

House Dust Mite Protozoon on a Nasal Smear in a Case of Allergic Rhinitis

Dear Dr. Bedrossian:

Allergic rhinitis (AR) is a common disorder with significant impact on quality of life and on health care expenditure.¹

AR is one of the main allergic diseases triggered by house dust mite allergens as well as outdoor allergens. The fact that certain arthropods, such as termites and cockroaches, contain protozoa in their intestines, help with digestion, leads us to wonder whether household dust mites, intimately related to respiratory allergy, might contain flagellate protozoa.

Three years ago, a study in which intestinal extracts from house dust mites (*Dermatophagoides* spp.) were examined under a light microscope² showed the existence of flagellated protozoal forms, also suggesting a possible relationship between respiratory allergy and these microorganisms.

Nasal smear cytology is a quick, simple, and inexpensive complementary procedure for the diagnosis of AR.

The aim of this letter is to show the similarity between the morphological features of a multiflagellated protozoon observed in a fresh sample from intestinal extract of a house dust mite, under a light microscope and phase contrast (Fig. 1), and a similar one in a nasal smear obtained by nose blowing and stained with Wheatley's trichromic (Fig. 2), from a 23-year-old man with a clinical history of AR and conjunctivitis for 15 years. In both images, a similar shape with a cytoplasmic projection ending in numerous and irregular flagella, and similar in size (about 20–25 μ m) may be seen. Moreover, to distinguish between these multiflagellated protozoa and degenerated ciliated cells, a CAM 5.2 immunostain (monoclonal antibody, DAKO 1:50) was performed to exclude degenerating epithelial cells, and was negative for protozoa.

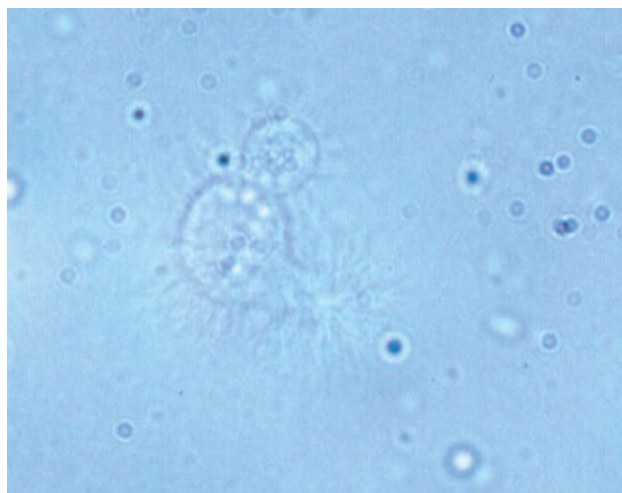


Fig. 1. Multiflagellated protozoon observed in intestinal extract of house dust mite (fresh sample, $\times 1000$). [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

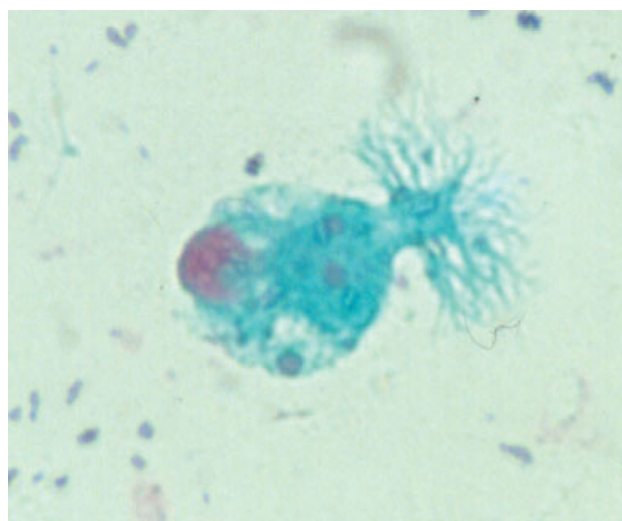


Fig. 2. Multiflagellated protozoon observed on a nasal exudate smear (Wheatley's trichromic, $\times 1000$). [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

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A taxonomic classification of these protozoa, on the basis of morphological features, may place them in the *Hypermastigida* Order. Similar and uncommon protozoa, observed in airways secretions, have been reported.³

On the other hand, the inhalation of mite faeces as a mechanism introducing pathogens, such as bacteria and protozoa, into the lungs has been postulated.⁴ Considering the accepted claim “one way, one disease,” if AR represents but one component of the spectrum of inflammatory diseases involving the unified airway, it is logical to consider that these protozoa may occur at any point of the airways, including the nasal cavities.

A possible pathogenic effect of these inhaled house dust mite protozoa on the nasal epithelium might be explained in two ways.

One, many inflammatory processes may depend on Toll-like receptors (TLRs), and TLR signaling may be involved in the pathogenesis of airway inflammatory diseases. In vitro studies strongly suggest that TLRs have a crucial role in the recognition of microbial pathogens, including protozoa, by inducing signals responsible for an effective host defence, especially pro-inflammatory cytokines.⁵

Two, similarly to alterations produced by disruption of the epithelial barrier, as is the case of flagellated protozoa such as *Trichomonas vaginalis* and *Giardia duodenalis*,^{6,7} proteases secreted by house dust mite multflagellated protozoa may induce disruption of epithelial tight junctions, which in turn increase airway permeability, increasing a loss of epithelial barrier function.

Although the role of micro-organisms in its pathogenesis is still unclear, AR is an increasingly common inflammatory disorder. Further and more complex studies are necessary to analyze these peculiar protozoa in nasal extrusions, principally using molecular techniques, in order to establish a relationship between its presence and the development of AR, comparing healthy control subjects to those with dust mite-induced AR.

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