

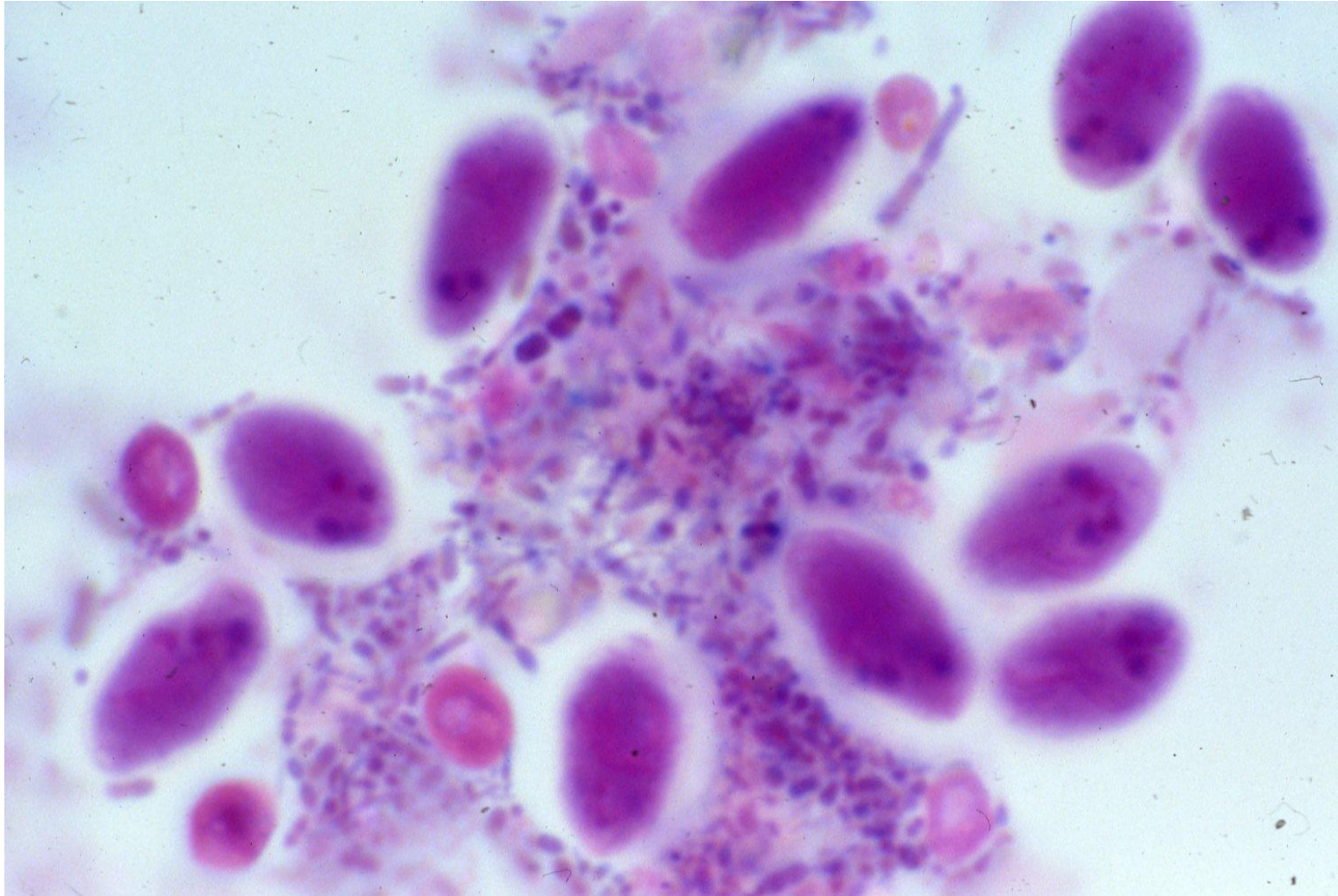
Giardiasis (*Giardia duodenalis* infection)

Giardiasis (lambliasis) is caused by the protozoa *Giardia duodenalis* (also called as *G. intestinalis* or *G. lamblia*). The binucleated and flagellated protozoan trophozoites infect the small intestinal mucosa, and causes watery diarrhea and flatulence, while some individuals remain asymptomatic. The protozoa are transmitted via the fecal-oral route, primarily through consuming contaminated water or food. Person-to-person transmission also occurs. International travelers, outdoor enthusiasts and daycare workers are the primary groups susceptible to this disease. Immunodeficient patients such as AIDS show a severe diarrheal disease (irritable bowel syndrome). *G. duodenalis* infects the surface of the duodenal and gallbladder mucosa, but the pathogen does not invade into the tissue. In immunocompetent patients with chronic diarrhea, the duodenal mucosa reveals lymphoid hyperplasia with marked increase of intraepithelial lymphocytes.

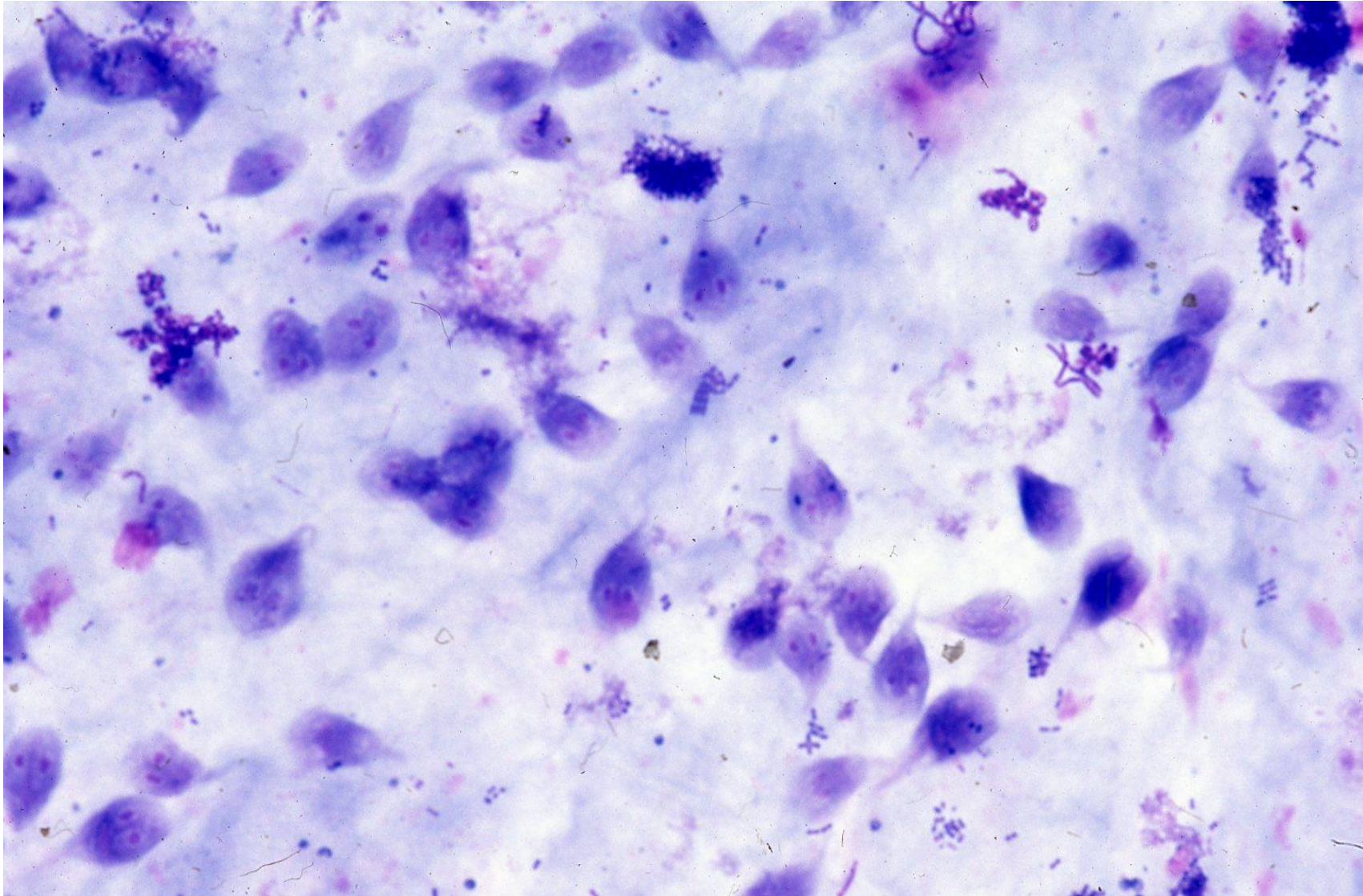
Ref.: Dunn N, Juergens AL. Giardiasis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK513239/>



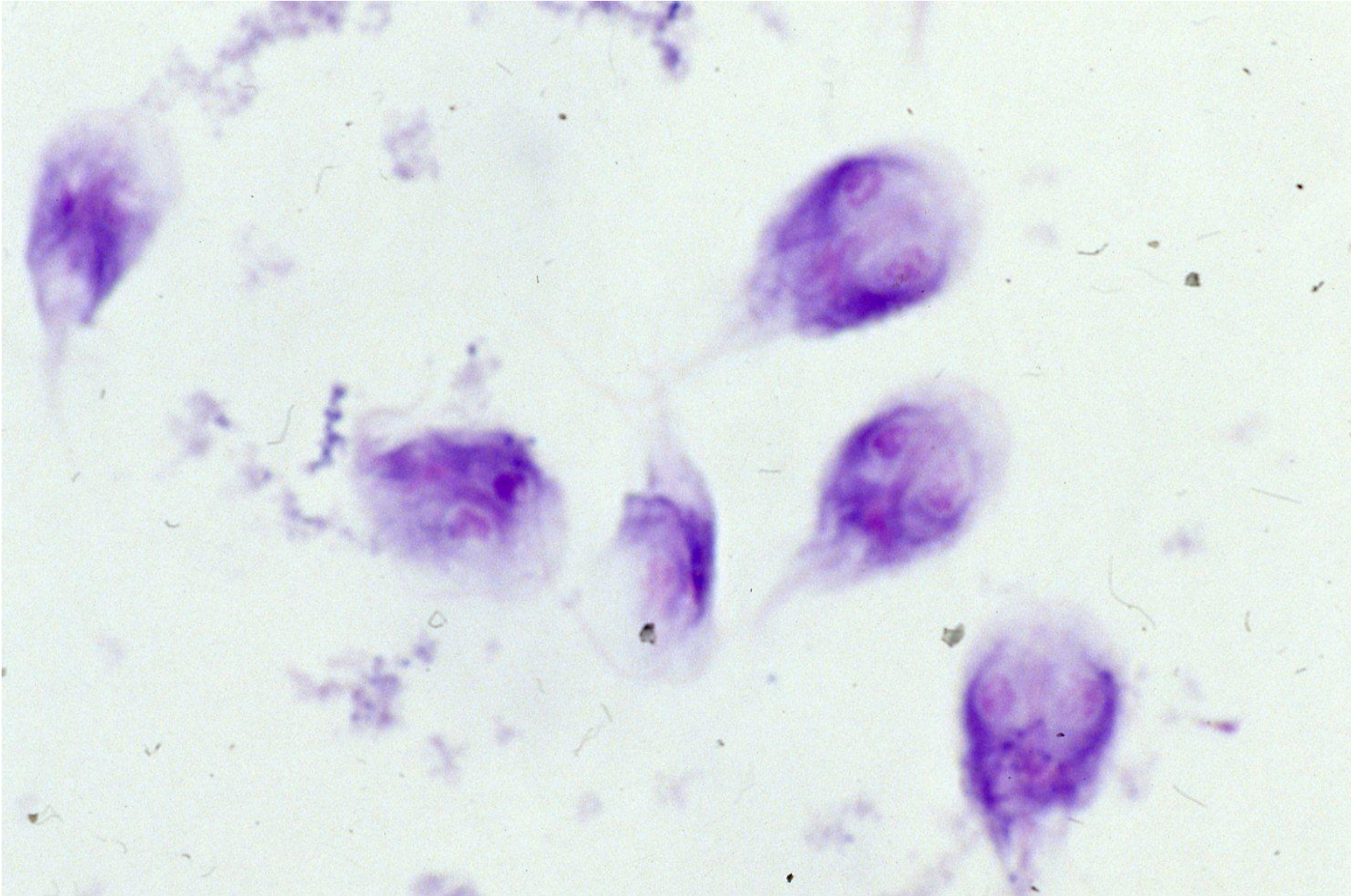
Cysts of *Giardia duodenalis* in feces. The cysts contain four nuclei. Unstained preparation



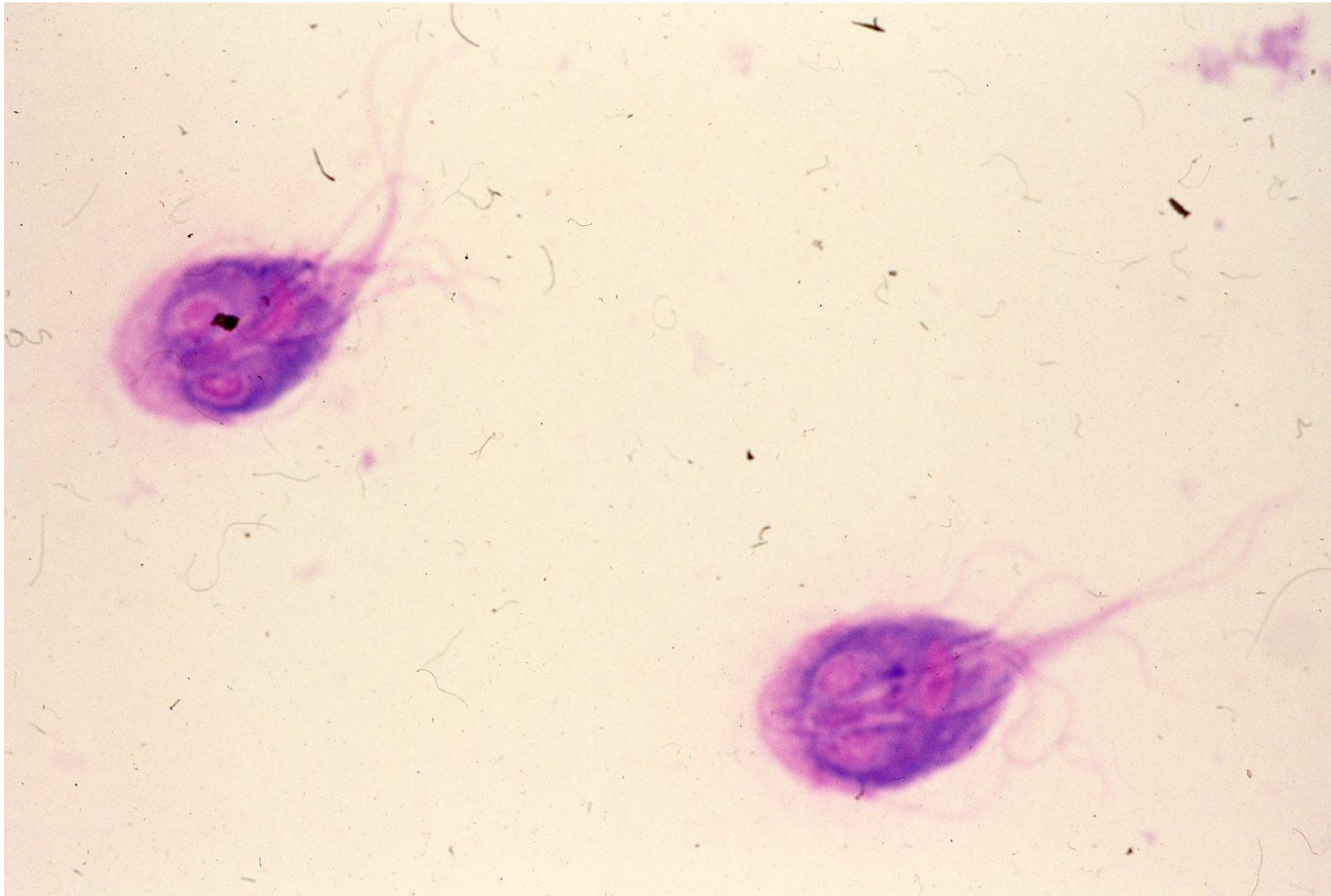
Cysts of *Giardia duodenalis* in feces. The cysts contain four nuclei. H&E



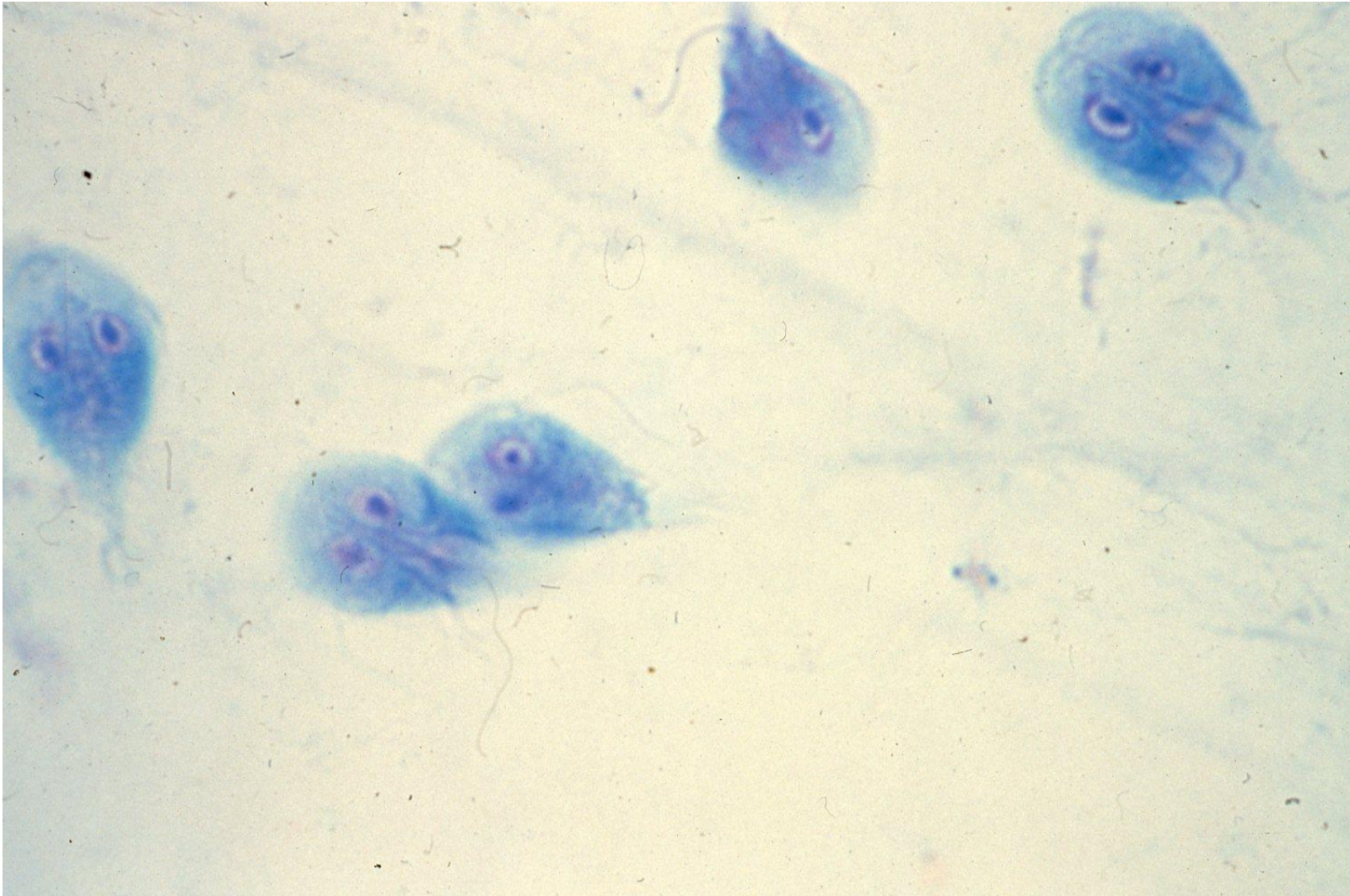
Giardia duodenalis infection in gallbladder bile of a 61-year-old female patient. Numbers of flagellated protozoa containing two symmetrical nuclei are observed. Bacterial (both coccal and bacillary) infection is associated. May-Giemsa-1



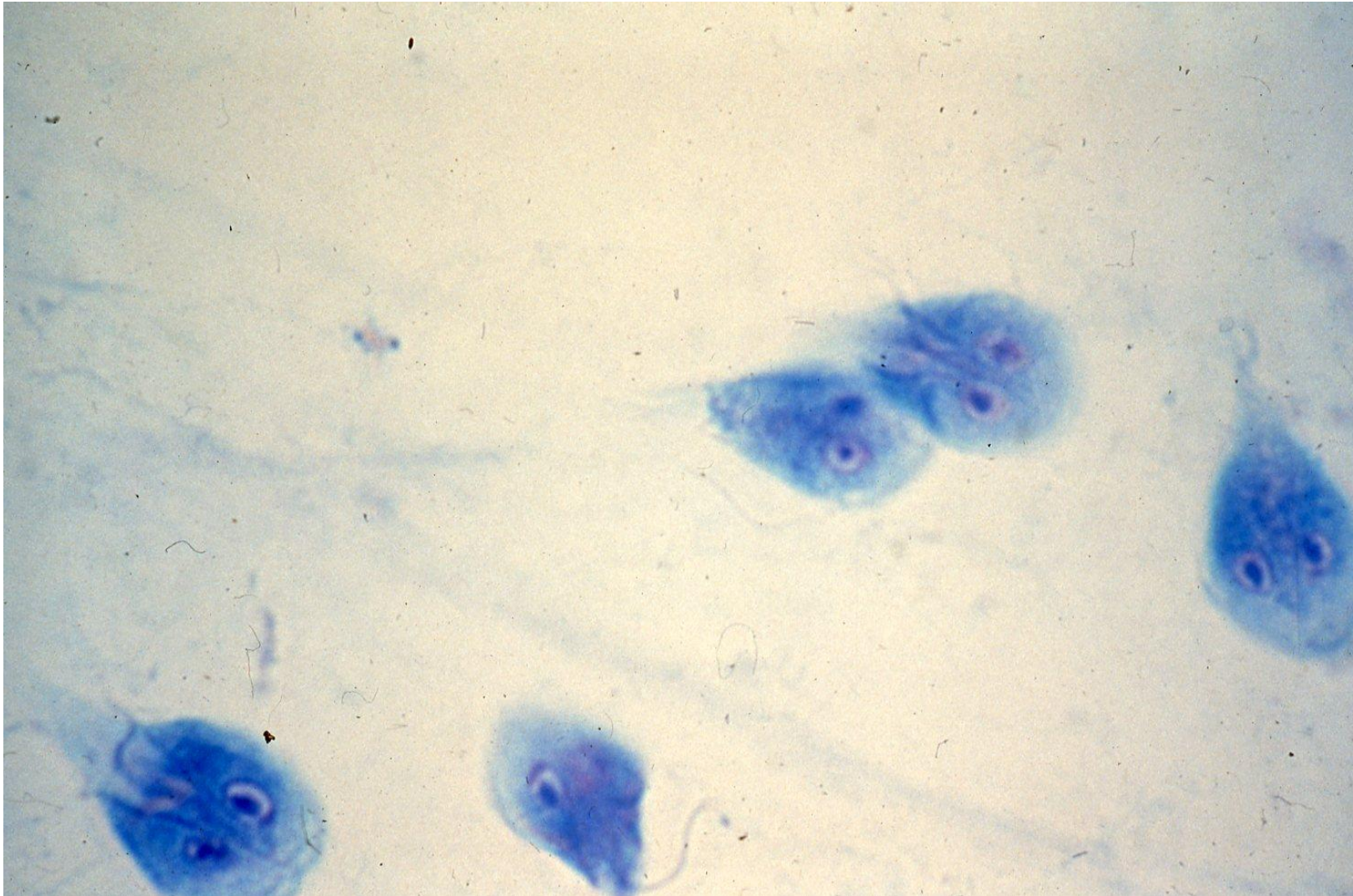
Giardia duodenalis infection in gallbladder bile of a 61-year-old female patient. Numbers of flagellated protozoa containing two symmetrical nuclei are observed. May-Giemsa-2



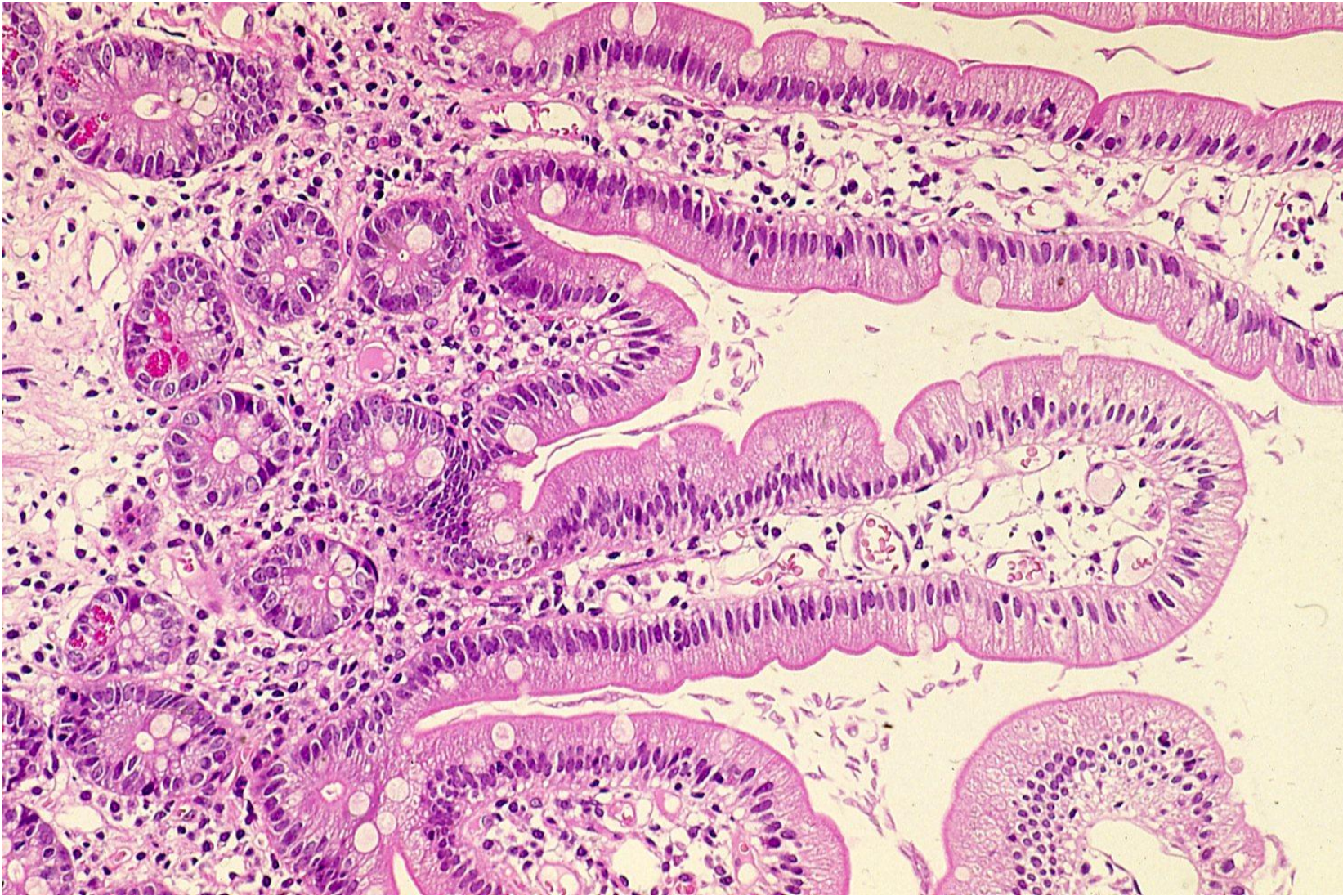
Giardia duodenalis infection in gallbladder bile of a 61-year-old female patient. Numbers of flagellated protozoa containing two symmetrical nuclei are observed. May-Giemsa-3



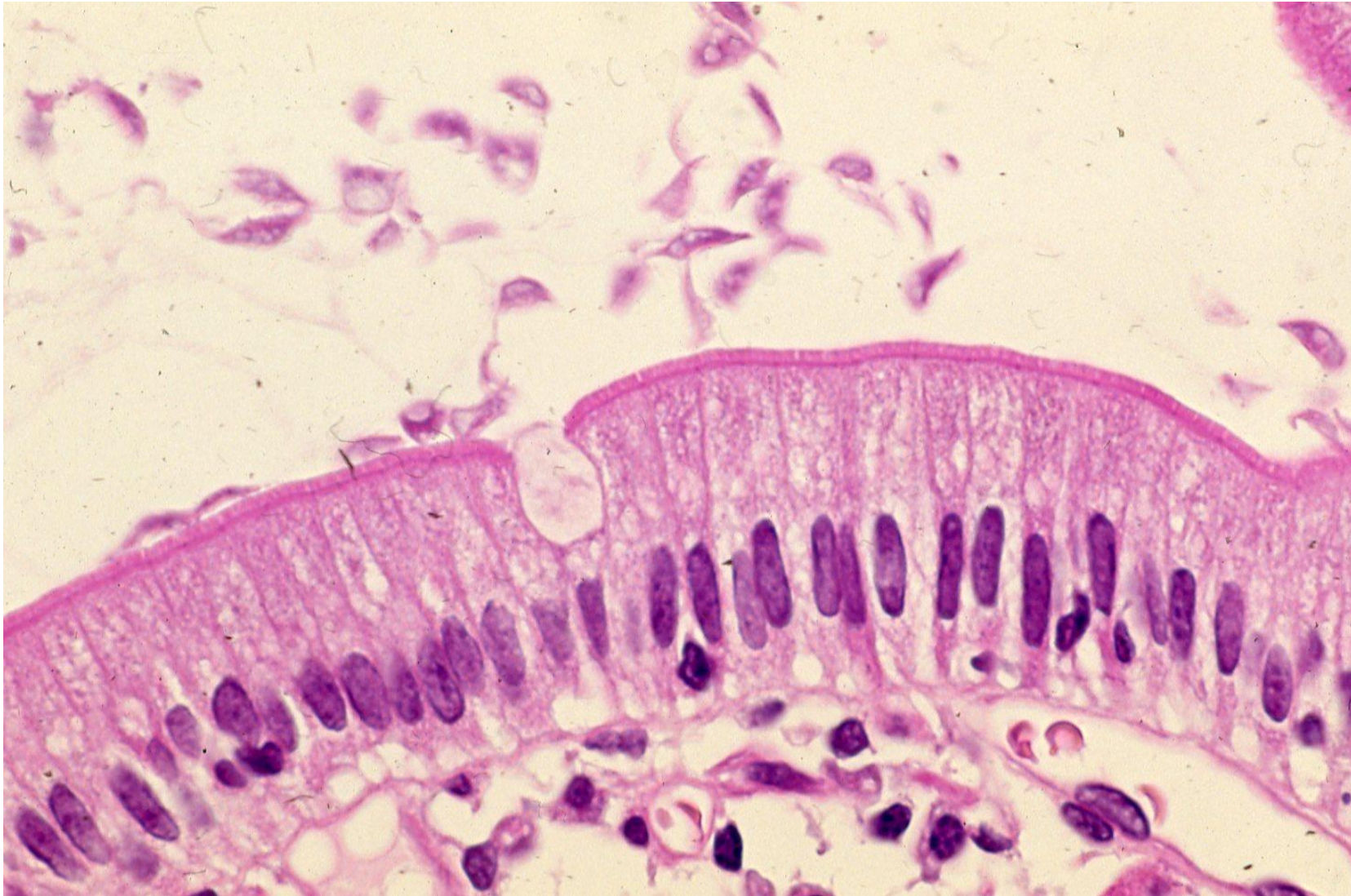
Giardia duodenalis infection in gallbladder bile of a 61-year-old female patient. Numbers of flagellated protozoa containing two symmetrical nuclei are observed. Papanicolaou-1



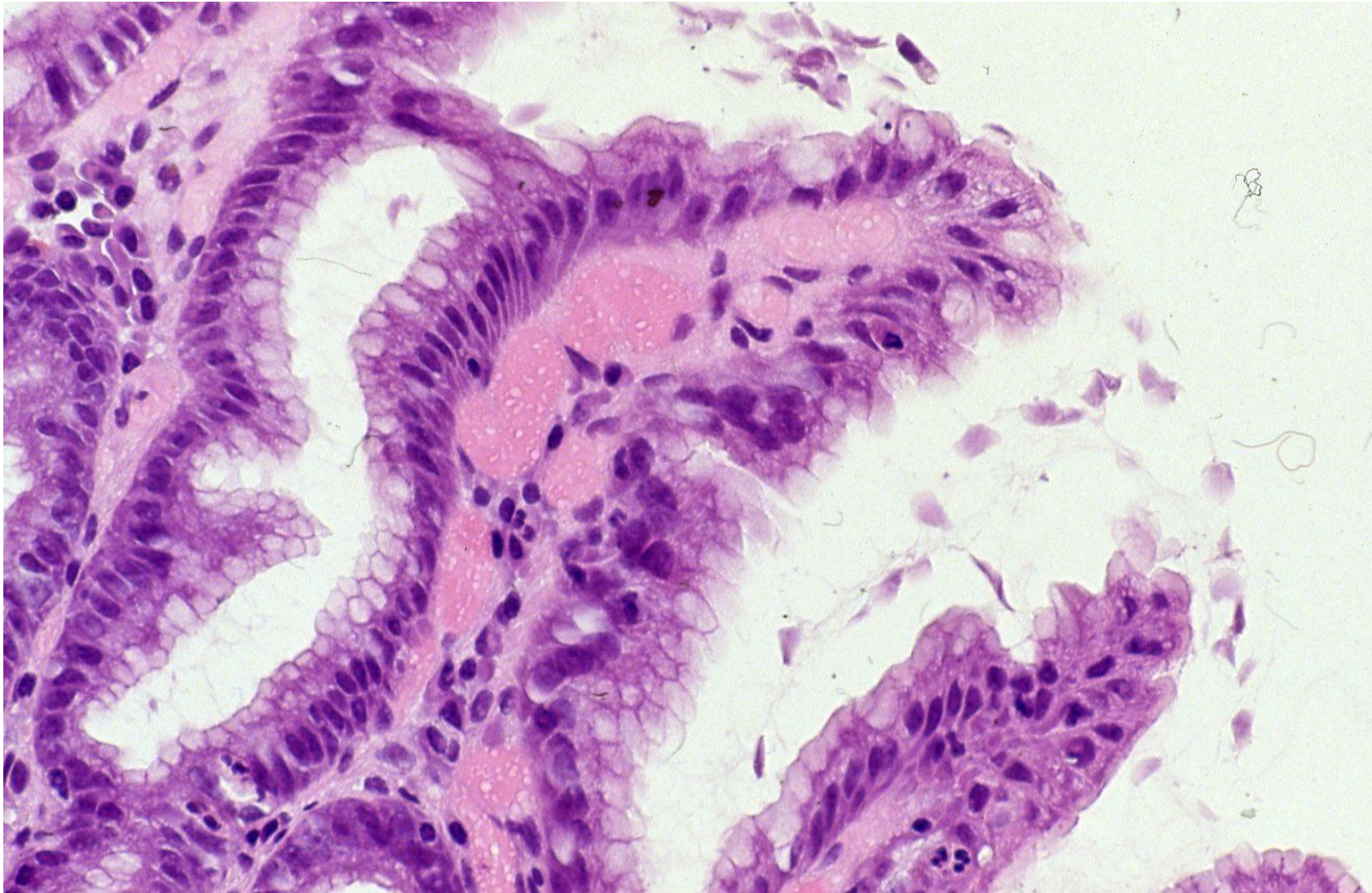
Giardia duodenalis infection in gallbladder bile of a 61-year-old female patient. Numbers of flagellated protozoa containing two symmetrical nuclei are observed. Papanicolaou-2



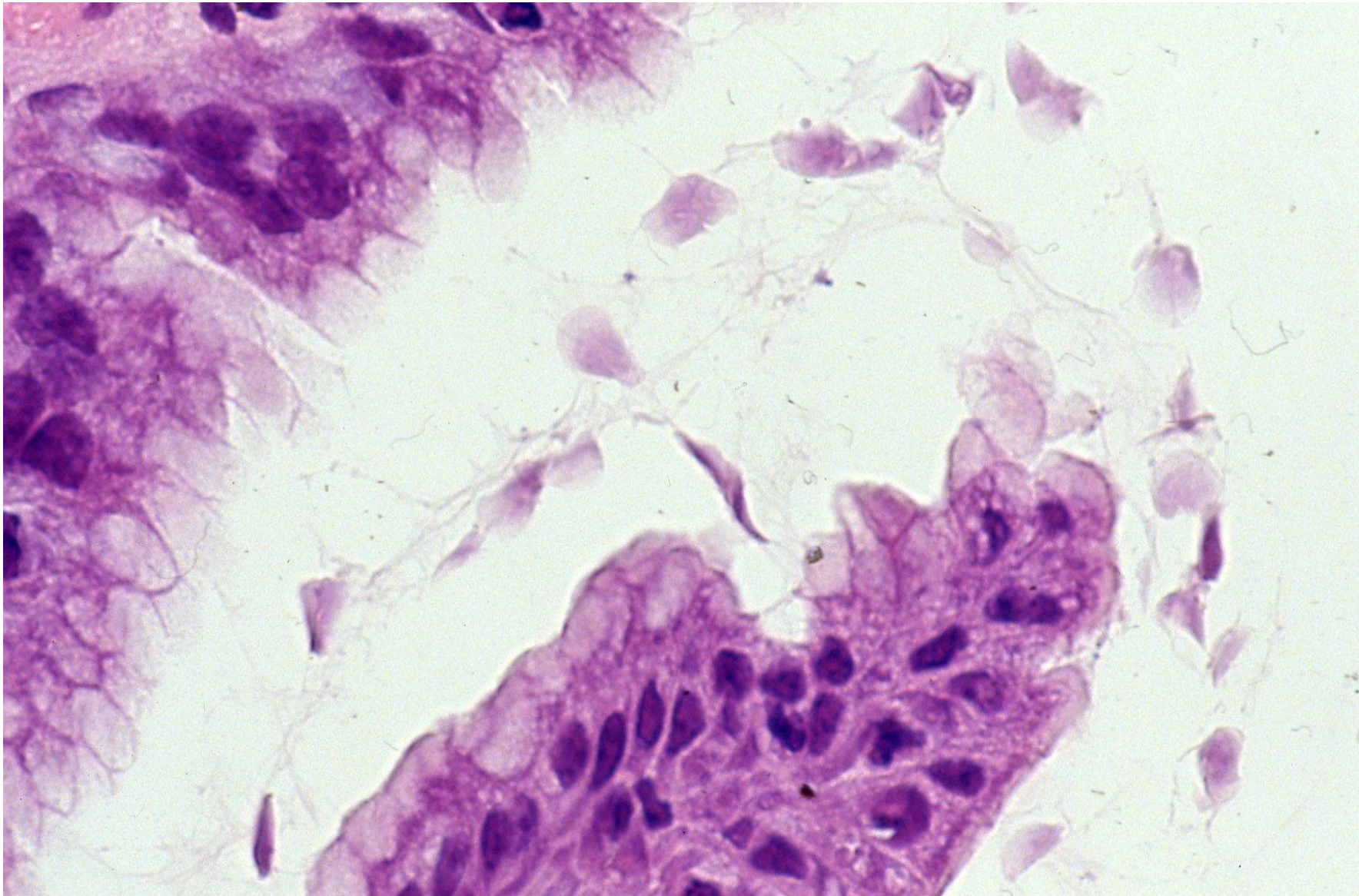
Giardia duodenalis infection in duodenal biopsy from a female patient aged 60's. Numbers of protozoa infect the surface of the duodenal mucosa. Crescent- or flat plate-like appearance is characteristic. No invasiveness is noted. H&E-1



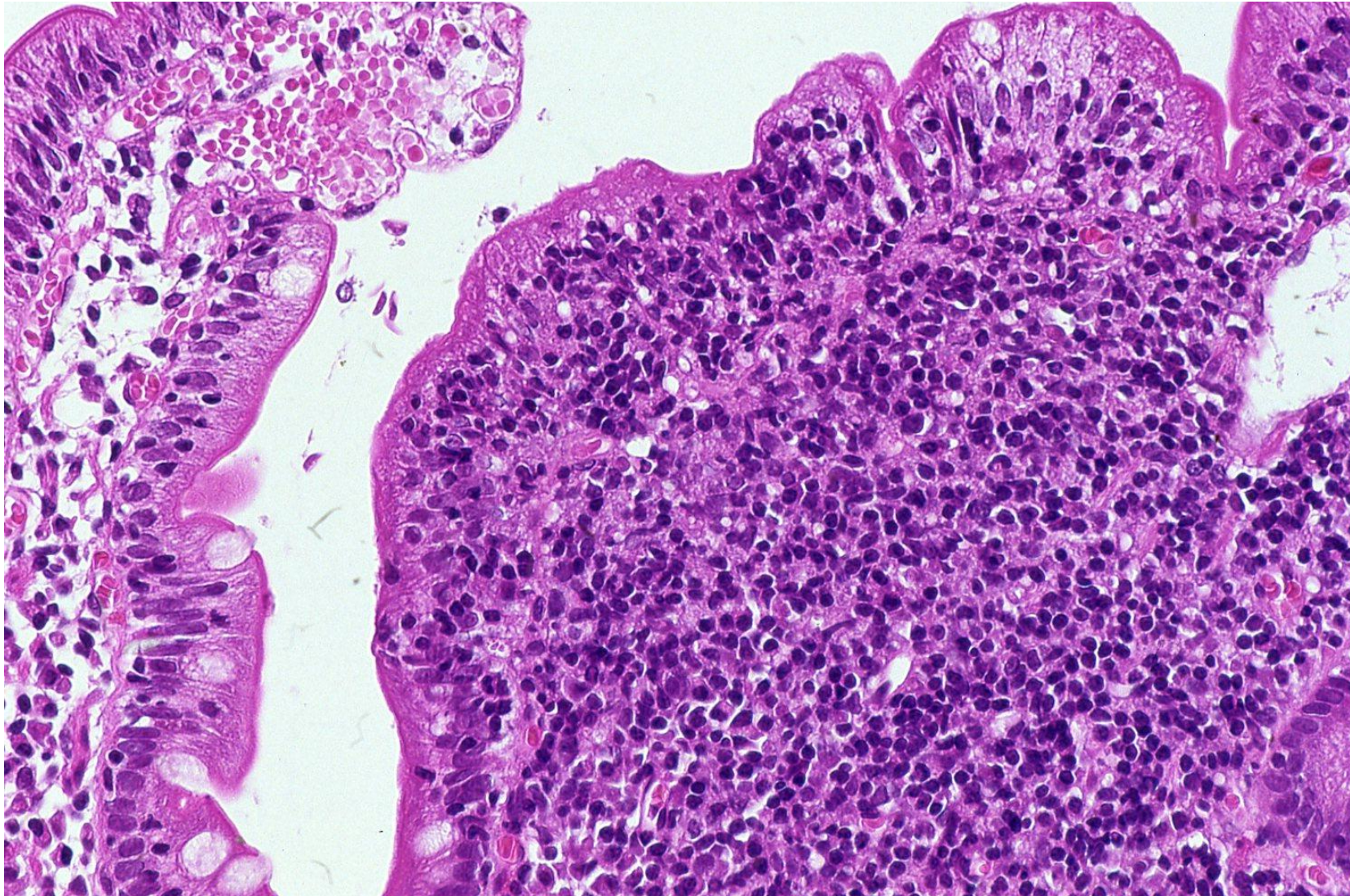
Giardia duodenalis infection in duodenal biopsy from a female patient aged 60's. Numbers of protozoa infect the surface of the duodenal mucosa. Crescent- or flat plate-like appearance is characteristic. No invasiveness is noted. H&E-2



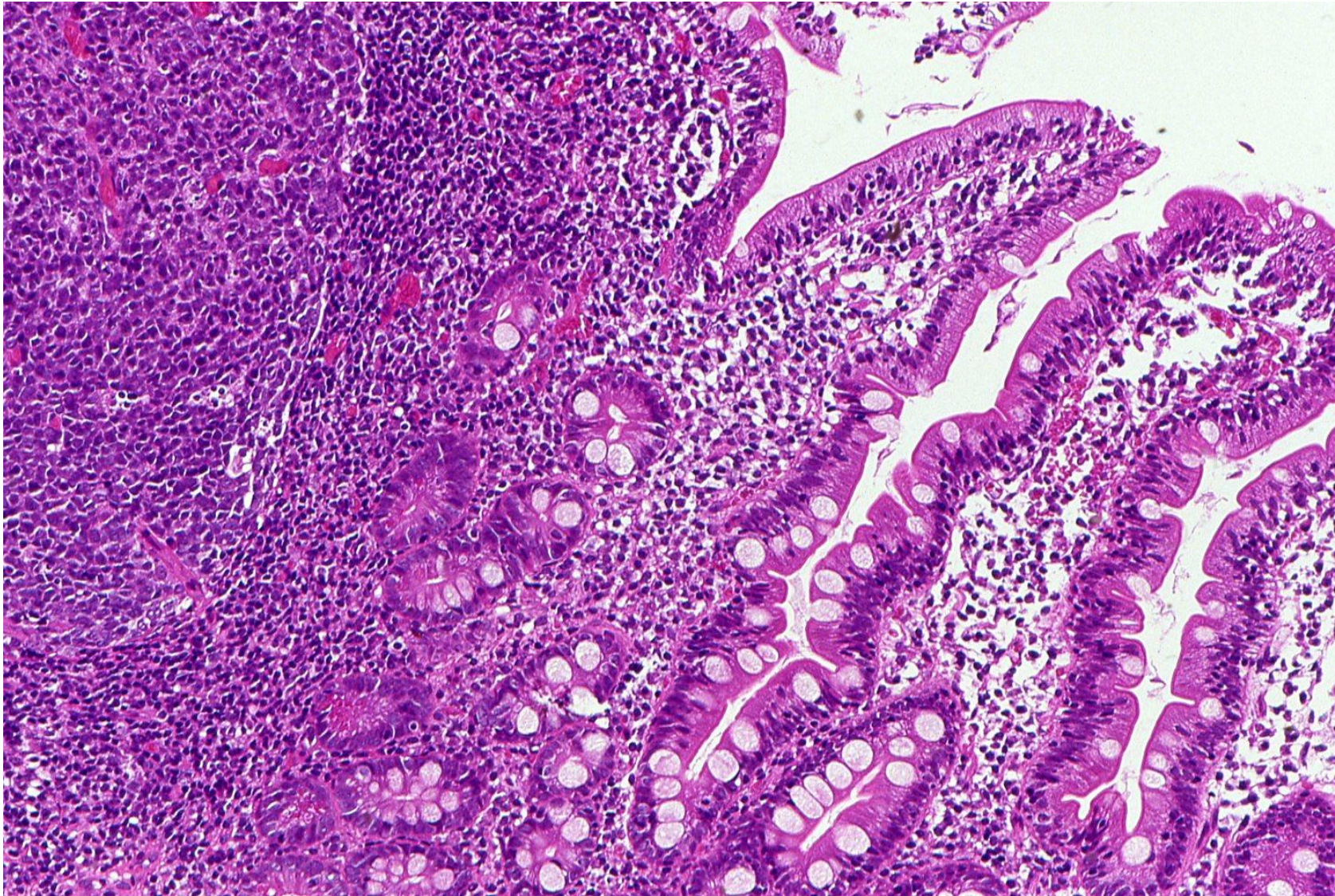
Giardia duodenalis infection in duodenal biopsy from a 67-year-old male patient. Numbers of protozoa infect the surface of the duodenal mucosa. Crescent- or flat plate-like appearance is characteristic. No invasiveness is noted. H&E-3



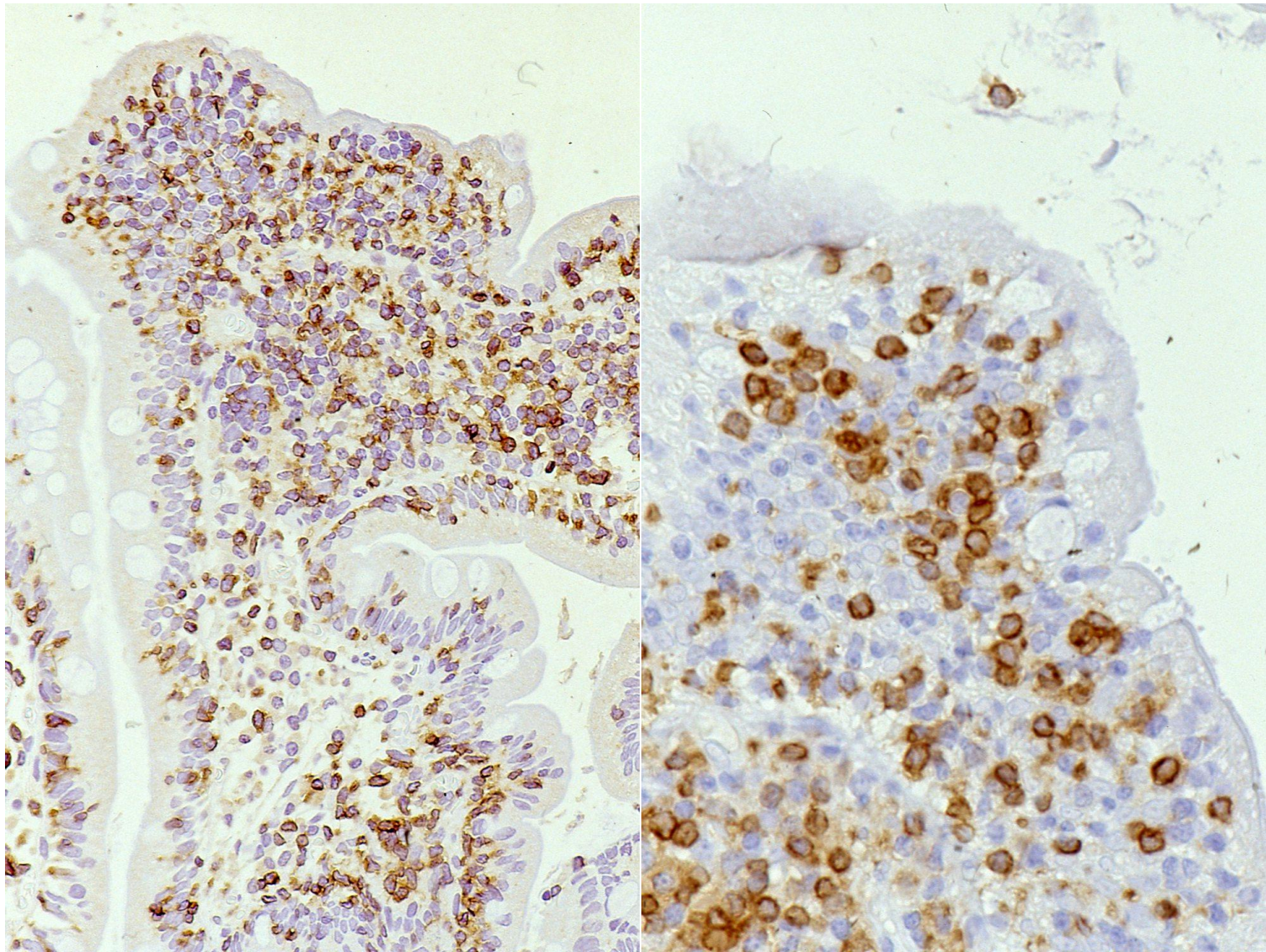
Giardia duodenalis infection in duodenal biopsy from a 67-year-old male patient. Numbers of protozoa infect the surface of the duodenal mucosa. Crescent- or flat plate-like appearance is characteristic. No invasiveness is noted. H&E-4



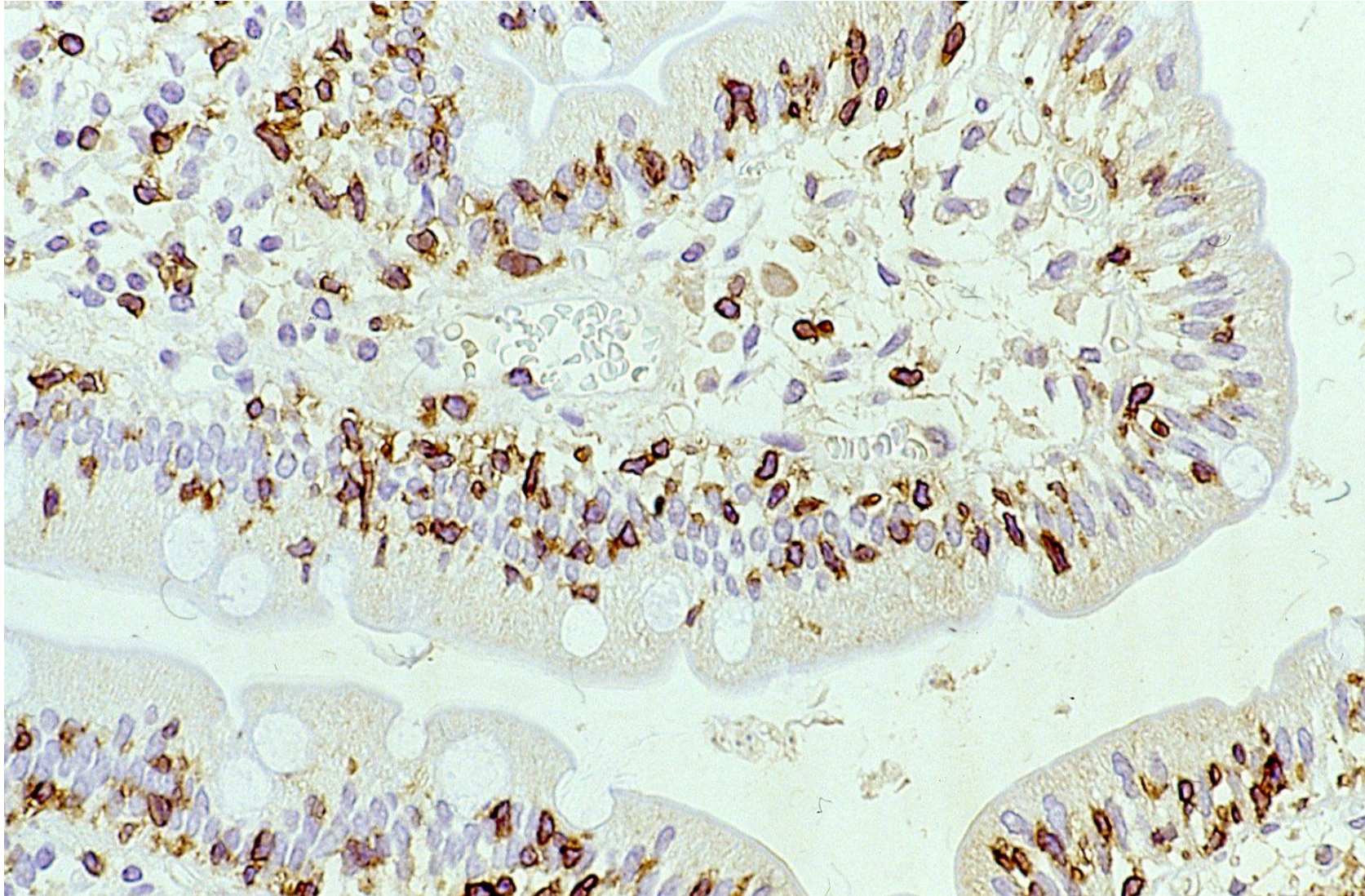
Giardia duodenalis infection in duodenal biopsy from a 30-year-old Iranian male patient complaining of diarrhea. Crescent- or flat plate-shaped protozoa infect the surface of the duodenal mucosa. Lymphoid follicle formation is evident, and intraepithelial lymphocytes are increased. H&E-5



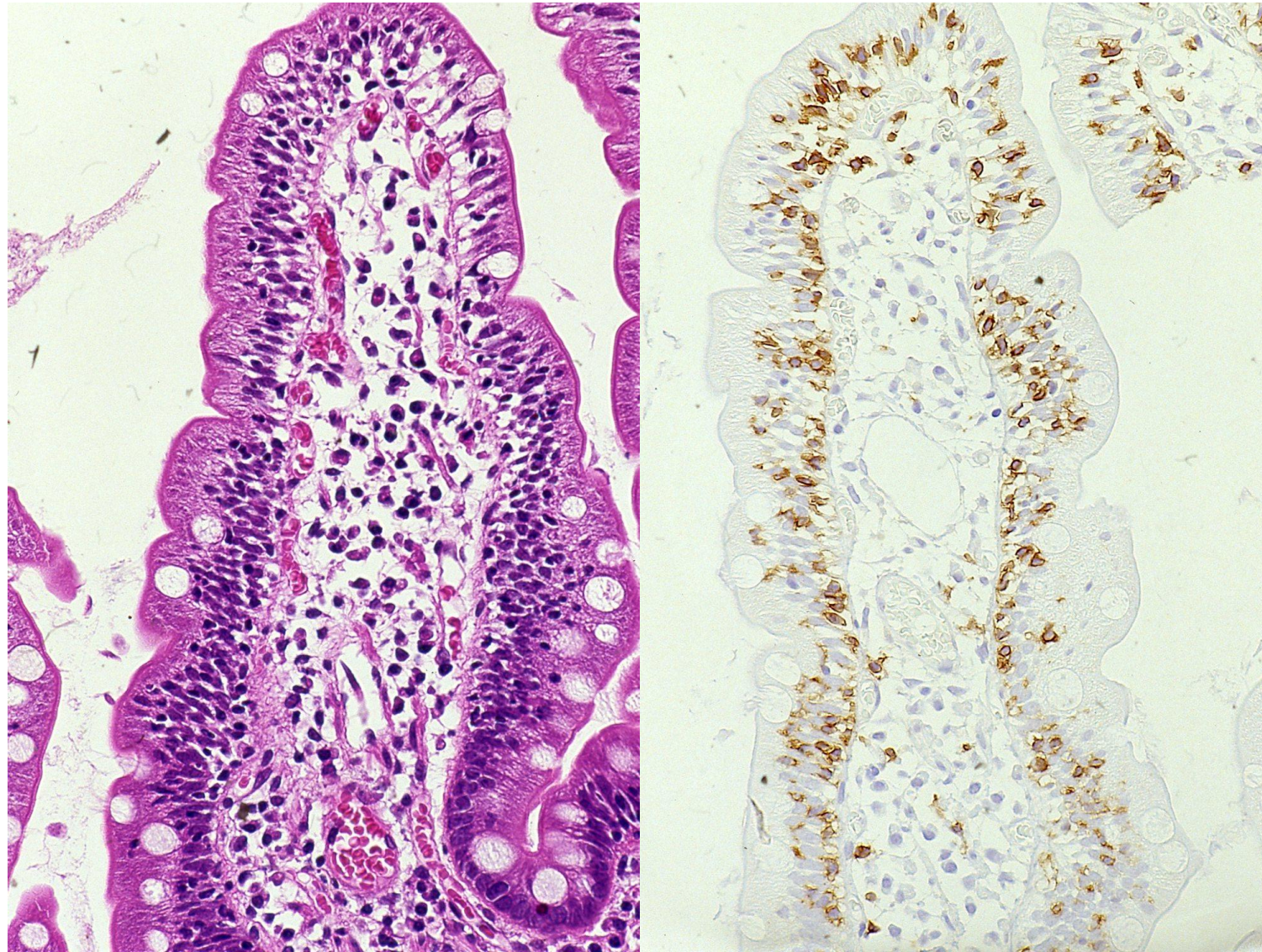
Giardia duodenalis infection in duodenal biopsy from a 30-year-old Iranian male patient complaining of diarrhea. Crescent- or flat plate-shaped protozoa infect the surface of the duodenal mucosa. Lymphoid follicle formation is evident, and intraepithelial lymphocytes are increased. H&E-6



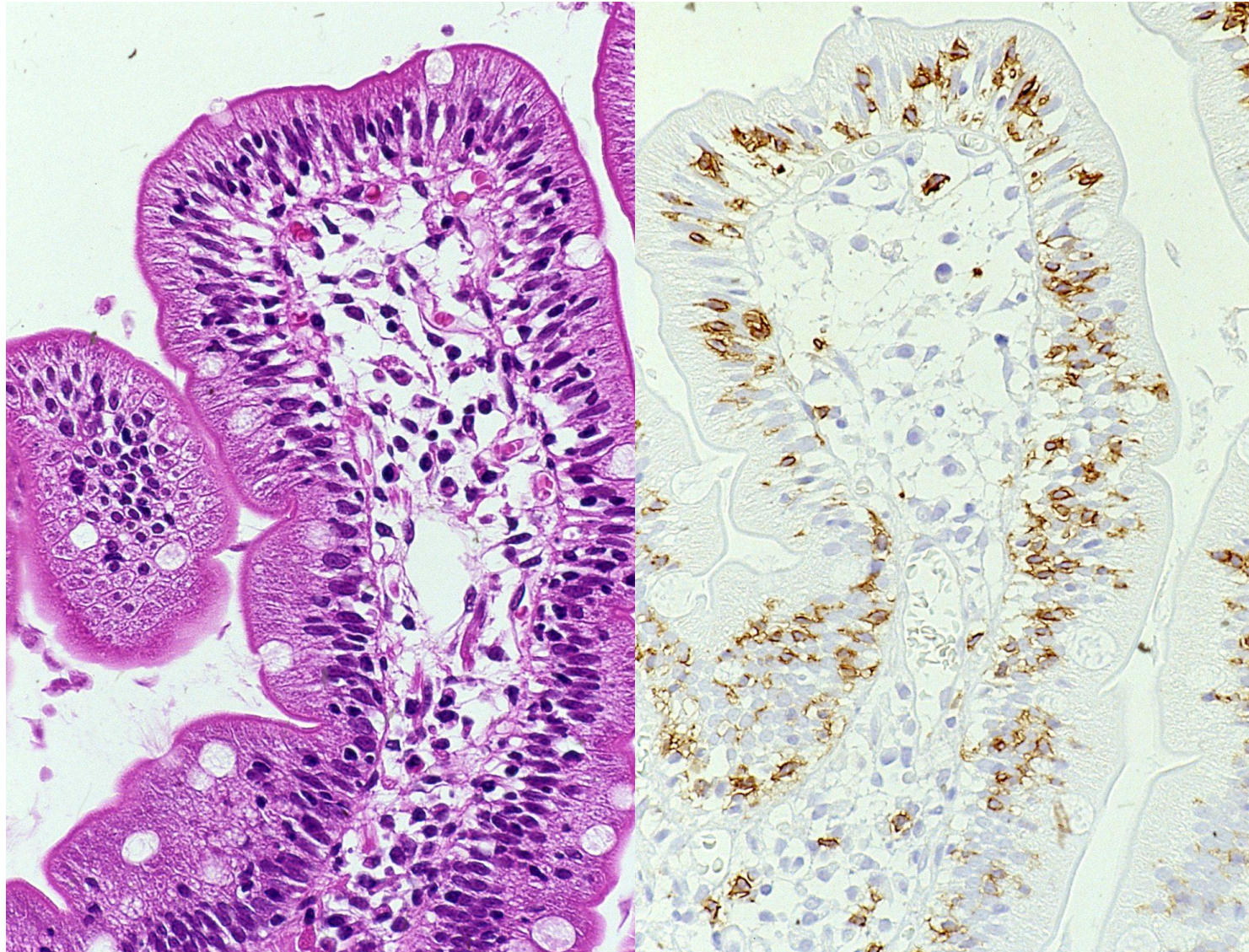
Giardia duodenalis infection in duodenal biopsy from a 30-year-old Iranian male patient complaining of diarrhea. CD79a-positive B-lymphocytes are clustered in the lymphoid follicle and some permeate among the duodenal epithelial cells. Immunostaining for CD79a



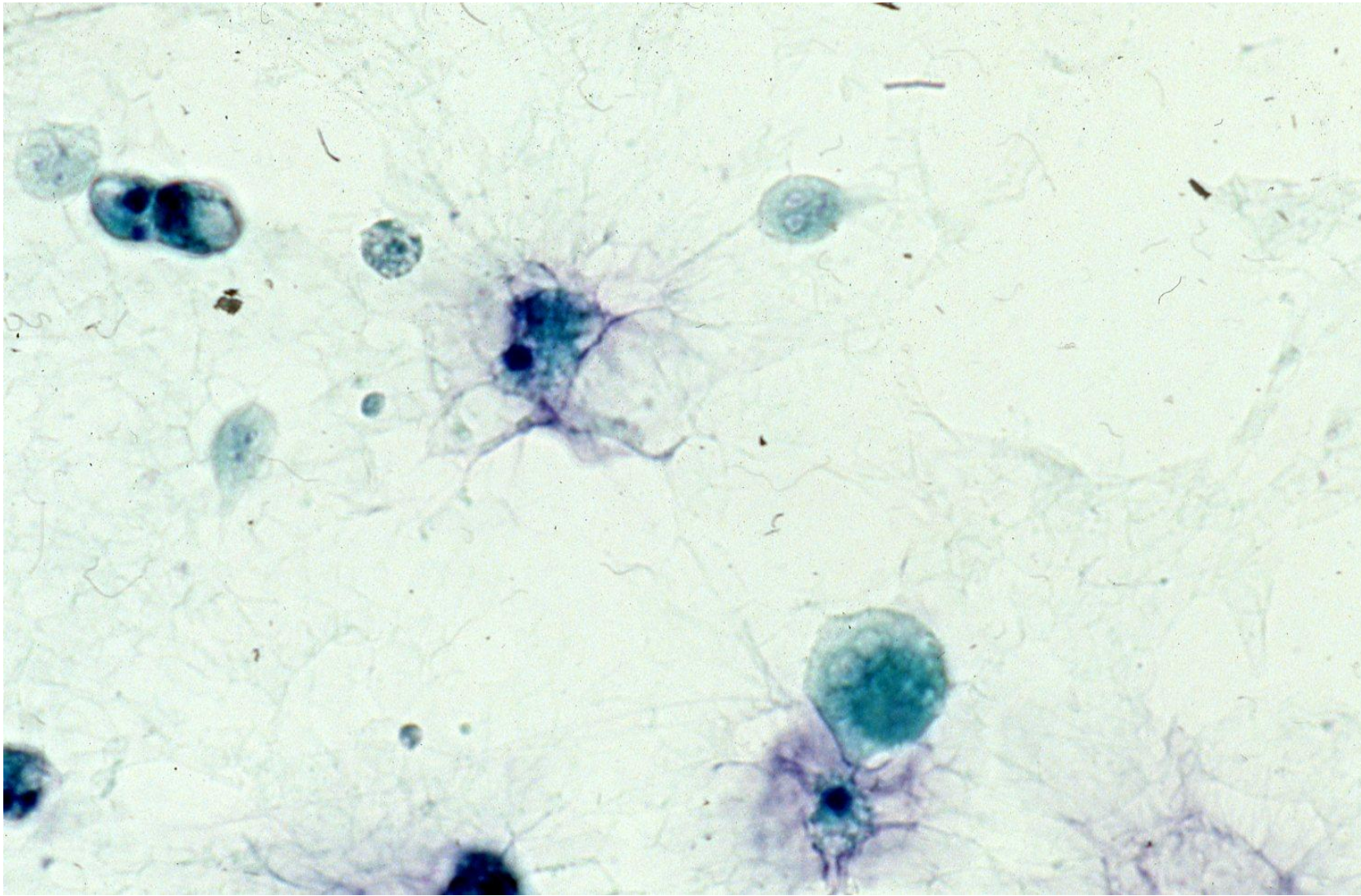
Giardia duodenalis infection in duodenal biopsy from a 30-year-old Iranian male patient complaining of diarrhea. CD3-positive T-lymphocytes are clustered among the duodenal epithelial cells as intraepithelial lymphocytes. Immunostaining for CD3



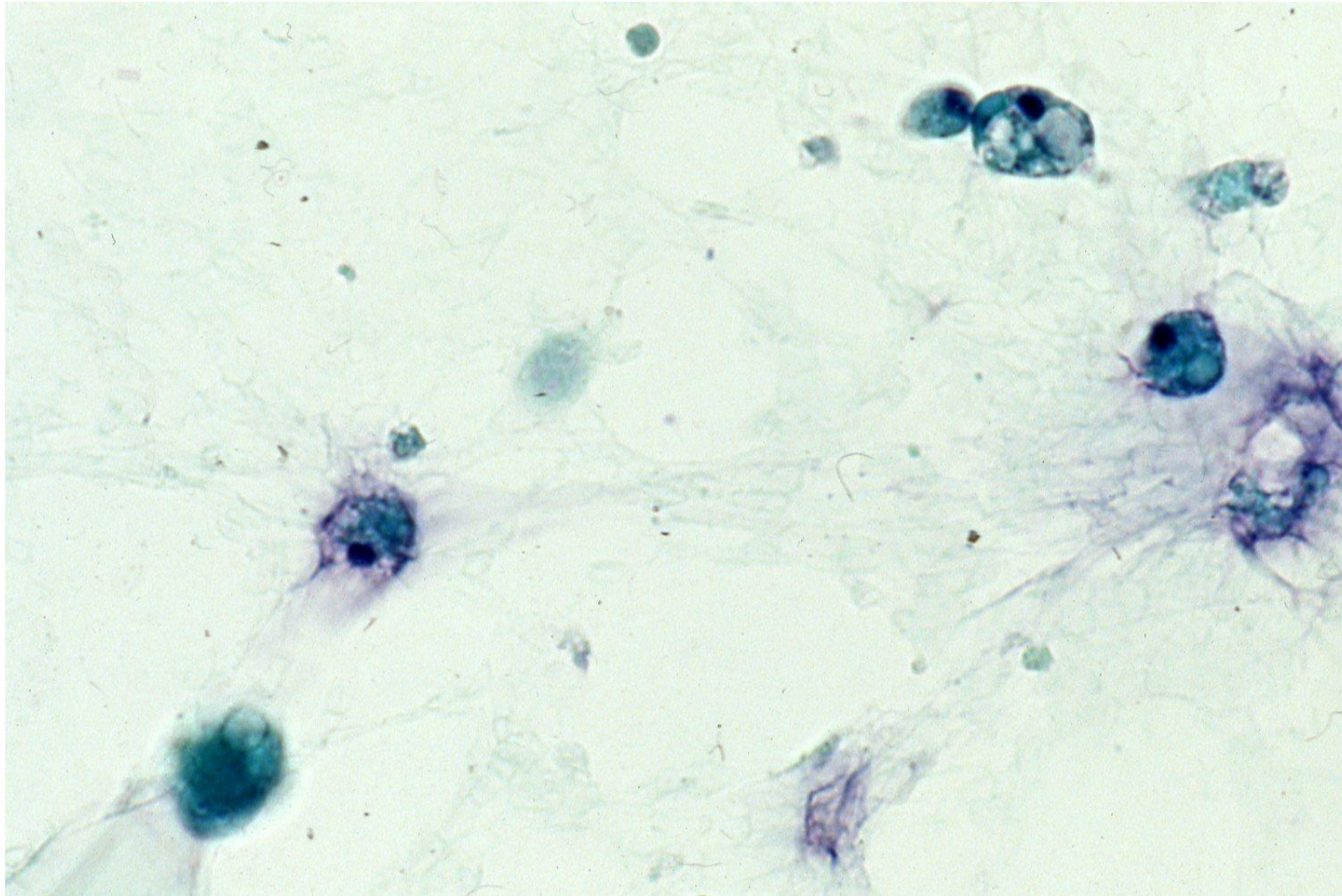
Giardia duodenalis infection in duodenal biopsy from a 30-year-old Iranian male patient complaining of diarrhea. CD8-positive cytotoxic T-lymphocytes are clustered as intraepithelial lymphocytes. Left: H&E, right: immunostaining for CD8 (1)



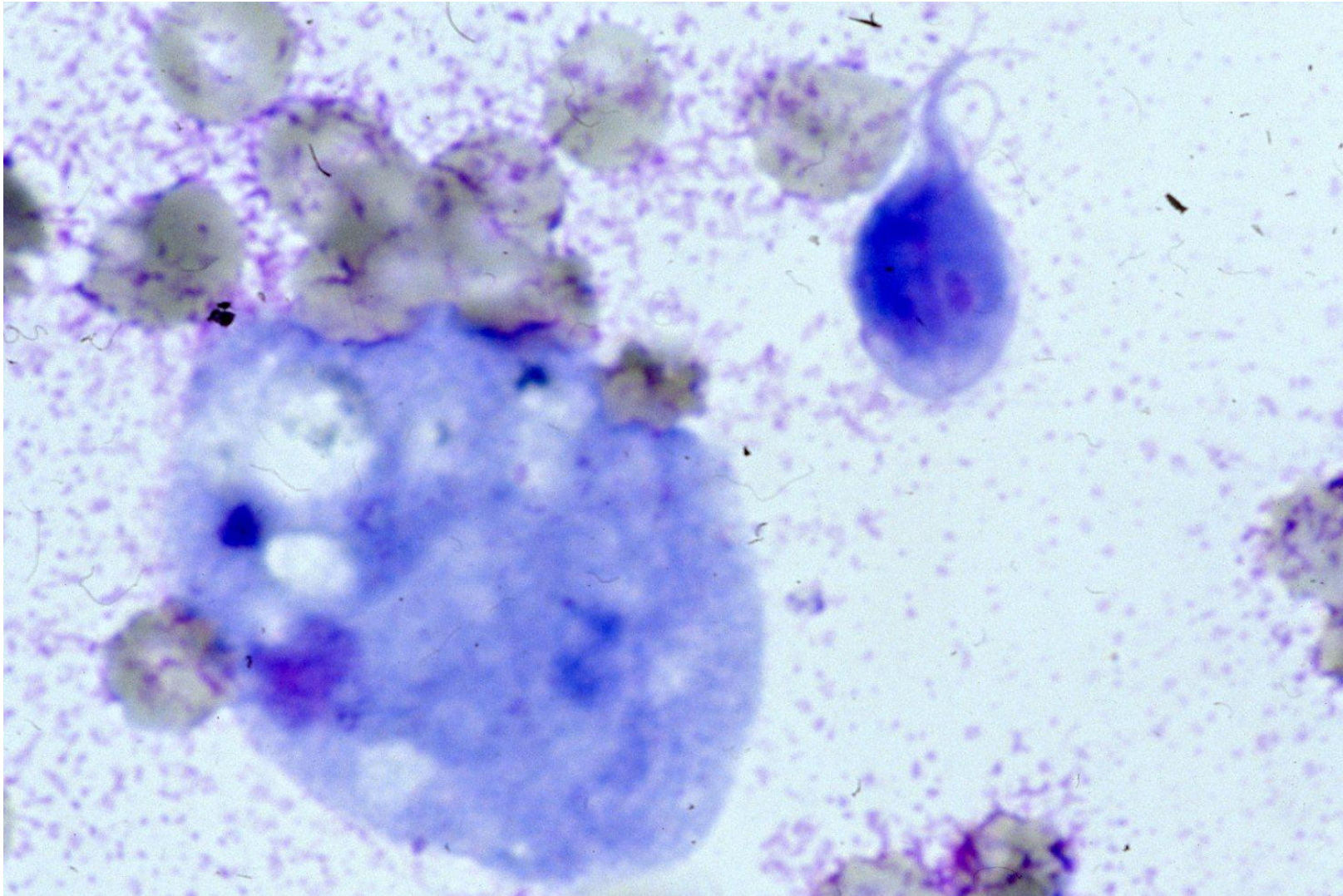
Giardia duodenalis infection in duodenal biopsy from a 30-year-old Iranian male patient complaining of diarrhea. CD8-positive cytotoxic T-lymphocytes are clustered as intraepithelial lymphocytes. Left: H&E, right: immunostaining for CD8 (2)



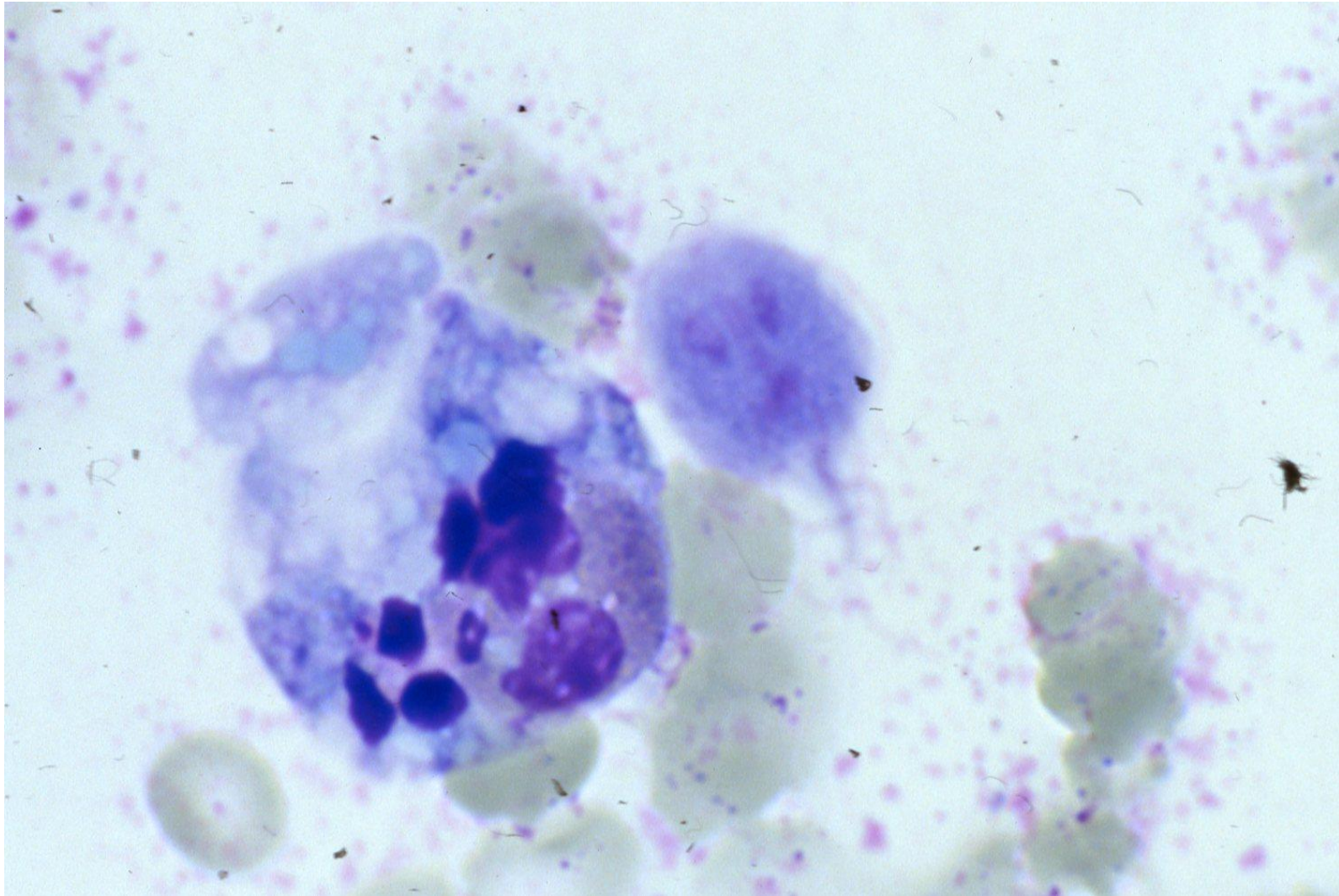
Dual opportunistic infection of *Giardia duodenalis* and *Entamoeba histolytica*. Rectal lavage fluid sampled from a male AIDS patient aged 30's. Trophozoites of *G. duodenalis* and *E. histolytica* are observed simultaneously. Papanicolaou-1



Dual opportunistic infection of *Giardia duodenalis* and *Entamoeba histolytica*. Rectal lavage fluid sampled from a male AIDS patient aged 30's. Trophozoites of *G. duodenalis* and *E. histolytica* are observed simultaneously. Papanicolaou-2



Dual opportunistic infection of *Giardia duodenalis* and *Entamoeba histolytica*. Rectal lavage fluid sampled from a male AIDS patient aged 30's. Trophozoites of *G. duodenalis* and *E. histolytica* are observed simultaneously. May-Giemsa-1



Dual opportunistic infection of *Giardia duodenalis* and *Entamoeba histolytica*. Rectal lavage fluid sampled from a male AIDS patient aged 30's. Trophozoites of *G. duodenalis* and *E. histolytica* are observed simultaneously. May-Giemsa-2