

## Letter to the Editor

### *Lophomonas* or Ciliated Epithelial Cells?☆



### ¿*Lophomonas* o células epiteliales ciliadas?

To the Editor:

We read with interest the scientific letter from Pinos et al.<sup>1</sup> on *Lophomonas blattarum* (LB) lung infection recently published in your journal.

In this study, the authors report 6 cases of lung infection allegedly caused by this multiflagellated protozoan that responded positively to treatment with metronidazole after unsuccessful empirical antibiotic therapy.

Bronchopulmonary infection by LB is quite rare and, although numerous cases have been described in the literature, it is unexpectedly common for this protozoan to be confused with bronchial epithelial cells or cell remains that retain only part of their cytoplasm and associated cilia and are capable of movement, a phenomenon known as ciliocytophthoria<sup>2</sup>.

Morphological criteria using various staining techniques have improved the identification of this protozoan<sup>3</sup>. Molecular biology methods have also recently contributed to deciphering their genetic sequence<sup>4</sup>.

LB are commensals found in their trophozoite form in the intestine of cockroaches<sup>5</sup> and as cysts in the feces of these insects, making them resistant to adverse environmental conditions. It can be assumed that inhaling fecal particles containing protozoan cysts

is the route of entry of the microorganism into the airways<sup>6</sup>. The favorable humidity and temperature conditions encountered in the respiratory tree allow the LB cysts to release their trophozoite forms.

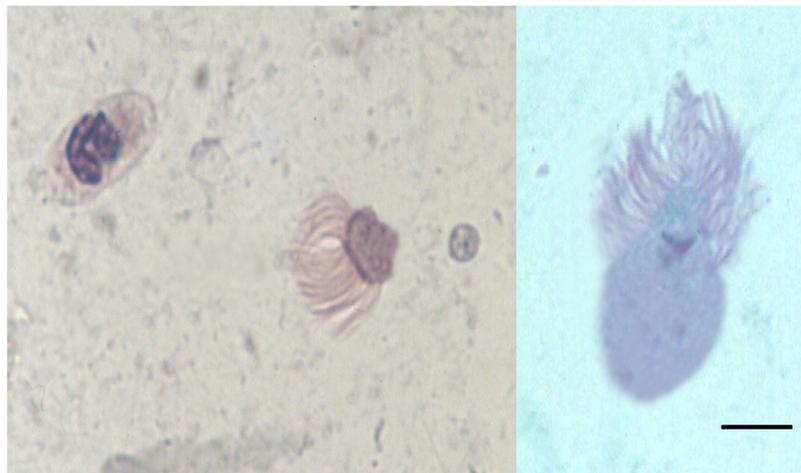
LB infection often manifests as bronchopneumonia with productive cough, fever, and dyspnea that does not respond to standard antibiotic therapy and yields nonspecific radiological images.

Treatment with metronidazole appears to resolve most clinical syndromes, suggesting that a respiratory infection with consistent clinical symptoms that does not respond to conventional antibiotic therapy may be caused by LB. However, it is important to remember that metronidazole is effective against gram-negative and anaerobic germs, so cultures and sensitivity testing are essential.

The image from a left lower lobectomy specimen shared by the authors shows what they believe to be the presence of LB.

In our view, the image provided is more in line with a small row of ciliated epithelial cells. The criteria on which we base our premise are: a) the presence of a rounded nucleus in the basal position of the two cells on the left of the image; b) the existence of a clear terminal bar in the middle cell, and c) an arrangement of short, uniform, unidirectional cilia at the apical end.

We provide an image to help compare these morphological criteria (Fig. 1) in which the phenomenon of ciliocytophthoria can be seen on the left, with well preserved and oriented remains of cytoplasm and cilia anchored to the terminal bar. On the right of the cytoplasmic remains, we can see what could be the nucleus of the ciliated cell. The image on the right shows a pyriform LB



**Fig. 1.** Cytological sputum smear. Left: Ciliocytophthoria phenomenon, and an accompanying polymorphonuclear leukocyte (Papanicolaou, 1000 $\times$ ). Right: *Lophomonas blattarum*. Bar scale 20  $\mu$ m (Wheatley trichrome stain, 1000 $\times$ ).

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with numerous flagellae, the longest in the center, in an irregular arrangement. No terminal bar is observed, but a small nucleus can be seen in the apical pole just below the flagellar insertion.

Because this protozoan is easily confused with ciliated epithelial cells on direct microscopy of fresh samples, we recommend using specific staining techniques (Wheatley trichrome, Giemsa or Papanicolaou) to assist in identification. The current lack of an appropriate culture method for this parasite could be supplemented by molecular biology techniques.

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### Conflict of interests

The authors state that they have no conflict of interests.

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### Reply to “Lophomonas or Ciliated Epithelial Cells?”<sup>☆</sup>



#### Respuesta a «¿Lophomonas o células epiteliales ciliadas?»

To the Editor:

We have read in detail the letter published by Martínez-Girón et al. entitled “Lophomonas or ciliated epithelial cells?”<sup>1</sup>, in which they question the evidence of the findings of flagellated parasites in patient samples from bronchoscopy samples.<sup>1</sup>

It is true that it is unusual to find this type of protozoan in bronchial lavage samples and it is also true to say that they may go unnoticed due to the lack of expertise of the microscopist, as they can be easily confused with ciliated cells originating in the bronchial tree. No specific culture media have been identified to date, but molecular techniques for confirming lophomoniasis were published by Fakhar et al. in 2019<sup>2</sup>.

We reported the presence of *Lophomona* sp. in patient specimens using the wet-mount technique with 400× magnification post-centrifugation and subsequent Giemsa staining. This was used to distinguish between ciliated respiratory cells and the protozoan and also to analyze various morphological characteristics of the parasite, including its rounded or ovoid form (20–60 mm long × 12–20 mm wide); the double strand of flagellae at the anterior end; the absence of a terminal bar; and a certain cytoplasmic plasticity. It also helped detect the presence of thick granules and some vacuoles along with a difficult-to-visualize nucleus and the main characteristic of these protozoa, namely, asynchronous movements that generate vibratory, rotational and revolving movements in the protozoan cytoplasm (Fig. 1).

These characteristics distinguish them from ciliated cells originating in the tracheobronchial tree, which are characterized by a basophilic cytoplasm, a basal end with a sharp conical insertion, and an apical end with a reinforced edge corresponding to the terminal bar from which the cilia arise. The nucleus is central, round, or oval with fine chromatin and a discrete nucleolus can be seen<sup>3,4</sup>.

Martínez-Girón et al. also mention that the protozoa were perhaps confused with the phenomenon called ciliocytophthoria, which is defined as a degenerative process of the ciliated cells as a consequence of viral infections and characterized by typical morphological changes. As we stated in our article, our lophomoniasis cases did not present any viral process at the time of diagnosis nor did we detect any evidence of carcinoma, another typical cause of these phenomena<sup>5</sup>.

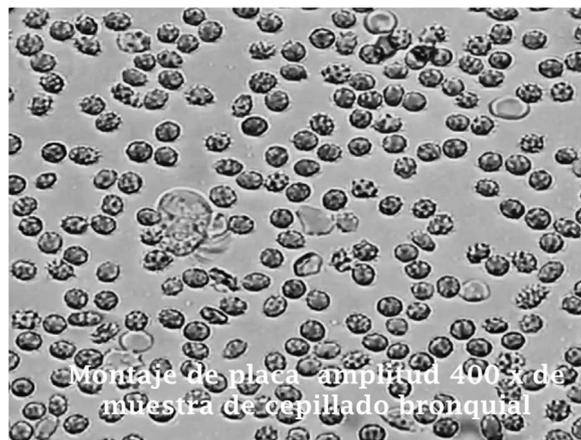


Fig. 1. 400× magnification of slide-mounted bronchial brushing sample.

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It is true that the species of *Lophomonas* sp. cannot be distinguished in fresh mounts, but they can be distinguished from ciliated