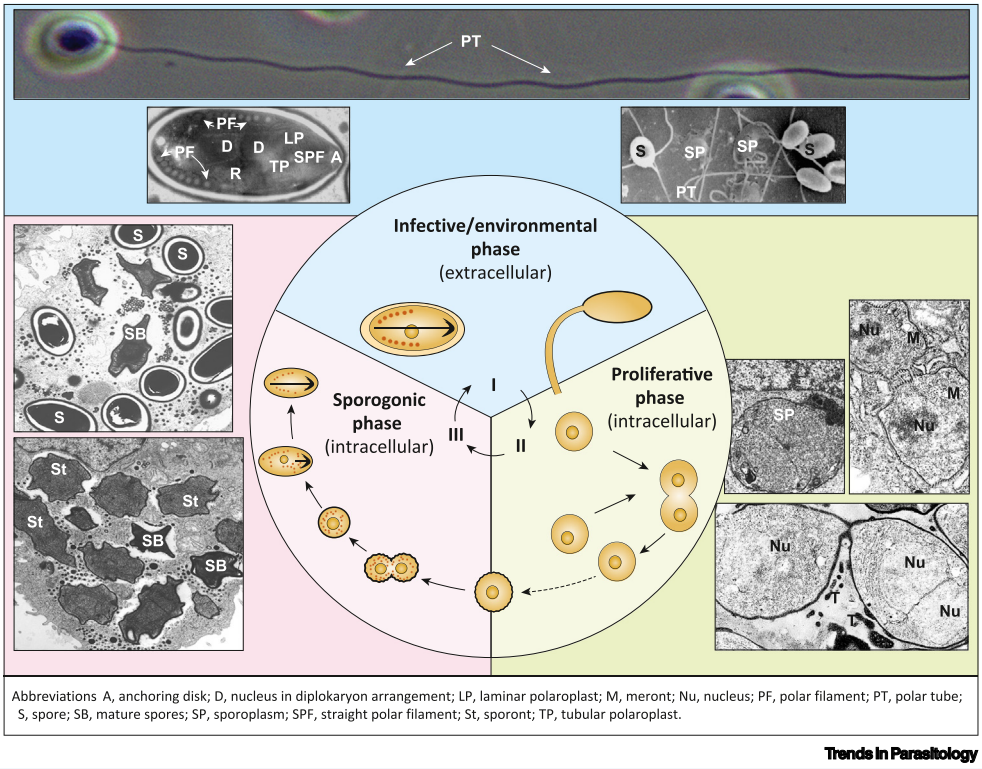
Trends in Parasitology | Parasite of the Month

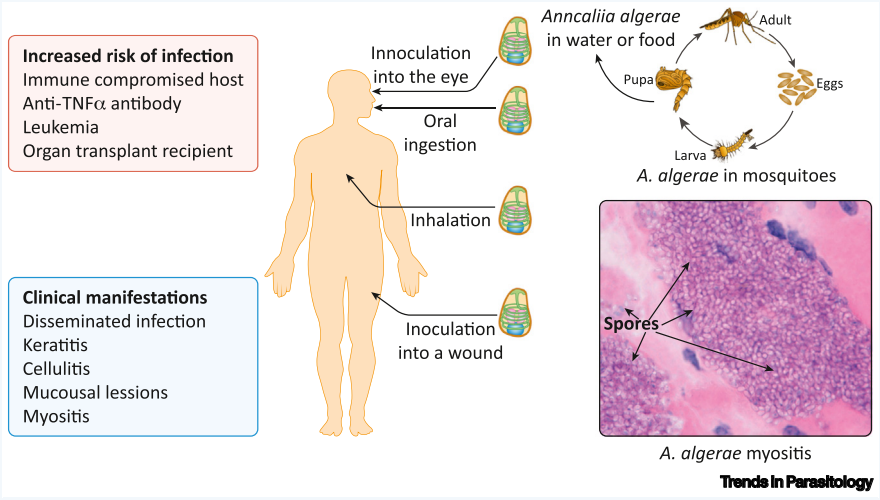
Anncaliia algerae

Louis M. Weiss [1,2,*] and Peter M. Takvorian [3]

[1]Department of Pathology, Albert Einstein College of Medicine, Bronx, NY, USA
[2]Department of Medicine Division of Infectious Diseases, Albert Einstein College of Medicine, Bronx, NY, USA
[3]Department of Biological Sciences, Rutgers University, Newark, NJ, USA



Anncaliia algerae belongs to the microsporidia, a group of obligate intracellular pathogens originally classified as early branching 'primitive' protozoa but now understood to be related to the Cryptomycota as a basal branch in the fungal kingdom. *A. algerae* has emerged as a rare opportunistic human pathogen in immune compromised patients such as those taking immune suppressive medications for arthritis, hematologic malignancy, or organ transplantation. It was originally identified as a pathogen of mosquitoes and is probably transmitted to humans by food or water through ingestion, inhalation, or contamination of ocular tissue or wounds with environmental spores. *A. algerae* infection primarily causes myositis; however, vocal cord, skin, corneal (in immune competent hosts), and disseminated infections have been reported. Human infection has also been reported with other members of the *Anncaliia* genus: *Anncaliia vesicularum* in a HIV patient, and *Anncaliia connori* in an infant with thymic dysplasia.



KEY FACTS:

A. algerae was previously called *Nosema algerae* and then *Brachiola algerae* before being reclassified to *Anncaliia.*

A. algerae can be grown *in vitro* in either mammalian or insect cells.

The genome sequences for human (ATCC PRA 109) and insect (ATCC PRA339, also called Undeen) isolates are available. The genome contains a large number of transposable elements and long terminal repeat (LTR) retrotransposons.

It has a worldwide distribution and is a pathogen of mosquitoes and other insects.

DISEASE FACTS:

Most cases have occurred in immune suppressed patients who either received immune modulating antibodies for arthritis or immune suppressive drugs for organ transplantation.

Myositis may be associated with central nervous system or cardiac involvement.

Infection is diagnosed by finding spores and other developmental forms in tissue. PCR based on the SSU-rRNA gene can also be used for diagnosis.

Management of *A. algerae* infection usually requires minimizing immunosuppression.

Albendazole has *in vitro* efficacy and has resulted in clinical improvement in several cases. The *A. algerae* tubulin sequence has amino acids associated with sensitivity to albendazole. The addition of fumagillin to albendazole has been needed for successful therapy in some cases.

TAXONOMY AND CLASSIFICATION:

PHYLUM: Microsporidia
CLASS: Microsporea
ORDER: Microsporidia
SUPERFAMILY: Tubulinosematoidea
FAMILY: Tubulinosematidae
GENUS: *Anncaliia*
SPECIES: A. *algerae*

*Correspondence:
louis.weiss@einsteinmed.org (L.M. Weiss).

  https://doi.org/10.1016/j.pt.2021.04.003

Acknowledgments

Supported by National Institutes of Health (NIH) National Institute of Allergy and Infectious Diseases (NIAID) grant RO1 AI124753 (L.M.W.).

Declaration of interests

The authors declare no competing interests.

Resources

https://microsporidiadb.org/micro/app
www.ATCC.org
https://onlinelibrary.wiley.com/doi/book/10.1002/9781118395264

Literature

1. Anderson, N.W. *et al.* (2019) A fatal case of disseminated microsporidiosis due to *Anncaliia algerae* in a renal and pancreas allograft recipient. *Open Forum Infect. Dis.* 6, ofz285
2. Boileau, M. *et al.* (2016) Successful treatment of disseminated *Anncaliia algerae* microsporidial infection with combination fumagillin and albendazole. *Open Forum Infect. Dis.* 3, ofw158
3. Cali, A. *et al.* (2010) Human vocal cord infection with the microsporidium *Anncaliia algerae*. *J. Eukaryot. Microbiol.* 57, 562–567
4. Cali, A. *et al.* (1998) *Brachiola vesicularum*, n. g., n. sp., a new microsporidium associated with AIDS and myositis. *J. Eukaryot. Microbiol.* 45, 240–251
5. Coyle, C.M. *et al.* (2004) Fatal myositis due to the microsporidian *Brachiola algerae*, a mosquito pathogen. *N. Engl. J. Med.* 351, 42–47
6. Field, A.S. *et al.* (2012) Myositis due to the microsporidian *Anncaliia* (*Brachiola*) *algerae* in a lung transplant recipient. *Transpl. Infect. Dis.* 14, 169–176
7. Franzen, C. *et al.* (2006) Transfer of the members of the genus *Brachiola* (microsporidia) to the genus *Anncaliia* based on ultrastructural and molecular data. *J. Eukaryot. Microbiol.* 53, 26–35
8. Santiana, M. *et al.* (2014) Analysis of the beta-tubulin gene and morphological changes of the microsporidium *Anncaliia algerae* both suggest albendazole sensitivity. *J. Eukaryot. Microbiol.* 62, 60–68
9. Sutrave, G. *et al.* (2018) *Anncaliia algerae* microsporidial myositis, New South Wales, Australia. *Emerg. Infect. Dis.* 24, 1528–1531
10. Watts, M.R. *et al.* (2014) *Anncaliia algerae* microsporidial myositis. *Emerg. Infect. Dis.* 20, 185–191

  https://doi.org/10.1016/j.pt.2021.04.003