Giardia has a relatively simple life cycle. It starts with the ingestion of cysts through contaminated water or food. Giardia lamblia is a flagellated protozoa. It colonized the small intestine causing a diarrheal condition known as giardiasis. These are transmitted by contaminated food and water and are responsible for Giardiasis. It is a monogenetic parasite commonly known as the Grand Old Man of intestine. The parasite causes diarrhea, dysentery, and liver abscesses in men. When the outer membrane of a cyst rupture, it is called Excystation. Giardia establishes noninvasive infection in the epithelial cells of the upper small intestine of mammals, including humans, causing a diarrheal disease known as giardiasis.

Gardia is a genus of anaerobic flagellated protozoan parasite. Dutch Micobiologist Antonie van Leeuwenhoek in 1681 first described Gardia. Genus got its name after French Zoologist Alfred Mathieu Giard. It is called Grand old man of Intestine. The Life of Gardia completed in two phase trophozoite and cyst. It colonized the small intestine causing a diarrheal condition known as giardiasis. The parasite causes diarrhea, dysentery, and liver abscesses in men. When the outer membrane of a cyst rupture, it is called Excystation.

**Scientific classification of Giardia**

| **Name** | **Classification** |
| --- | --- |
| **Phylum** | Metamonada |
| **Order** | Diplomonadida |
| **Family** | Hexamitidae |
| **Genus** | Giardia |
| **Species** | Lamblia/duodenalis/intestinalis |

**Morphology**

It exists in 2 forms-

1. Trophozoite
2. Cyst

**Trophozoite**

* It is the active feeding stage of parasite which is responsible for colonization in intestine.
* The shape of trophozoite is pear shape or tennis racket shape. It measures 9-21 micro metre in length and 5 to 6 micro metre in breadth.
* The dorsal surface is convex while ventral surface is concave with a sucking disc (Adhesive disc).
* IT is bilaterally symmetrical and all organs of body are paired. They have two median bodies, two axostyle, two nuclei four pair of flagella.
* Each nucleus consist of large central kkaryosome giving a characteristic face like appearance to the parasite in stained preparation.
* Motility shown typical falling leaf type motility.
* A bean shaped sucking disc is present on the ventral surface of the broad or anterior end.
* The protoplasm of oval body is clear (Body flattened).

**Cyst (Infective Stage)**

The fully formed cyst is oval and measures 12 microns and 7 microns broad. The axostyle lies more or less diagonally, forming a sort of dividing line within the cyst wall. There are four nuclei that may remain clustered at one end or lie in pairs at opposite poles. The remain of the flagella and the margins of the sucking disc may be seen inside the cytoplasm. An acid environment often causes the parasite, to encyst.

* It is an infective stage of parasite.
* A fully mature cyst is oval or ellipsoidal in shape and measures 8-13 micro metre in length and 7 – 10 micrometre in breadth.
* Cyst is surrounded by a thick cyst wall. Cytoplasm is granulated and is separated from the cyst wall by clear space.
* The axostyle lies more or less diagonally.
* A cyst contains 4 nuclei.
* A remaining of flagella and the margins of sucking disc may be seen inside the cytoplasm.
* Each cyst gives rise to two trophozoites during excystation in intestinal tract.

**Life cycle of Giardia**

Giardia life cycle

It passes its life cycle in a single host, the man. No intermediate host is required. Man acquires infection by the ingestion of mature cysts present in contaminated water and food. Infection can also occur by anal-oral sexual practices among male homosexuals.

* The parasite uses binary fission to multiply in the human gut during the trophozoite stage.
* When conditions in the duodenum are unfavorable, encystment occurs, usually in the large intestine.
* During encystment, a thick resistant wall is secreted by the parasite and the cell then divides into two within the cyst.
* Insection of man is brought about by ingestion of cysts within 30 minutes of ingestion.
* Two trophozoites emerge from the cyst, and they colonize the duodenum after multiplying enormously. The duodenum and jejunum are the colonies formed by the binary fission of trophozoites.
* The Trophozoites undergo another phase of nuclear division and produce quadrinucleated mature cysts.
* Arter that cyst and trophozoite both release out the body but survive only cyst
* To avoid the high acidity of duodenum giardia often localizes in the biliary tract( gall bladder).

In the trophozoite stage, the parasite multiplies in the intestive of man by binary fission. When conditions in the duodenum are unfavourable, encystment occurs, usually in the large intestine. During encystment, a thick resistant wall is secreted by the parasite and the cell then divides into two within the cyst. Insection of man is brought about by ingestion of cyst within 30 minutes of ingestion. The cyst hatches out two trophozoites which then multiply in enormous numbers and colonize in the duodenum. To avoid the high acidity of duodenum giardia often localizes in the biliary tract (gall bladder).

Life cycle of G. lamblia is simple and completes in a single host, man. No intermediate host is required.

Infection is acquired orally by ingestion of cyst form contaminated hand or water or food.

Excystation occurs in the stomach and in the duodenum in the presence of gastric acid.

Each cyst produce two trophozoite with in 30 minutes.

These trophozoites multiplies in the intestine by binary fission. Then they adhere to enterocyst through their ventral suckers.

Some trophozoite pass down on the large intestine where they again encyst in the presence of neutral PH and Bile salts.

There encysted trophozoites then undego another phase of nuclear division and produces quadrinuleated mature cyst.

The cyst which are the infective form of parasite are excreted in faecal cycle is repeated.

**Pathogenesis**

Large number of trophozoites attached to the bowl wall with the help of sucking discs that is present on the ventral surface of giardia lamblia and cause irritation. Low grade inflammation of duodenal or jejunal mucosa associated with crypt hypertrophy as well as atrophy and epithelial cells damage leading to acute or chronic diarrhea.

Disease- It is highly pathogenic and causes Giardiasis.

Symptoms-

Include abdominal pain, cramp, dysentery.

Rarely blood and mucus in stool.

Chronic symptoms- malabsorbtion of B12, lactose intollerence, etc.

Diagnosis- Microscopic examination of cyst in stool.

String test from mucus layer of small intestine and microscopy.

Treatment- Treated in early stage by chemical called metronidazole.

Prevention- by avoiding contaminated food.

**Note-**

Sometimes G.lambilia can also localizes in the biliary tract to causes cholecystitis and jaundice.

**Conclusion:**

The organism is found worldwide. hikers who drink untreated stream water are frequently infected are frequently infectedmany species of human as well as mammals act as reservoirs. the incidence of giardiasis is high among children in decay and among patients in mental hospitals. Giardia establishes noninvasive infection in the epithelial cells of the upper small intestine of mammals, including humans, , causing a diarrheal disease known as giardiasis, causing a diarrheal disease known as giardiasis.