

TABLE 245e-4 ALTERNATIVE PROCEDURES FOR LABORATORY DIAGNOSIS OF PARASITES FOUND IN FECES^a

Parasites and Fecal Stages	Alternative Diagnostic Procedures
Tapeworms (Cestodes)	
<i>Taenia saginata</i> ova and segments	Perianal "cellophane tape" test for ova
<i>T. solium</i> ova and segments	Serology; brain biopsy for neurocysticercosis
Flukes (Trematodes)	
<i>Clonorchis (Opisthorchis) sinensis</i> ova	Examination of bile for ova and adults in cholangitis
<i>Fasciola hepatica</i> ova	Examination of bile for ova and adults in cholangitis
<i>Paragonimus</i> ova	Serology; sputum; biopsy of lung or brain for larvae
<i>Schistosoma</i> ova	Serology for all; rectal snips (especially for <i>S. mansoni</i>), urine (<i>S. haematobium</i>), liver biopsy and liver ultrasound
Roundworms	
<i>Enterobius vermicularis</i> ova and adults	Perianal "cellophane tape" test for ova and adults
<i>Trichuris trichiura</i> ova	None
<i>Ascaris lumbricoides</i> ova and adults	Examination of sputum for larvae in lung disease
Hookworm ova and occasional larvae	Examination of sputum for larvae in lung disease
<i>Strongyloides</i> larvae	Duodenal aspirate or jejunal biopsy; serology; sputum or lung biopsy for filariform larvae in disseminated disease
Protozoans	
<i>Entamoeba histolytica</i> trophozoites and cysts	Serology; liver biopsy for trophozoites and cysts
<i>Giardia lamblia</i> trophozoites and cysts	Duodenal aspirate or jejunal biopsy
<i>Iso spor a belli</i> oocysts	Duodenal aspirate or jejunal biopsy ^b
<i>Cryptosporidium</i> oocysts	Duodenal aspirate or jejunal biopsy ^b
Microsporidian spores	Duodenal aspirate or jejunal biopsy

^aStains and concentration techniques are discussed in the text. ^b*Iso spor a* and *Cryptosporidium* are acid-fast.

TABLE 245e-5 IDENTIFICATION OF PARASITES IN BLOOD AND OTHER BODY FLUIDS

Body Fluid, Parasite	Enrichment/Stain	Culture Technique
Blood		
<i>Plasmodium</i> spp.	Thick and thin smears/Giemsa or Wright's	Not useful for diagnosis
<i>Leishmania</i> spp.	Buffy coat/Giemsa	Media available from CDC
African trypanosomes ^a	Buffy coat, anion column/wet mount and Giemsa	Mouse or rat inoculation ^b
<i>Trypanosoma cruzi</i> ^c	As for African species	As above and xenodiagnosis
<i>Toxoplasma gondii</i>	Buffy coat/Giemsa	Fibroblast cell lines
Microfilariae ^d	Filtration/wet mount and Giemsa	None
Urine		
<i>Schistosoma haematobium</i>	Centrifugation/wet mount	None
Microfilariae (in chyluria)	As for blood	None
Spinal Fluid		
African trypanosomes	Centrifugation, anion column/wet mount and Giemsa	As for blood
<i>Naegleria fowleri</i>	Centrifugation/wet mount and Giemsa or trichrome	Nonnutrient agar overlaid with <i>Escherichia coli</i>

^a*Trypanosoma rhodesiense* and *T. gambiense*. ^bInject mice intraperitoneally with 0.2 mL of whole heparinized blood (0.5 mL for rats). After 5 days, check tail blood daily for trypanosomes as described above. Call the CDC (770-488-7775) for information on diagnosis and treatment. ^cDetectable in blood by conventional techniques only during acute disease. Xenodiagnosis is successful in ~50% of patients with chronic Chagas' disease. ^dDaytime (1000–1400 h) and nighttime (2200–0200 h) blood samples should be drawn to maximize the chance of detecting *Wuchereria* (nocturnal except for Pacific strains), *Brugia* (nocturnal), and *Loa loa* (diurnal).

TABLE 245e-6 MINOR PROCEDURES FOR DIAGNOSIS OF PARASITIC INFECTIONS

Parasite(s) and Stage	Procedure
<i>Onchocerca volvulus</i> and <i>Mansonella streptocerca</i> microfilariae	<i>Skin snips</i> : Lift skin with a needle and excise ~1 mg to a depth of 0.5 mm from several sites. Weigh each sample, place it in 0.5 mL of saline for 4 h, and examine wet mounts and Giemsa stains of the saline either directly or after filtration. Count microfilariae. ^a
<i>Loa loa</i> adults and <i>O. volvulus</i> adults and microfilariae	<i>Biopsies of subcutaneous nodules</i> : Stain routine histopathologic sections and impression smears with Giemsa.
<i>Trichinella spiralis</i> larvae (and perhaps <i>Taenia solium</i> cysticerci)	<i>Muscle biopsies</i> : Excise ~1.0 g of deltoid or gastrocnemius muscle and squash between two glass slides for direct microscopic examination.
<i>Schistosoma</i> ova of all species, but especially <i>S. mansoni</i>	<i>Rectal snips</i> : From four areas of mucosa, take 2-mg snips, tease onto a glass slide, and flatten with a second slide before examining directly at 10x. Preparations may be fixed in alcohol or stained.
<i>Trypanosoma gambiense</i> and <i>T. rhodesiense</i> trypomastigotes	<i>Aspirate of chancre or lymph node</i> : ^b Aspirate center with an 18-gauge needle, place a drop on a slide, and examine for motile forms. An otherwise insufficient volume of material may be stained with Giemsa.
<i>Acanthamoeba</i> spp. trophozoites or cysts	<i>Corneal scrapings</i> : Have an ophthalmologist obtain a sample for immediate Giemsa staining and culture on nutrient agar overlaid with <i>Escherichia coli</i> .
Cutaneous and mucocutaneous <i>Leishmania</i> spp.	<i>Swabs, aspirates, or punch biopsies of skin lesions</i> : Obtain a specimen from the margin of a lesion for Giemsa staining of impression smears; section and culture on special media from the CDC.

^aCounts of >100/mg are associated with a significant risk of complications. ^bLymph node aspiration is contraindicated in some infections and should be used judiciously.