

# A Mysterious Illness on Vancouver Island, British Columbia

by

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## Background

This mystery takes place on Vancouver Island, west of mainland Canada in the province of British Columbia (Figure 1). The island is just north of the state of Washington in the United States. This area has one of the warmest climates in Canada, and since the mid-1990s has been mild enough in a few areas to grow subtropical Mediterranean crops such as olives and lemons. In particular, Victoria, Vancouver Island has the mildest climate in Canada since the Pacific Ocean in this region maintains a constant temperature of 50 °F. Prevailing westerly ocean winds provide a buffer to warmer summer and cooler winter temperatures. Regional mountains also provide weather protection, and as a result, Victoria has low rainfall. The west coast of Vancouver Island is exposed to the moisture-laden westerly winds blowing off the warmer Pacific Ocean. The warm air masses are forced up by the island's mountain ranges resulting in considerable precipitation falling on the Pacific Rim region during the winter months of September to March. Summers are relatively dry.



Figure 1. Map of South Vancouver Island, [PD, <https://commons.wikimedia.org/wiki/File:Vancouver\\_Island\\_South.png>](https://commons.wikimedia.org/wiki/File:Vancouver_Island_South.png).



## Part II – Possible Suspects

One of the difficult things about a “mysterious illness,” especially when it appears to affect different organismal taxa, is how to identify the source of the infection.

### *Questions*

Based on what you know about organismal biology, what cellular and biochemical features or processes would you need to know to determine if the mystery illness is caused by a:

Bacteria?

Protist?

Fungus?

Plant?

Animal?

*(Your instructor will provide you with additional information before you answer the following question.)*

Based on what you know about organismal biology and the additional information provided by your instructor, what type of classification would you give to our mystery organism?

### Part III – The Culprit

The culprit of this mysterious illness is a fungus named *Cryptococcus gattii*, an encapsulated yeast (of the phylum, Basidiomycota) that lives in soil and in association with certain trees (Figure 2).

This fungus had never before been seen on the island, nor was it known to survive outside of the tropics and subtropics. Now, the fungus was present in British Columbia, although no one knew where it had come from or how long it had been there.



Figure 2. Pigmented (melanized) yeast colonies of *Cryptococcus gattii* on a Niger seed agar petri plate. Credit: Djspring, CC BY-SA 3.0, <[https://commons.wikimedia.org/wiki/File:Cryptococcus\\_gattii\\_selection.jpg](https://commons.wikimedia.org/wiki/File:Cryptococcus_gattii_selection.jpg)>.

#### Questions

1. Where might a tropical fungus *C. gattii* be able to survive on the island? What microhabitats provide possibly suitable areas for its growth?
  
  
  
  
  
  
  
  
  
  
2. Why would organisms on land and in water get sick?

## Part IV – More to the Story

Once *C. gattii* was identified and developed into an epidemic, scientists at the British Columbia Centre for Disease Control, as well as at the Centers for Disease Control and Prevention (CDC) in the United States, paid attention. Between 1999–2007, there were 218 cases noted in humans with 19 deaths (8.7%) in British Columbia. The disease continues, but at a lower rate and has spread to mainland British Columbia and northwestern United States (Washington and Oregon). People cannot spread it from person to person or person to animal. Incubation may be between 6 weeks to 11 months.

### Questions

1. How do you think that this fungus got to Vancouver Island?
2. Why “all of a sudden” were organisms getting sick?
3. Why is treating a fungal infection more difficult than treating a viral or bacterial infection?
4. What can be done to control the spread of the organism?