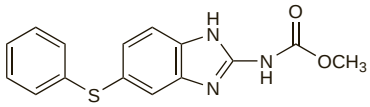
Fenbendazole *(BAN, USAN, rINN)*

Fenbendatsoli; Fenbendazol; Fenbendazolum; Hoe-881V. Methyl 5-phenylthio-1*H*-benzimidazol-2-ylcarbamate.

Фенбендазол

$C_{15}H_{13}N_3O_2S$ = 299.3.
CAS — 43210-67-9.
ATC — P02CA06.
ATC Vet — QP52AC13.



Pharmacopoeias. In *Eur.* (see p.vii) and *US* for veterinary use only.
Ph. Eur. 6.2 (Fenbendazole for Veterinary Use; Fenbendazole BP(Vet) 2008). A white or almost white powder. Practically insoluble in water; sparingly soluble in dimethylformamide; very slightly soluble in methyl alcohol. Protect from light.
USP 31 (Fenbendazole). A white to off-white powder. Practically insoluble in water; sparingly soluble in dimethylformamide; very slightly soluble in methyl alcohol. Store at a temperature of 25°, excursions permitted between 15° and 30°. Protect from light.

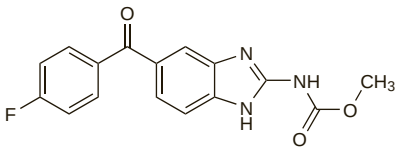
Profile
Fenbendazole is a benzimidazole carbamate anthelmintic structurally related to mebendazole (p.148). It is used in veterinary medicine.

Flubendazole *(BAN, USAN, rINN)*

Flubendatsoli; Flubendazol; Flubendazolas; Flubendazolum; Fluoromebendazole; R-17889. Methyl 5-(4-fluorobenzoyl)-1*H*-benzimidazol-2-ylcarbamate.

Флубендазол

$C_{16}H_{12}FN_3O_3$ = 313.3.
CAS — 31430-15-6.
ATC — P02CA05.
ATC Vet — QP52AC12.



Pharmacopoeias. In *Eur.* (see p.vii).
Ph. Eur. 6.2 (Flubendazole). A white or almost white powder. It exhibits polymorphism. Practically insoluble in water, in alcohol, and in dichloromethane. Protect from light.

Profile
Flubendazole, a benzimidazole carbamate anthelmintic, is an analogue of mebendazole (p.148) and has similar actions and uses.

For the treatment of enterobiasis in adults and children, flubendazole 100 mg is given as a single oral dose, repeated after 2 to 3 weeks. For ascariasis, hookworm infections, and trichuriasis 100 mg is given twice daily for 3 days. For discussions of these infections and their treatment, see under Choice of Anthelmintic, p.134.

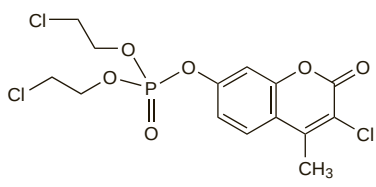
Preparations
Proprietary Preparations (details are given in Part 3)
Arg.: Flumoxal; ***Fr.:*** Fluvermal; ***Port.:*** Fluvermal; Teniverme; ***Spain:*** Flicum; ***Venez.:*** Fluvermox.

Haloxon *(BAN, rINN)*

Haloxón; Haloxone; Haloxonum. Bis(2-chloroethyl) 3-chloro-4-methylcoumarin-7-yl phosphate.

Галоксон

$C_{14}H_{14}Cl_3O_6P$ = 415.6.
CAS — 321-55-1.
ATC Vet — QP52AB04.



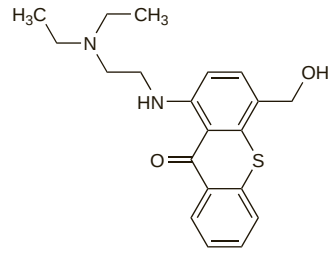
Profile
Haloxon is an organophosphorus compound (see Organophosphorus Insecticides, p.2047) used as an anthelmintic in veterinary medicine.

Hycanthone *(USAN, rINN)*

Hicantona; Hycanthonum; NSC-134434; Win-24933. 1-(2-Diethylaminoethylamino)-4-hydroxymethylthioxanthen-9-one.

Гикантон

$C_{20}H_{24}N_2O_2S$ = 356.5.
CAS — 3105-97-3.



Hycanthone Mesilate *(rINNM)*

Hycanthone, Mésilate d'; Hycanthone Mesylate; Hycanthoni Mesilas; Hydroxylucanthone Methanesulphonate; Mesilato de hicantona.

Гикантона Мезилат

$C_{20}H_{24}N_2O_2S,CH_3SO_3H$ = 452.6.
CAS — 23255-93-8.

Profile
Hycanthone has been used as a schistosomicide in the individual or mass treatment of infection with *Schistosoma haematobium* and *S. mansoni*.

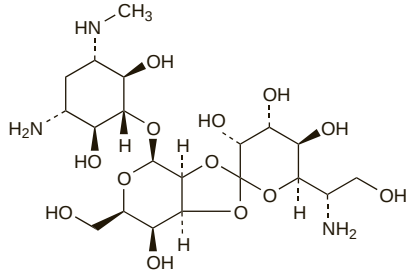
Owing to its toxicity and concern about possible carcinogenicity, mutagenicity, and teratogenicity, hycanthone has been replaced by other drugs such as praziquantel.

Hygromycin B

Higromicina B. *O*-6-Amino-6-deoxy-L-glycero-D-galacto-heptopyranosylidene-(1→2-3)-*O*-β-D-talopyranosyl-(1→5)-2-deoxy-*N*^{3}-methyl-D-streptamine.

Гигромицин Б

$C_{20}H_{37}N_3O_{13}$ = 527.5.



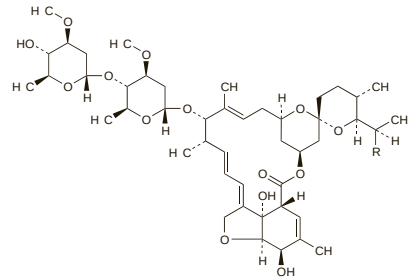
Profile
Hygromycin B is an anthelmintic used in veterinary medicine for nematode infections.

Ivermectin *(BAN, USAN, rINN)*

Ivermectina; Ivermectine; Ivermectinum; Ivermektiini; Ivermektin; Ivermektinas.

Ивермектин

CAS — 70288-86-7 (ivermectin); 70161-11-4 (component B_{1a}); 70209-81-3 (component B_{1b}).
ATC — P02CF01.
ATC Vet — QP54AA01; QS02QA03.



Pharmacopoeias. In *Eur.* (see p.vii) and *US*.
Ph. Eur. 6.2 (Ivermectin). A mixture of ivermectin component H_2B_{1a} (5-*O*-demethyl-22,23-dihydroavermectin A_{1a}; $C_{48}H_{74}O_{14}$ = 875.1) and ivermectin component H_2B_{1b} (5-*O*-demethyl-25-de(1-methylpropyl)-25-(1-methylethyl)-22,23-dihydroavermectin A_{1a}; $C_{47}H_{72}O_{14}$ = 861.1).
A white or yellowish-white, slightly hygroscopic, crystalline powder. Practically insoluble in water; soluble in alcohol; freely soluble in dichloromethane. Store in airtight containers.
USP 31 (Ivermectin). A mixture of component H_2B_{1a} (5-*O*-demethyl-22,23-dihydro-avermectin A_{1a}; $C_{48}H_{74}O_{14}$ = 875.1) and component H_2B_{1b} (5-*O*-demethyl-25-de(1-methylpropyl)-22,23-dihydro-25-(1-methylethyl)-avermectin A_{1a}; $C_{47}H_{72}O_{14}$ = 861.1). It may contain small amounts of suitable antoxidant and chelating agents.
A white to yellowish-white, slightly hygroscopic, crystalline powder. Practically insoluble in water and in petroleum spirit; soluble in acetone and in acetonitrile; freely soluble in dichloromethane and in methyl alcohol. Store in airtight containers at a temperature of 2° to 8°. Where the use of an antoxidant is allowed, store at 25°, excursions permitted between 15° and 30°.

Adverse Effects and Precautions
The adverse effects reported with ivermectin in patients with filariasis are generally consistent with a mild Mazzotti reaction arising from its effect on microfilariae. They include fever, pruritus, skin rashes, arthralgia, myalgia, asthenia, orthostatic hypotension, tachycardia, oedema, lymphadenopathy, gastrointestinal symptoms, sore throat, cough, and headache. The effects tend to be transient and if treatment is required they respond to analgesics and antihistamines.

Ivermectin may cause mild ocular irritation. Somnolence, transient eosinophilia, and raised liver enzyme values have also been reported.

Ivermectin is not recommended during pregnancy. Mass treatment is generally withheld from pregnant women (see Pregnancy, below), children under 15 kg, and the seriously ill.

Incidence of adverse effects. Some studies have shown quite a high incidence of adverse effects with ivermectin and have associated the effects with the severity of infection.[1-3] However, in none of these studies were the reactions considered to be life-threatening and only symptomatic treatment was required. The severity, incidence, and duration of adverse reactions was reported to be reduced after repeated annual administration.[4] When larger groups of patients were considered in the Onchocerciasis Control Programme (OCP) in West Africa, a much lower incidence of adverse reactions was seen in patients given ivermectin for the first time[5] and when treatment was repeated a year later that incidence was reduced even further. The results from several studies in this programme[6] showed 93 severe reactions in 50 929 patients (1.83%), most of the reactions being orthostatic hypotension or dizziness (53). In a 3-year randomised, double-blind, controlled study of ivermectin for onchocerciasis control in 572 patients,[7] 3-monthly treatment with the standard dose of 150 micrograms/kg was associated with a reduced risk of adverse reactions, especially oedema, pruritus, and back pain, when compared with the same dose given annually. Higher doses of 400 then 800 micrograms/kg, given either 3-monthly or annually, were associated with subjective ocular problems. Another study[8] found 22 severe reactions in 17 877 patients treated for onchocerciasis in an area also endemic for *Loa loa* infection, and demonstrated a relationship to heavy *L. loa* microfilaraemia. The Mectizan® Expert Committee and the Technical Consultative Committee have reported the incidence of encephalopathy after ivermectin treatment of onchocerciasis in *Loa loa* endemic areas to be less than 1 case in 10 000 treatments[9] and have implemented recommendations for ivermectin mass treatment programmes