

MICROSPORIDIOSIS

Drug	Adult dosage	Pediatric dosage
Ocular (<i>Encephalitozoon hellem</i> , <i>E.cuniculi</i> , <i>Vittaforma corneae</i> [<i>Nosema corneum</i>])		
Drug of choice:	Albendazole ^{1,2} plus fumagillin ^{3*}	400 mg PO bid
Intestinal (<i>E. bieneusi</i> , <i>E. [Septata] intestinalis</i>)		
<i>E. bieneusi</i>		
Drug of choice:	Fumagillin ^{4*}	20 mg PO tid x 14d
<i>E. intestinalis</i>		
Drug of choice:	Albendazole ^{1,2}	400 mg PO bid x 21d
Disseminated (<i>E. hellem</i> , <i>E. cuniculi</i> , <i>E. intestinalis</i> , <i>Pleistophora</i> sp., <i>Trachipleistophora</i> sp. and <i>Brachiola vesicularum</i>)		
Drug of choice: ⁵	Albendazole ^{1,2*}	400 mg PO bid

* Availability problems. See table below.

1. Not FDA-approved for this indication.

2. Albendazole must be taken with food; a fatty meal increases oral bioavailability.

3. CM Chan et al, Ophthalmology 2003; 110:1420. Ocular lesions due to *E. hellem* in HIV-infected patients have responded to fumagillin eyedrops prepared from *Fumidil-B* (bicyclohexyl ammonium fumagillin) used to control a microsporidial disease of honey bees (MJ Garvey et al, Ann Pharmacother 1995; 29:872), available from Leiter's Park Avenue Pharmacy, San Jose, CA (800-292-6773; www.leiters.com) is a compounding pharmacy that specializes in ophthalmic drugs. For lesions due to *V. corneae*, topical therapy is generally not effective and keratoplasty may be required (RM Davis et al, Ophthalmology 1990; 97:953).

4. Oral fumagillin (*Flisint* – Sanofi-Aventis, France) has been effective in treating *E. bieneusi* (J-M Molina et al, N Engl J Med 2002; 346:1963), but has been associated with thrombocytopenia and neutropenia. Highly active antiretroviral therapy (HAART) may lead to microbiologic and clinical response in HIV-infected patients with microsporidial diarrhea. Octreotide (*Sandostatin*) has provided symptomatic relief in some patients with large-volume diarrhea.

5. J-M Molina et al, J Infect Dis 1995; 171:245. There is no established treatment for *Pleistophora*. For disseminated disease due to *Trachipleistophora* or *Brachiola*, itraconazole 400 mg PO once/d plus albendazole may also be tried (CM Coyle et al, N Engl J Med 2004; 351:42).

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MANUFACTURERS OF DRUGS USED TO TREAT PARASITIC INFECTIONS

albendazole – <i>Albenza</i> (GlaxoSmithKline) – albendazole	† <i>Germanin</i> (Bayer, Germany) – suramin sodium
<i>Alinia</i> (Romark) – nitazoxanide	§ <i>Glucantime</i> (Aventis, France) – meglumine antimonate
<i>AmBisome</i> (Gilead) – amphotericin B, liposomal	† <i>Hetrazan</i> – diethylcarbamazine citrate (DEC)
amphotericin B – <i>Fungizone</i> (Apothecon), others	<i>Humatin</i> (Monarch) – paromomycin
amphotericin B, liposomal – <i>AmBisome</i> (Gilead)	§ <i>Impavido</i> (Zentaris, Germany) – miltefosine
<i>Ancobon</i> (Valeant) – flucytosine	iodoquinol – <i>Yodoxin</i> (Glenwood), others
§ <i>Antiminth</i> (Pfizer) – pyrantel pamoate	itraconazole – <i>Sporanox</i> (Janssen-Ortho), others
• <i>Aralen</i> (Sanofi) – chloroquine HCl and chloroquine phosphate	ivermectin – <i>Stromectol</i> (Merck)
§ artemether – <i>Artemam</i> (Arenco, Belgium)	ketoconazole – <i>Nizoral</i> (Janssen), others
§ artemether/lumefantrine – <i>Coartem</i> , <i>Riamet</i> (Novartis)	† <i>Lampit</i> (Bayer, Germany) – nifurtimox
§ <i>Artemam</i> (Arenco, Belgium) – artemether	<i>Lariam</i> (Roche) – mefloquine
§ artesunate – (Guilin No. 1 Factory, People's Republic of China)	§ <i>Leshcutan</i> (Teva, Israel) – topical paromomycin
atovaquone – <i>Mepron</i> (GlaxoSmithKline)	levamisole – <i>Ergamisol</i> (Janssen)
atovaquone/proguanil – <i>Malarone</i> (GlaxoSmithKline)	lumefantrine/artemether – <i>Coartem</i> , <i>Riamet</i> (Novartis)
azithromycin – <i>Zithromax</i> (Pfizer), others	<i>Malarone</i> (GlaxoSmithKline) – atovaquone/proguanil
• <i>Bactrim</i> (Roche) – TMP/Sulfa	malathion – <i>Ovide</i> (Medicis)
§ benznidazole – <i>Rochagan</i> (Brazil)	mebendazole – <i>Vermap</i> (McNeil), others
• <i>Biaxin</i> (Abbott) – clarithromycin	mefloquine – <i>Lariam</i> (Roche)
§ <i>Biltricide</i> (Bayer) – praziquantel	§ meglumine antimonate – <i>Glucantime</i> (Aventis, France)
† bithionol – <i>Bitin</i> (Tanabe, Japan)	† <i>Melarsoprol</i> – <i>Mel-B</i>
† <i>Bitin</i> (Tanabe, Japan) – bithionol	† <i>Mel-B</i> – melarsoprol
§ <i>Brolene</i> (Aventis, Canada) – propamidine isethionate	<i>Mepron</i> (GlaxoSmithKline) – atovaquone
chloroquine HCl and chloroquine phosphate – <i>Aralen</i> (Sanofi), others	metronidazole – <i>Flagyl</i> (Pfizer), others
clarithromycin – <i>Biaxin</i> (Abbott), others	§ miconazole – <i>Monistat i.v.</i>
• <i>Cleocin</i> (Pfizer) – clindamycin	§ miltefosine – <i>Impavido</i> (Zentaris, Germany)
clindamycin – <i>Cleocin</i> (Pfizer), others	§ <i>Monistat i.v.</i> – miconazole
<i>Coartem</i> (Novartis) – artemether/lumefantrine	<i>NebuPent</i> (Fujisawa) – pentamidine isethionate
crotamiton – <i>Eurax</i> (Westwood-Squibb)	§ <i>Niclosamide</i> – <i>Yomesan</i> (Bayer, Germany)
dapsone – (Jacobus)	† <i>nifurtimox</i> – <i>Lampit</i> (Bayer, Germany)
§ <i>Daraprim</i> (GlaxoSmithKline) – pyrimethamine USP	nitazoxanide – <i>Alinia</i> (Romark)
† diethylcarbamazine citrate (DEC) – <i>Hetrazan</i>	<i>Nix</i> (GlaxoSmithKline) – permethrin
• <i>Diflucan</i> (Pfizer) – fluconazole	• <i>Nizoral</i> (Janssen) – ketoconazole
§ diloxanide furoate – <i>Furamide</i> (Boots, United Kingdom)	§ <i>Ornidazole</i> – <i>Tiberal</i> (Roche, France)
doxycycline – <i>Vibramycin</i> (Pfizer), others	<i>Ornidyl</i> (Aventis) – eflornithine (Difluoromethylornithine, DFMO)
eflornithine (Difluoromethylornithine, DFMO) – <i>Ornidyl</i> (Aventis)	<i>Ovide</i> (Medicis) – malathion
§ <i>Egaten</i> (Novartis) – triclabendazole	§ <i>oxamniquine</i> – <i>Vansil</i> (Pfizer)
<i>Elmite</i> (Allergan) – permethrin	§ <i>Paludrine</i> (AstraZeneca, United Kingdom) – proguanil paromomycin – <i>Humatin</i> (Monarch); <i>Leshcutan</i> (Teva, Israel; topical formulation not available in US)
<i>Ergamisol</i> (Janssen) – levamisole	<i>Pentam 300</i> (Fujisawa) – pentamidine isethionate
<i>Eurax</i> (Westwood-Squibb) – crotamiton	pentamidine isethionate – <i>Pentam 300</i> (Fujisawa), <i>NebuPent</i> (Fujisawa)
• <i>Flagyl</i> (Pfizer) – metronidazole	† <i>Pentostam</i> (GlaxoSmithKline, United Kingdom) – sodium stibogluconate
§ <i>Flisint</i> (Sanofi-Aventis, France) – fumagillin	permethrin – <i>Nix</i> (GlaxoSmithKline), <i>Elimite</i> (Allergan)
fluconazole – <i>Diflucan</i> (Pfizer), others	§ <i>praziquantel</i> – <i>Biltricide</i> (Bayer)
flucytosine – <i>Ancobon</i> (Valeant)	primaquine phosphate USP
§ fumagillin – <i>Flisint</i> (Sanofi-Aventis, France)	§ <i>proguanil</i> – <i>Paludrine</i> (AstraZeneca, United Kingdom)
• <i>Fungizone</i> (Apothecon) – amphotericin	proguanil/atovaquone – <i>Malarone</i> (GlaxoSmithKline)
§ <i>Furamide</i> (Boots, United Kingdom) – diloxanide furoate	
§ furazolidone – <i>Furozone</i> (Roberts)	
§ <i>Furozone</i> (Roberts) – furazolidone	

(continued)

- § propamidine isethionate – *Brolene* (Aventis, Canada)
- § pyrantel pamoate – *Antiminth* (Pfizer)
- pyrethrins and piperonyl butoxide – *RID* (Pfizer), others
- § pyrimethamine USP – *Daraprim* (GlaxoSmithKline)
- Qualaquin* – quinine sulfate (Mutual Pharmaceutical Co/AR Scientific)
 - quinacrine
 - * quinidine gluconate (Eli Lilly)
- § quinine dihydrochloride
 - quinine sulfate – *Qualaquin* (Mutual Pharmaceutical Co/AR Scientific)
 - Riamet* (Novartis) – artemether/lumefantrine
 - *RID* (Pfizer) – pyrethrins and piperonyl butoxide
 - *Rifadin* (Aventis) – rifampin
 - rifampin – *Rifadin* (Aventis), others
 - § *Rochagan* (Brazil) – benznidazole
 - * *Rovamycin* (Aventis) – spiramycin
- † sodium stibogluconate – *Pentostam* (GlaxoSmithKline, United Kingdom)
- * spiramycin – *Rovamycin* (Aventis)
- *Sporanox* (Janssen-Ortho) – itraconazole
- Stromectol* (Merck) – ivermectin
- sulfadiazine – (Eon)
- † suramin sodium – *Germanin* (Bayer, Germany)
- § *Tiberal* (Roche, France) – ornidazole
- Tindamax* (Mission) – tinidazole
- tinidazole – *Tindamax* (Mission)
- TMP/Sulfa – *Bactrim* (Roche), others
- § triclabendazole – *Egaten* (Novartis)
- § *Vansil* (Pfizer) – oxamniquine
- *Vermox* (McNeil) – mebendazole
- *Vibramycin* (Pfizer) – doxycycline
- *Yodoxin* (Glenwood) – iodoquinol
- § *Yomesan* (Bayer, Germany) – niclosamide
- *Zithromax* (Pfizer) – azithromycin

* Available in the US only from the manufacturer.

§ Not available commercially. It may be obtained through compounding pharmacies such as Panorama Compounding Pharmacy, 6744 Balboa Blvd, Van Nuys, CA 91406 (800-247-9767) or Medical Center Pharmacy, New Haven, CT (203-688-6816). Other compounding pharmacies may be found through the National Association of Compounding Pharmacies (800-687-7850) or the Professional Compounding Centers of America (800-331-2498, www.pccarx.com).

† Available from the CDC Drug Service, Centers for Disease Control and Prevention, Atlanta, Georgia 30333; 404-639-3670 (evenings, weekends, or holidays: 770-488-7100).

• Also available generically.

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