Answer to Photo Quiz: *Balamuthia mandrillaris*

(See page 1707 in this issue [doi:10.1128/JCM.02226-10] for photo quiz case presentation)

Balamuthia mandrillaris is a free-living amoeba that was first isolated in 1986 in the brain tissue of a mandrill baboon that died of necrotizing, hemorrhagic encephalitis (1). Over 100 cases of balamuthia amebic encephalitis (BAE) in humans have been described worldwide (2). The majority of patients develop rapidly progressing hemorrhagic encephalitis. Cutaneous infections have also been documented, with most of these patients ultimately developing central nervous system involvement (1). BAE has been reported in immunocompetent individuals; however, immunocompromised patients are more susceptible to infection (1). The majority of infections have occurred in hot, dry climates and in patients with soil contact. It has been suggested that the organism gains entry through the skin or lungs and disseminates hematogenously. Species of *Balamuthia* have recently been isolated in soil; however, unlike species of other free-living amoeba such as *Acanthamoeba* and *Naegleria*, they have not yet been isolated in water. Indirect immunofluorescent staining of the *Balamuthia* amoebal antibody in formalin-fixed tissue is the definitive test used for diagnosis, but the organism can also be detected by PCR, enzyme-linked immunosorbent assay, and indirect immunofluorescence of the serum (2). On tissue sections stained with hematoxylin and eosin, the vegetative trophozoite form of the organism measures 15 to 60 μm , has an irregular branching structure and one nucleus, and occasionally contains two or

more nucleoli. The dormant cyst form of the organism measures 13 to 30 μm , is round, and contains three walls; however, only two walls are visible using light microscopy (1). In contrast to *Balamuthia*, *Acanthamoeba* species contain only one nucleolus and two cyst walls. The majority of cases of BAE are detected postmortem, with a fatality rate greater than 98%. The few reported survivors have been treated with different combinations of antimicrobials, such as pentamidine, sulfadiazine, fluconazole, and clarithromycin. A recommended treatment regimen has not emerged. It has been speculated that this patient may have come into contact with *Balamuthia* while laying tile at construction sites.

REFERENCES

1. **Matin, A., R. Siddiqui, S. Jayasekera, and N. Khan.** 2008. Increasing importance of *Balamuthia mandrillaris*. Clin. Microbiol. Rev. **21**:435–448.
2. **Schuster, F. L., et al.** 2009. Under the radar: *Balamuthia* amebic encephalitis. Clin. Infect. Dis. **48**:879–887.

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