

On Cilia, Flagella, and Pulmonary Pseudoprotezoa

Rafael Martínez-Girón^{1,*}, Hugo Cornelis van Woerden²

¹Protozoal Respiratory Pathology Research Unit, INCLÍNICA Foundation, Calvo Sotelo, Oviedo, Spain; ²Institute of Primary Care and Public Health, School of Medicine, Cardiff University, U.K.

Dear Editor,

We have read with interest the article published in your journal by Xue et al. [1] regarding a case report of bronchopulmonary infection by the multiflagellated protozoon *Lophomonas blattarum* (LB). After observing carefully the images showed by authors, we think that there may be a misidentification of detached ciliated bronchial cells as true LB. The figures for the fresh samples may reflect a ciliated cell as there is a clear terminal bar and short, regular unidirectional cilia inserted on the apical end (Fig. 1A). In the top right panel (Fig. 1B), a small cluster (2 or 3 elements) of ciliated bronchial cells may represent a “Creola body”, as there is irregularity of the cytoplasm contours and a round nucleus. This irregular cytoplasmic contour could resemble an amoeboid movement, which is different from the flagellar-related motility of LB. Moreover, short regular and unidirectional cilia can be also observed.

In the Wright-Giemsa stained images, some cells in the center (Fig. 1C) have a columnar shape with a visible short tail behind the nucleus and short, unidirectional cilia at the apical end. Finally, in Fig. 1D, which may represent a pseudoparasite, the cytoplasmic projections are irregular and very thick, resembling detached ciliary tufts which we would argue are different to those observed in LB.

Although cilia and flagella, at an ultrastructural level, are virtually indistinguishable, they differ principally in their length (cilia are much shorter than flagella), mode of beat, and func-

tion [2]. In the respiratory epithelium, cilia are responsible for the displacement of the mucus to the throat. In protozoa, flagella are responsible for its locomotion and for the capture of particles for ingestion.

LB is a Parabasalid that has been recognized under light microscopy in respiratory secretions [3,4] and considered as a bronchopulmonary pathogen [5]. Nevertheless, the possibility of misinterpretation between bronchial ciliated cells and true multiflagellated protozoa [6] is a possibility in this case.

REFERENCES

1. Wue J, Li YL, Li DK, Liu ME, Qiu JF, Xue JJ. Bronchopulmonary infection of *Lophomonas blattarum*: a case and literature review. *Korean J Parasitol* 2014; 52: 521-525.
2. Lindemann CB, Lesich KA. Flagellar and ciliary beating: the proven and the possible. *J Cell Sci* 2010; 123: 519-528.
3. Martínez-Girón R, Doganci L. *Lophomonas blattarum*: a bronchopulmonary pathogen. *Acta Cytol* 2010; 54: 1050-1051.
4. Martínez-Girón R, van Woerden HC. Bronchopulmonary lophomoniasis: emerging disease or unsubstantiated legend? *Parasit Vectors* 2014; 7: 284.
5. Martínez-Girón R, van Woerden HC. *Lophomonas blattarum* and bronchopulmonary disease. *J Med Microbiol* 2013; 62: 1641-1648.
6. Martínez-Girón R, Doganci L, Ribas A. From the 19th century to the 21st, an old dilemma: ciliocytophthoria, multiflagellated protozoa, or both? *Diagn Cytopathol* 2008; 36: 609-611.

•Received 20 November 2014, accepted 26 February 2015.

*Corresponding author (rmartinezgiron@hotmail.com)

© 2015, Korean Society for Parasitology and Tropical Medicine

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.