

B.Sc PART III
PAPER I Applied and Economic
Zoology

UNIT I: Parasitology

Giardia lamblia

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INTRODUCTION

- Giardia lamblia is also known as Giardia intestinalis inhabits small intestinal tract of vertebrates. Giardia is a single celled protozoan endoparasite.
- G.lamblia was first observed by Antony Van Leeuwenhoek (1681) ,also called father of microbiology in his own stool.
- In 1859 a physician named Vilem Lambl observed G. Intestinalis in stool of children with diarrhoea.

SYSMATIC POSITION

Phylum - Protozoa

Class - Mastigophora

Order - Protomonadina

Genus - Giardia

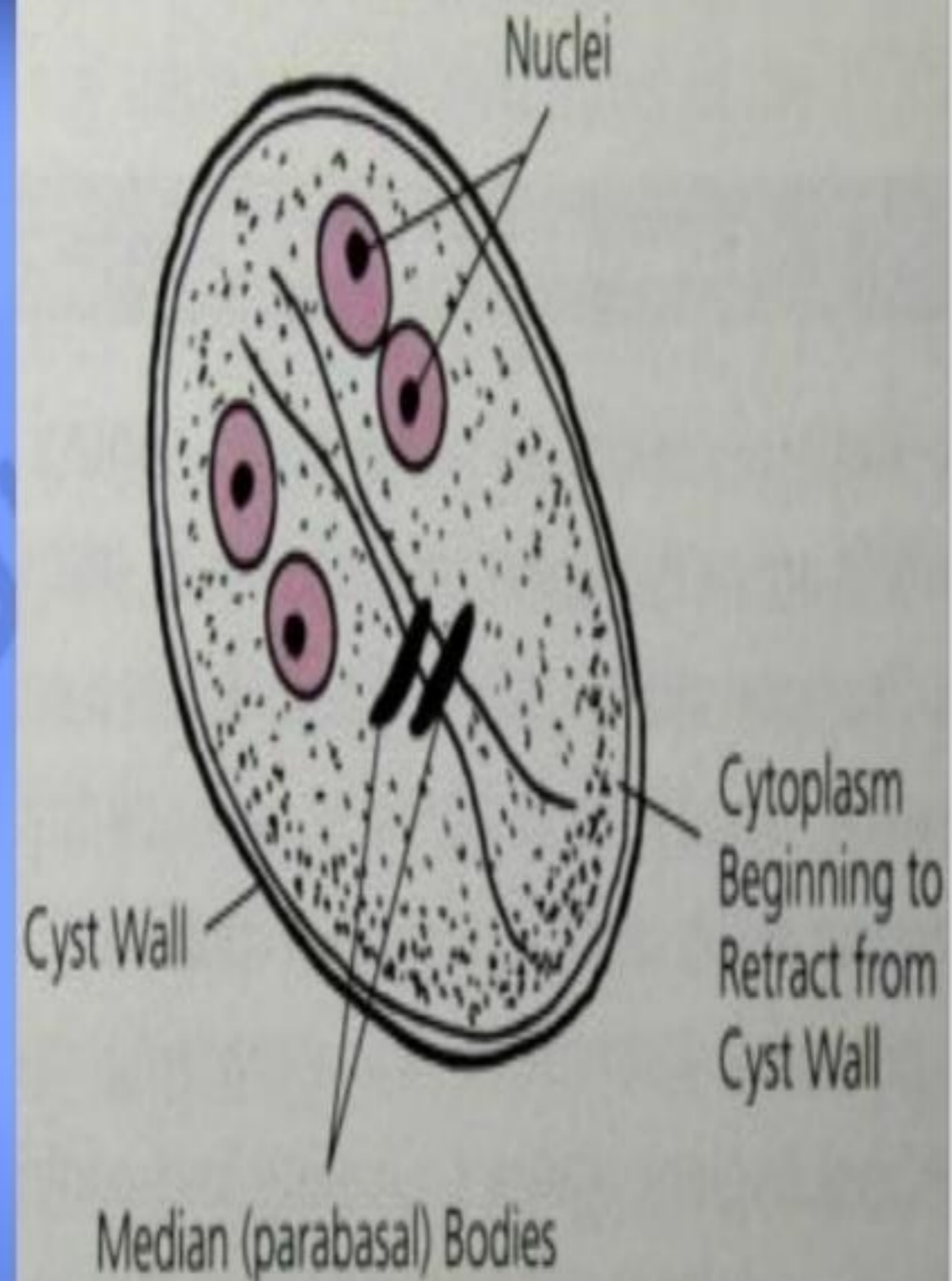
Species- lamblia

G.lamblia occurs in two morphological forms

1. Trophozoite
2. Cyst

- **Cyst:**

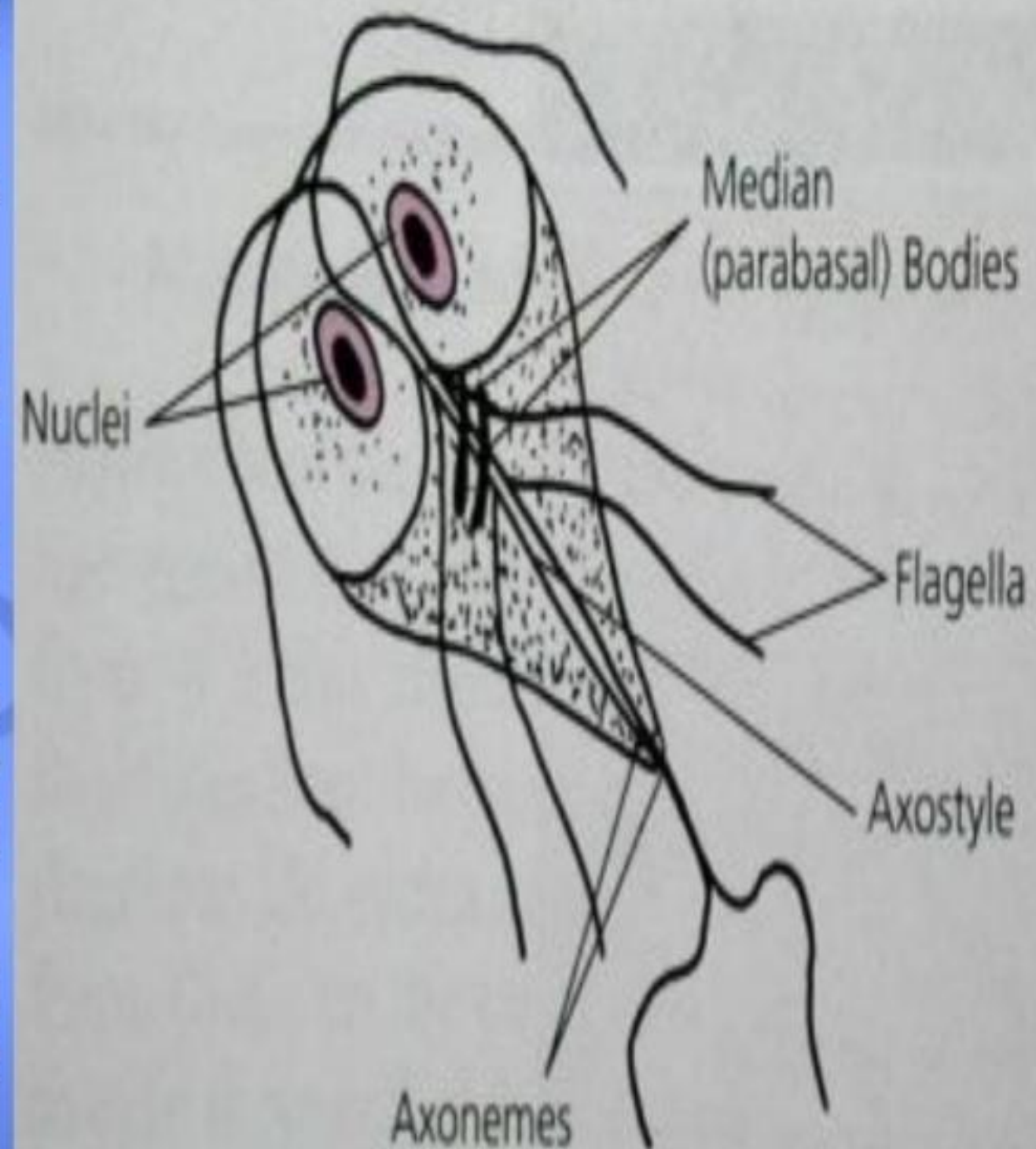
- Infective stage of parasite
- Oval or ellipsoidal in shape measuring 8-12 μm in length and 7-10 μm in breadth
- Thick cyst wall surrounds the cyst
- Cyst consists of finely granular cytoplasm which is separated from cyst wall by clear space
- Cyst consists of four nuclei which remain in pairs on either side of axostyle and median bodies
- Iodine stains the cysts brown





Size Range: 8 – 17 μm by 6 – 10 μm
Average Length: 10 – 12 μm

• Trophozoites

- Pear shaped disk with broad rounded anterior end and tapering posterior end
- 10-20 μm in length and 5 – 15 μm in breadth
- Dorsal surface is convex while ventral surface is concave hence appears sickle shape in lateral view
- Ventral surface is occupied by bilobed adhesive disc
- It is bilaterally symmetrical with two median bodies, two axonemes and four pairs of flagella (Lateral, ventral and caudal)
- It has two nuclei with central karyosome giving characteristic face like appearance
- Two axostyles run diagonally across the cytoplasm
- It shows **falling leaf** type of motility



Size Range: 8 – 20 μm by 5 – 16 μm
Average Length: 10 – 15 μm

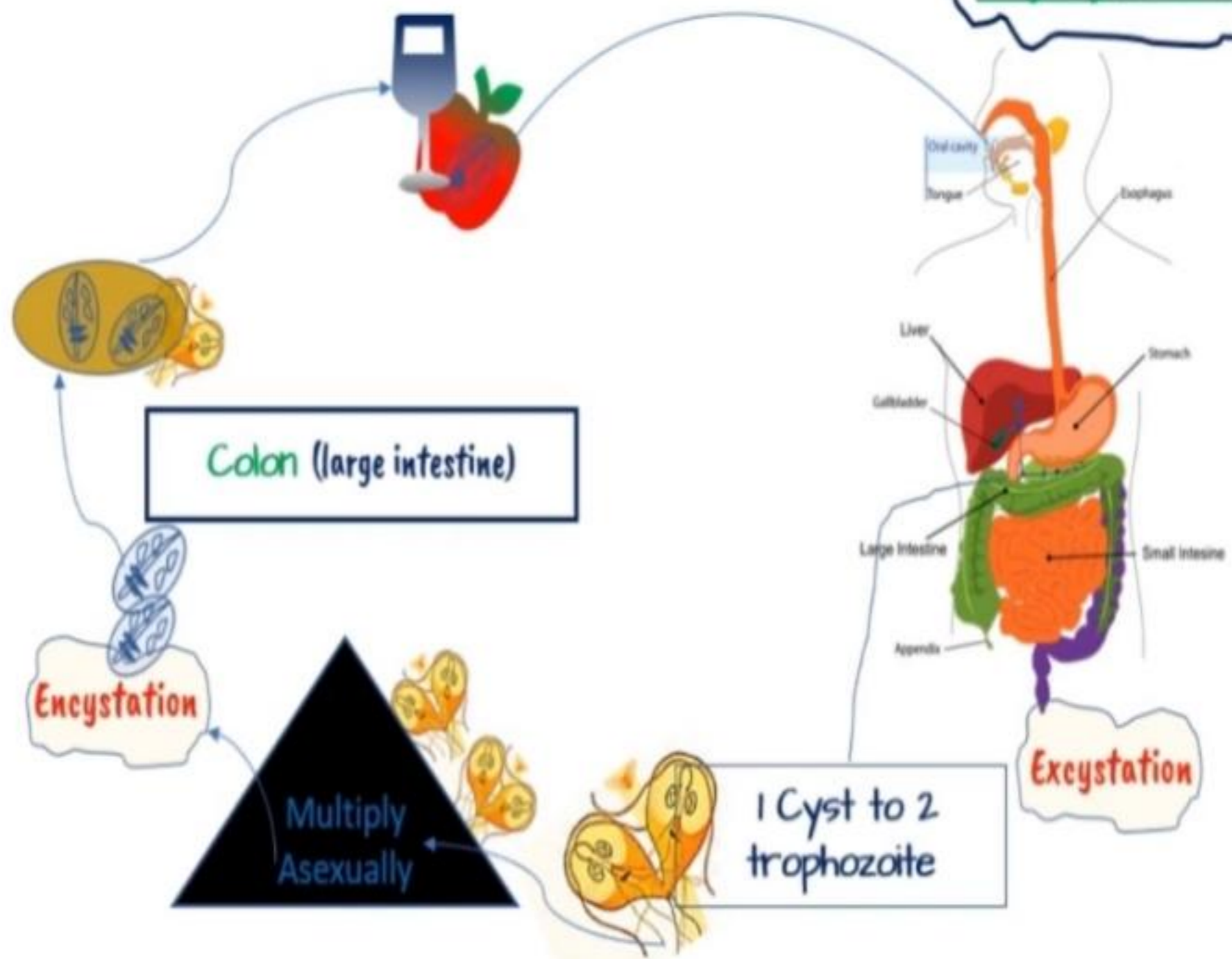
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- Trophozoites absorb their nutrition from the lumen of the small intestine and are anaerobes .
 - One cyst gives rise to two trophozoites (one amebic cyst produces eight trophozoites).
 - Affects humans but is also one of most common parasites infecting cats, dogs and birds.
 - Incubation period - 1-3 week.
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LIFE CYCLE

- Ingestion of dormant cysts in contaminated water, food or the faecal – oral route (through poor hygiene practices)
- Cyst → Trophozoite → Cyst
- Encystation releases trophozoites with each cyst producing two trophozoites within the small intestine, the trophozoites reproduce asexually by binary fission.
- Some trophozoites then encysts in the small intestine, both trophozoites and cysts are passed in feces and infectious immediately.

Life cycle

Medical Laboratory Technician
1 Cyst give 2 Trophozoite



PATHOGENESIS AND SYMPTOMS

- Trophozoites attach to mucosal cells of duodenum and jejunum through ventral suckers.
- The spectrum of disease produced by Giardia is called giardiasis (Beaver fever).
- Giardiasis lead to chronic diarrhoea and malabsorption of fat and carbohydrates.
- Acute Giardia infection cause water diarrhea, abdominal cramps, bloating and flatulence.
- In this patient has loss of appetite, vomiting and weakness

PREVENTION

- Hand hygiene
- Boiling water before use
- Drinking filtered water
- Chlorination of water
- Improved water supply
- Proper disposal of human faeces
- Health education
- Iodine is effective in disinfecting drinking water.



LAB DIAGNOSIS

- Trophozoites or cysts in diarrhoeal stool
- In formed stool on cysts are seen
- Antigen detection in stool by ELISA
- String test
- No serological test available



TREATMENT

- The drugs like **Metronidazole** and **Tinidazole** are recommended.