



The Systematics, Molecular Biology, and Clinical Significance of Intestinal Protozoan Parasites

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DESCRIPTION

Intestinal protozoan parasites are microscopic organisms that can infect the human digestive tract and cause various diseases. Some of the most important intestinal protozoan parasites are *Entamoeba histolytica*, *Giardia lamblia*, *Cryptosporidium* spp., *Cyclospora cayetanensis*, and *Isoospora belli*. These parasites have different life cycles, modes of transmission, molecular characteristics, and clinical manifestations. *Entamoeba histolytica* is the causative agent of amoebiasis, a disease that affects about 50 million people worldwide and causes up to 100,000 deaths annually.

The parasite exists in two forms: the cyst and the trophozoite. The cyst is the infective stage that is ingested through contaminated food or water. The cyst then excysts in the small intestine and releases trophozoites that colonize the large intestine. Some trophozoites can invade the intestinal wall and cause ulceration, bleeding, and dysentery. They can also spread to other organs such as the liver, lungs, and brain and form abscesses. The diagnosis of amoebiasis is based on microscopy, antigen detection, or molecular methods such as PCR2 (Polymerase Chain Reaction). The treatment of amoebiasis involves metronidazole or tinidazole for invasive disease and paromomycin or diloxanide furoate for asymptomatic carriers.

Giardia lamblia is the causative agent of giardiasis, a disease that affects about 200 million people worldwide and causes diarrhoea, malabsorption, and weight loss. The parasite also has two forms: the cyst and the trophozoite. The cyst is the infective stage that is ingested through contaminated food or water. The cyst then exists in the small intestine and releases trophozoites that attach to the intestinal epithelium by a ventral sucking disk. The trophozoites multiply by binary fission and interfere with

nutrient absorption and digestion. Some trophozoites can encyst and be excreted in the feces. The diagnosis of giardiasis is based on microscopy, antigen detection, or molecular methods such as PCR3. The treatment of giardiasis involves metronidazole, tinidazole, or nitazoxanide.

Cryptosporidium spp. are coccidian parasites that cause cryptosporidiosis, a disease that affects millions of people worldwide and causes watery diarrhoea, dehydration, and electrolyte imbalance. The parasite has a complex life cycle that involves both sexual and asexual stages. The infective stage is the oocyst that is ingested through contaminated food or water. The oocyst then releases sporozoites that invade the intestinal epithelial cells and undergo several cycles of replication. Some sporozoites can differentiate into gametocytes and fuse to form new oocysts that are excreted in the feces. The diagnosis of cryptosporidiosis is based on microscopy, antigen detection, or molecular methods such as PCR4. The treatment of cryptosporidiosis involves supportive care and anti-parasitic drugs such as nitazoxanide or paromomycin.

Cyclospora cayetanensis is another coccidian parasite that causes cyclosporiasis, a disease that affects mainly travelers and immunocompromised individuals and causes watery diarrhea, nausea, fatigue, and weight loss. The parasite has a similar life cycle to *Cryptosporidium* spp., except that the oocysts are not infective when excreted and need to sporulate in the environment for several days before becoming infectious. The diagnosis of cyclosporiasis is based on microscopy or molecular methods such as PCR. The treatment of cyclosporiasis involves trimethoprim-sulfamethoxazole or ciprofloxacin. *Isoospora belli* is another coccidian parasite that causes isosporiasis, a disease that affects mainly immunocompromised individuals and causes watery diarrhea, abdominal pain, fever, and malabsorption.

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Received: 02-May-2023, Manuscript No. JBP-23-21433; **Editor assigned:** 05-May-2023, PreQC No. JBP-23-21433 (PQ); **Reviewed:** 19-May-2023, QC No. JBP-23-21433; **Revised:** 26-May-2023, Manuscript No. JBP-23-21433 (R); **Published:** 02-Jun-2023, DOI: 10.35248/2155-9597.23.14.467

Citation: Hartmann T (2023) The Systematics, Molecular Biology, and Clinical Significance of Intestinal Protozoan Parasites. J Bacteriol Parasitol. 14:467.

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