Closing the Brief Case: Cryptococcus gattii Meningitis with Ventriculitis


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ANSWERS TO SELF-ASSESSMENT QUESTIONS

1. What is the reservoir for Cryptococcus gattii?
   (a) Rodents
   (b) Plant matter
   (c) Avian guanos
   (d) Water

   Answer: b. C. gattii is an environmental organism most often associated with trees, including decomposing wood in tree hollows. Over 50 tree species provide an ecological niche for the organism.

2. In the United States and Canada, what clinical presentation was most often associated with outbreak cases due to C. gattii?
   (a) Central nervous system disease
   (b) Osteomyelitis
   (c) Pulmonary disease
   (d) Endocarditis

   Answer: c. In North America, outbreak cases have been dominated by respiratory disease, rather than central nervous system (CNS) involvement. Conversely, nonoutbreak cases are more frequently associated with CNS disease.

3. Which of the following statements correctly describes the biochemical basis for the reaction of C. gattii on L-canavanine–glycine–bromothymol blue agar?
   (a) A yellow-to-blue color change occurs because of an alkaline pH shift that occurs because C. gattii can use citrate as a sole carbon source and ammonium ions as the sole nitrogen source.
   (b) A yellow-to-blue color change occurs because of an alkaline pH shift that occurs when the urease enzyme produced by C. gattii hydrolyzes urea to ammonia.
   (c) A yellow-to-blue color change occurs because of an alkaline pH shift that occurs because C. gattii is able to grow in the presence of L-canavanine and utilize glycine as the sole source of carbon and nitrogen.
   (d) There is no color change because, although C. gattii can grow in the presence of L-canavanine, it does not utilize glycine.

   Answer: c. C. gattii can grow on media containing both glycine and L-canavanine, an arginine metabolite synthesized by leguminous plants. C. gattii produces glycine decarboxylase and is uniquely able to use glycine as a carbon and nitrogen source. The ammonia released when glycine is cleaved causes a pH change that turns the bromothymol blue indicator a cobalt blue color.

TAKE-HOME POINTS

- C. gattii usually affects normal, immunocompetent hosts, while C. neoformans typically infects immunocompromised individuals.
- Clinical symptoms range from a pneumonia-like illness to central nervous system infection. Respiratory disease is more pronounced in North American outbreak cases than in nonoutbreak cases.
- A cryptococcal antigen test on serum or cerebrospinal fluid is useful as a rapid first test to detect Cryptococcus infection, but the test does not differentiate between C. neoformans and C. gattii and should not be used to monitor response to therapy.
- C. gattii and C. neoformans are encapsulated yeasts that hydrolyze urea, produce melanin, as evidenced by dark brown colonies on birdseed or caffeic acid agar, and do not produce pseudohyphae. The distinguishing biochemical characteristics are that C. gattii grows on CGB agar and turns it blue within 2 to 5 days and that C. neoformans produces no color change.


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