Antiepileptics. For increased *phenytoin* concentrations when given with levamisole and fluorouracil, see Interactions, Antine-oplastics, under Phenytoin, p.499.

Pharmacokinetics

Levamisole is rapidly absorbed from the gastrointestinal tract. Maximum plasma concentrations are attained within 1.5 to 2 hours. It is extensively metabolised in the liver. The plasma half-life for levamisole is 3 to 4 hours and for the metabolites is 16 hours. It is excreted mainly in the urine as metabolites and a small proportion in the faeces. About 70% of a dose is excreted in the urine over 3 days, with about 5% as unchanged levamisole.

♦ References.

- Luyckx M, et al. Pharmacokinetics of levamisole in healthy subjects and cancer patients. Eur J Drug Metab Pharmacokinet 1982; 7: 247–54.
- Kouassi E, et al. Novel assay and pharmacokinetics of levamisole and p-hydroxylevamisole in human plasma and urine. Biopharm Drug Dispos 1986; 7: 71–89.

Uses and Administration

Levamisole hydrochloride is the active laevo-isomer of tetramisole hydrochloride. It is used as an anthelmintic and as an adjuvant in malignant disease. It has also been tried in several conditions where its stimulant effect on the depressed immune response might be useful.

Levamisole is active against intestinal nematode worms and appears to act by paralysing susceptible worms which are subsequently eliminated from the intestines. In particular, levamisole is effective in the treatment of ascariasis (p.134). It is also used in hookworm infections (p.136).

Doses of levamisole hydrochloride are expressed in terms of the equivalent amount of levamisole. Levamisole hydrochloride 1.18 g is equivalent to about 1 g of levamisole. The usual adult dose in ascariasis is 150 mg of levamisole orally as a single dose; children have been given 3 mg/kg as a single dose; children hookworm infection ancylostomiasis or for mixed ascariasis-hookworm infections, both adults and children may be given 2.5 mg/kg as a single dose, repeated after 7 days in cases of severe hookworm infection.

Levamisole influences host defences by modulating cell-mediated immune responses; it restores depressed T-cell functions and has been described as an immunostimulant, although stimulation above normal levels does not seem to occur. It has been tried in many disorders, including bacterial and viral infections and rheumatic disorders, although in these conditions results have not been encouraging.

Levamisole has also been used as an adjunct in patients with malignant disease, although it is not clear that any response is due to its action on the immune system. Adjuvant treatment with levamisole and fluorouracil has been given to reduce recurrence after resection of adenocarcinoma of the colon with regional lymph node involvement (but see Malignant Neoplasms, below).

◊ Reviews.

- 1. Amery WKP, Bruynseels JPJM. Levamisole, the story and the lessons. *Int J Immunopharmacol* 1992; **14:** 481–6.
- Scheinfeld N, et al. Levamisole in dermatology: a review. Am J Clin Dermatol 2004; 5: 97–104.

Malignant neoplasms. Levamisole has been tried in the adjuvant treatment of various malignant neoplasms^{1,2} with conflicing results. Based on the results of early adjuvant trials,³⁻⁵ levamisole was used as standard therapy to modulate fluorouracil in patients with colorectal cancer (p.665), particularly in the USA. However, whether levamisole actually added to the beneficial effect of adjuvant fluorouracil was unclear. Adjuvant levamisole alone was no more effective than placebo in 1 study,⁶ and more recent trials have indicated that levamisole is no more effective than placebo when added to fluorouracil,⁷ or to fluorouracil plus folinic acid.⁸

- Spreafico F. Use of levamisole in cancer patients. *Drugs* 1980; 20: 105–16.
- Amery WK, Butterworth BS. Review/commentary: the dosage regimen of levamisole in cancer: is it related to efficacy and safety? Int J Immunopharmacol 1983; 5: 1–9.

- Laurie JA, et al. Surgical adjuvant therapy of large-bowel carcinoma: an evaluation of levamisole and the combination of levamisole and fluorouracii: the North Central Cancer Treatment Group and the Mayo Clinic. J Clin Oncol 1989; 7: 1447–56.
- Moertel CG, et al. Levamisole and fluorouracil for adjuvant therapy of resected colon carcinoma. N Engl J Med 1990; 322: 352–8
- Moertel CG, et al. Fluorouracil plus levamisole as effective adjuvant therapy after resection of stage III colon carcinoma: a final report. Ann Intern Med 1995; 122: 321–6.
- Chlebowski RT, et al. Long-term survival following levamisole or placebo adjuvant treatment of colorectal cancer: a Western Cancer Study Group trial. Oncology 1988; 45: 141–3.
- QUASAR Collaborative Group. Comparison of fluorouracil with additional levamisole, higher-dose folinic acid, or both, as adjuvant chemotherapy for colorectal cancer: a randomised trial. *Lancet* 2000; 355: 1588–96.
- Wolmark N, et al. Clinical trial to assess the relative efficacy of fluorouracil and leucovorin, fluorouracil and levamisole, and fluorouracil, leucovorin, and levamisole in patients with Dukes' B and C carcinoma of the colon: results from National Surgical Adjuvant Breast and Bowel Project C-04. J Clin Oncol 1999; 17: 3553-9.

Mansonella infections. Levamisole is one of the drugs that has been suggested for the treatment of *Mansonella* infections (p.137). There have been reports^{1,2} of response when given with mebendazole.

- 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.

Mouth ulceration. Levamisole might be beneficial in severe mouth ulceration (p.1700) but is limited by its adverse effects. A review of its use in recurrent aphthous stomatitis indicated that beneficial results have been reported with levamisole in open studies, but results of double-blind studies have been conflicting. Nevertheless, there have been patients with severe recurrent aphthous stomatitis refractory to all other modes of treatment who have responded to levamisole. Dosage has been with 150 mg daily in divided doses given for 3 days at the first sign of ulceration, followed by 11 days without treatment, repeated as necessary.

 Miller MF. Use of levamisole in recurrent aphthous stomatitis. *Drugs* 1980; 20: 131–6.

Renal disorders. In a randomised double-blind study, children with frequently relapsing corticosteroid-sensitive and corticosteroid-dependent nephrotic syndrome were given placebo or levamisole 2.5 mg/kg on alternate days and steroid therapy was gradually withdrawn. ¹ Of 31 children being treated with levamisole, 14 were still in remission 112 days after the start of the study compared with 4 of 30 receiving placebo. There have been subsequent reports of adjunctive use in children with nephrotic syndrome, ²⁶ but its place in therapy remains to be established. For a discussion of the treatment of glomerular kidney disorders, including the nephrotic syndrome, see p.1504.

- British Association for Paediatric Nephrology. Levamisole for corticosteroid-dependent nephrotic syndrome in childhood. *Lancet* 1991; 337: 1555–7.
- Donia AF, et al. Levamisole: adjunctive therapy in steroid dependent minimal change nephrotic children. Pediatr Nephrol 2002; 17: 355–8.
- Fu LS, et al. Levamisole in steroid-sensitive nephrotic syndrome children with frequent relapses and/or steroid dependency: comparison of daily and every-other-day usage. Nephron Clin Pract 2004; 97: c137–c141.
- Stimegi V, et al. Long-term effects of levamisole treatment in childhood nephrotic syndrome. Pediatr Nephrol 2004; 19: 1354-60
- Al-Saran K, et al. Experience with levamisole in frequently relapsing, steroid-dependent nephrotic syndrome. Pediatr Nephrol 2006; 21: 201–5.
- Boyer O, et al. Short- and long-term efficacy of levamisole as adjunctive therapy in childhood nephrotic syndrome. Pediatr Nephrol 2008; 23: 575–80.

Vitiligo. In a study¹ involving 36 patients with limited slow-spreading vitiligo, response to levamisole treatment occurred in 34 within 2 to 4 months. Patients received 150 mg of oral levamisole daily on 2 consecutive days each week. Patients who were additionally treated with topical fluocinolone or clobetasol had higher rates of repigmentation. A later controlled study² involving 43 patients reported less benefit.

The usual treatment of vitiligo is discussed under Pigmentation Disorders, p.1582.

- Pasricha JS, Khera V. Effect of prolonged treatment with levamisole on vitiligo with limited and slow-spreading disease. *Int J Dermatol* 1994; 33: 584–7.
- Agarwal S, et al. A randomized placebo-controlled double-blind study of levamisole in the treatment of limited and slowly spreading vitiligo. Br J Dermatol 2005; 153: 163–6.

Preparations

USP 31: Levamisole Hydrochloride Tablets.

Proprietary Preparations (details are given in Part 3)

Arg.: Levam; Meglum; Austral: Ergamisol†; Belg.: Ergamisol†; Braz.: Ascandil: Canda: Ergamisol†; Cz.: Decaris†; Gen: Ergamisol†; Gr.: Ergamisol†, Gr.: Ergamisol†; Gr.: Ergamisol†; Gr.: Ergamisol†; Indon.: Askamex; Inl.: Ketrax†; Israel: Ergamisol; Mex.: Decaris; Meth.: Ergamisol†; Mex.: Decaris (Apeapue); S.Afr.: Ergamisol; Turk.: Paraks; Sitraks; UK: Ketrax†; USA: Ergamisol†; Venez.: Decaris (Apeapue); S.Afr.: Ergamisol†; Turk.: Paraks; Sitraks; UK: Ketrax†; USA: Ergamisol†; Venez.: Decaris (Apeapue); S.Afr.: Ergamisol†; Venez.: Decaris (Apeapue); Venez.: Decaris (Apeapue)

Male Fern

Aspidium; Farnwurzel; Felce Maschio; Feto Macho; Filix Mas; Fougère Mâle; Helecho macho; Rhizoma Filicis Maris. Шитовник Мужской

Pharmacopoeias. In Chin.

Profile

Male fern consists of the rhizome, frond-bases, and apical bud of *Dryopteris filix-mas* agg. (Polypodiaceae), collected late in the autumn, divested of the roots and dead portions and carefully dried, retaining the internal green colour. It contains not less than 1.5% of filicin. During storage the green colour of the interior gradually disappears, often after a lapse of 6 months, and such material is unfit for medicinal use.

Filicin is the mixture of ether-soluble substances obtained from male fern. Its activity is chiefly due to flavaspidic acid, a phloroglucinol derivative.

Male fern has anthelmintic properties and was formerly used as male fern extract (aspidium oleoresin) for the expulsion of tapeworms. However, male fern is highly toxic and has been superseded by other drugs.

Adverse effects include headache, nausea and vomiting, severe abdominal cramp, diarrhoea, dyspnoea, albuminuria, hyperbilirubinaemia, dizziness, tremors, convulsions, visual disturbances including blindness (possibly permanent), stimulation of uterine muscle, coma, respiratory failure, bradycardia, and cardiac failure. Fatalities have occurred.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: Austria: Digestodoron; Ger.: Digestodoron; S.Afr.:
Digestodoron.

Mebendazole (BAN, USAN, rINN)

Mebendatsoli; Mebendazola; Mébendazola; Mébendazole; Mebendazolum; R-17635. Methyl 5-benzoyl-1*H*-benzimidazol-2-yl-carbamate.

Мебендазол

 $C_{16}H_{13}N_3O_3 = 295.3.$ CAS - 31431-39-7. ATC - P02CA01. $ATC \ Vet - QP52AC09.$

Pharmacopoeias. In *Chin., Eur.* (see p.vii), *Int., US*, and *Viet.* **Ph. Eur. 6.2** (Mebendazole). A white or almost white powder. It shows polymorphism. Practically insoluble in water, in alcohol, and in dichloromethane. Protect from light.

USP 31 (Mebendazole). A white to slightly yellow, almost odourless, powder. Practically insoluble in water, in alcohol, in chloroform, in ether, and in dilute mineral acids; freely soluble in formic acid.

Adverse Effects

Since mebendazole is poorly absorbed from the gastrointestinal tract at the usual therapeutic doses, adverse effects have generally been restricted to gastrointestinal disturbances, such as transient abdominal pain and diarrhoea, and have tended to occur in patients being treated for heavy intestinal infection. Headache and dizziness have been reported. Adverse effects have been reported more frequently with the high doses tried in echinococcosis and have included allergic reactions, raised liver enzyme values, alopecia, and bone marrow depression.

Incidence of adverse effects. In the first phase¹ of WHO-coordinated multicentre studies on the treatment of echinococcosis (hydatid disease) involving *Echinococcus granulosus* or *E. multilocularis*, the most frequent adverse effects in the 139 patients given *high-dose* mebendazole, generally for 3 months, were reduced leucocyte count (25 patients), gastrointestinal symptoms (22), and raised serum-transaminase values (22). Other adverse effects were allergic conditions such as fever and skin reactions (4), CNS symptoms including headache (6), and loss of hair (7). Seven patients stopped treatment because of adverse effects.

The second phase of studies² compared albendazole with mebendazole in more prolonged high-dosage schedules for cystic *E. granulosus* infection. Adverse effects were similar to those reported with the first phase. However, in the first phase the allergic consequences of the 14 ruptured lung cysts and the 4 ruptured

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; Vormog;
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.