Aden Abdi Y, Gustafsson LL. Poor patient compliance reduces the efficacy of metrifonate treatment of Schistosoma haematobium in Somalia. Eur J Clin Pharmacol 1989; 36: 161-4.
- 3. Aden Abdi Y. Gustafsson LL. Field trial of the efficacy of a simplified and standard metrifonate treatments of Schistosoma hae-matobium. Eur J Clin Pharmacol 1989; **37:** 371–4.

Milbemycin Oxime

CGA-179246; Milbemicina oxima. A mixture of milbemycin A_4 5-oxime and milbemycin A₃ 5-oxime.

Мильбемицин Оксим

CAS - 129496-10-2 ATC Vet — QP54AB01.

Milbemycin oxime is an anthelmintic used in veterinary medi-

Morantel Citrate (BANM, pINNM)

Citrato de morantel; Morantel, Citrate de; Moranteli Citras. (E)-I,4,5,6-Tetrahydro-I-methyl-2-[2-(3-methyl-2-thienyl)vinyl]pyrimidine citrate monohydrate.

Морантела Цитрат

 $C_{12}H_{16}N_2S, C_6H_8O_7, H_2O = 430.5.$ $CAS = 20574-50-9 \text{ (morantel)}; 69525-81-1 \text{ (morantel ci-$

Morantel Tartrate (BANM, USAN, pINNM)

CP-12009-18; Moranteelivetytartraatti; Morantel, hydrogénotartrate de; Morantel, Tartrate de; Morantel-hidrogén-tartarát; Morantel-hydrogen-tartarát; Moranteli hydrogenotartras; Moranteli Tartras; Morantelvätetartrat; Tartrato de morantel; UK-2964-18.

Морантела Тартрат

 $C_{12}H_{16}N_2S, C_4H_6O_6 = 370.4.$ CAS — 20574-50-9 (moran 20574-50-9 (morantel); 26155-31-7 (morantel tartrate).

Pharmacopoeias. In Eur. (see p.vii) and US for veterinary use

Ph. Eur. 6.2 (Morantel Hydrogen Tartrate for Veterinary Use; Morantel Tartrate BP(Vet) 2008). A white or pale yellow, crystalline powder. Very soluble in water and in alcohol; practically insoluble in ethyl acetate. A 1% solution in water has a pH of 3.3 to 3.9. Protect from light.

USP 31 (Morantel Tartrate). A white or pale vellow, crystalline powder. Very soluble in water and in alcohol; practically insoluble in ethyl acetate. pH of a 1% solution in water is between 2.8 and 3.9. Store at a temperature of 25°, excursions permitted between 15° and 30°. Protect from light.

Profile

Morantel is an analogue of pyrantel. The citrate and the tartrate are used as anthelmintics in veterinary medicine for the treatment of gastrointestinal roundworms.

Moxidectin (BAN, USAN, rINN)

CL-301423; Moksidektiini; Moxidectina; Moxidectine; Moxidectinum; Moxidektin. (6R,15S)-5-O-Demethyl-28-deoxy-25-[(E)-1,3-dimethylbut-1-enyl]-6,28-epoxy-23-oxomilbemycin B (E)-23-O-methyloxime.

Моксидектин

 $C_{37}H_{53}NO_8 = 639.8.$ CAS — 113507-06-5. ATC Vet - QP54AB02.

Pharmacopoeias. In Eur. (see p.vii) for veterinary use. **Ph. Eur. 6.2** (Moxidectin for Veterinary Use). A white or pale yellow, amorphous powder. Practically insoluble in water; very soluble in alcohol; slightly soluble in hexane.

Profile

Moxidectin is an anthelmintic used in veterinary medicine. It is also used as a systemic veterinary ectoparasiticide and is under investigation for the treatment of human onchocerciasis.

♦ References

1. Cotreau MM. et al. The antiparasitic moxidectin: safety, tolerability, and pharmacokinetics in humans. J Clin Pharmacol 2003; **43:** 1108-15.