Case #128

NAME Educational Activities Committee

Case provided by:

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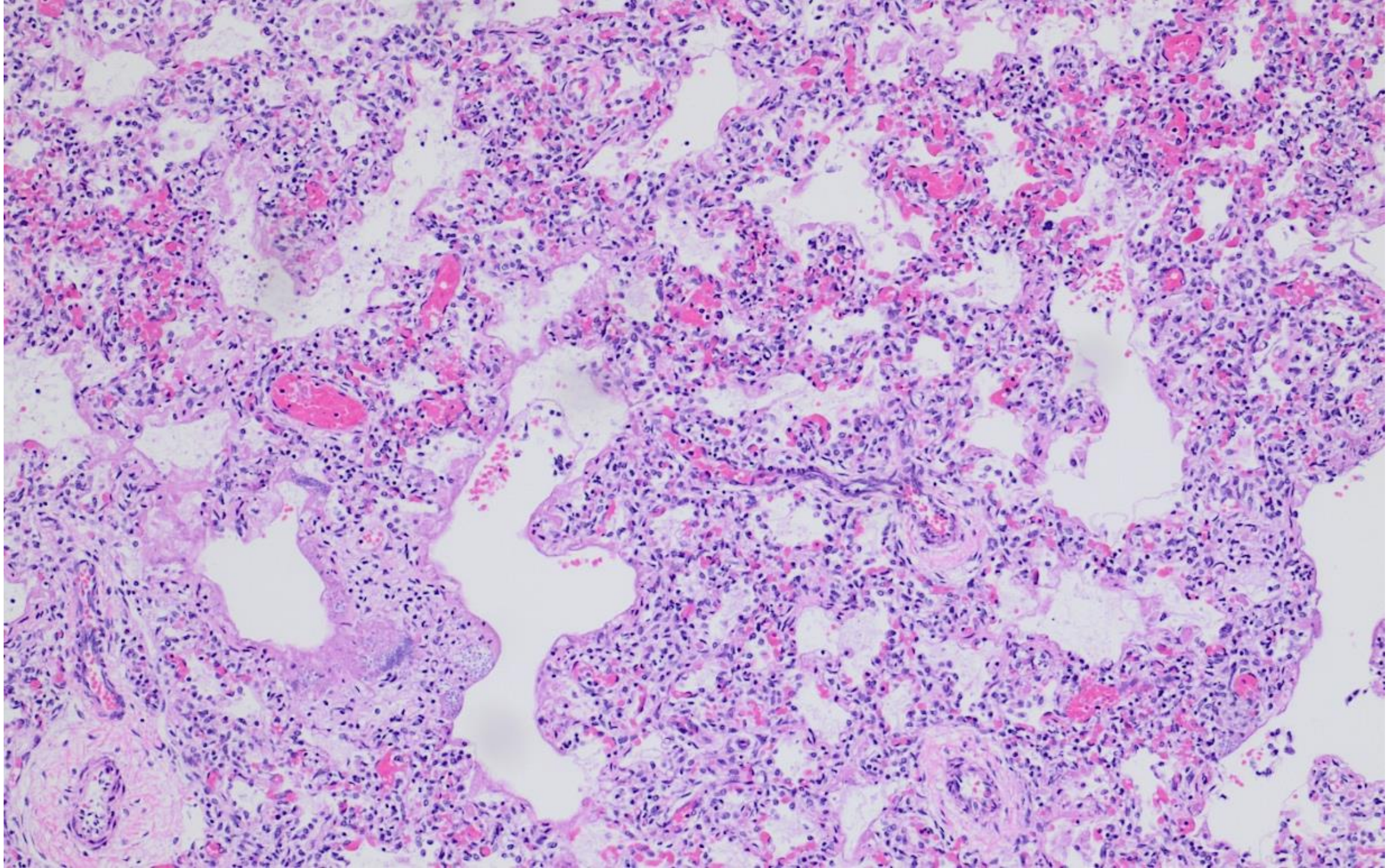
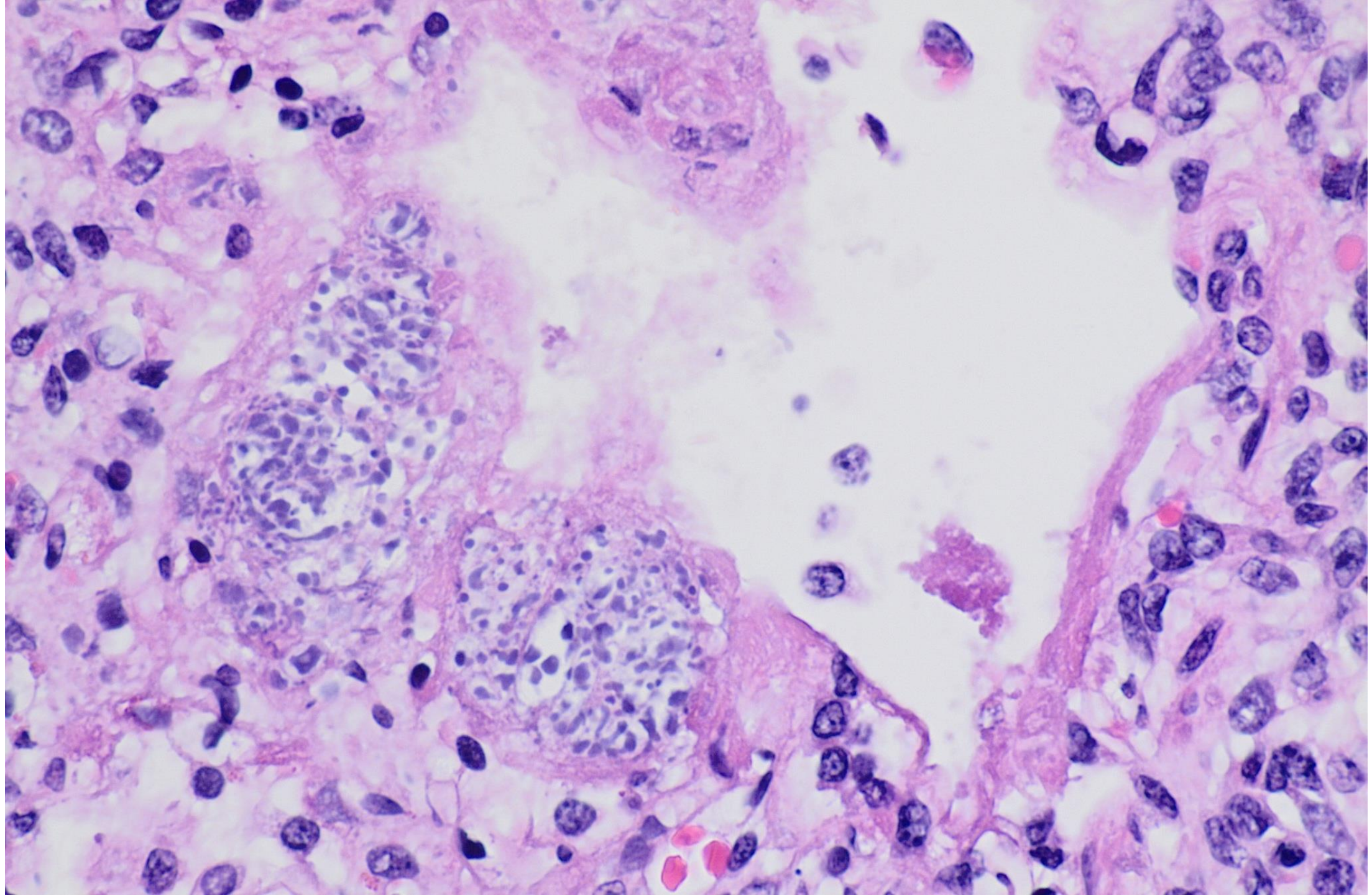
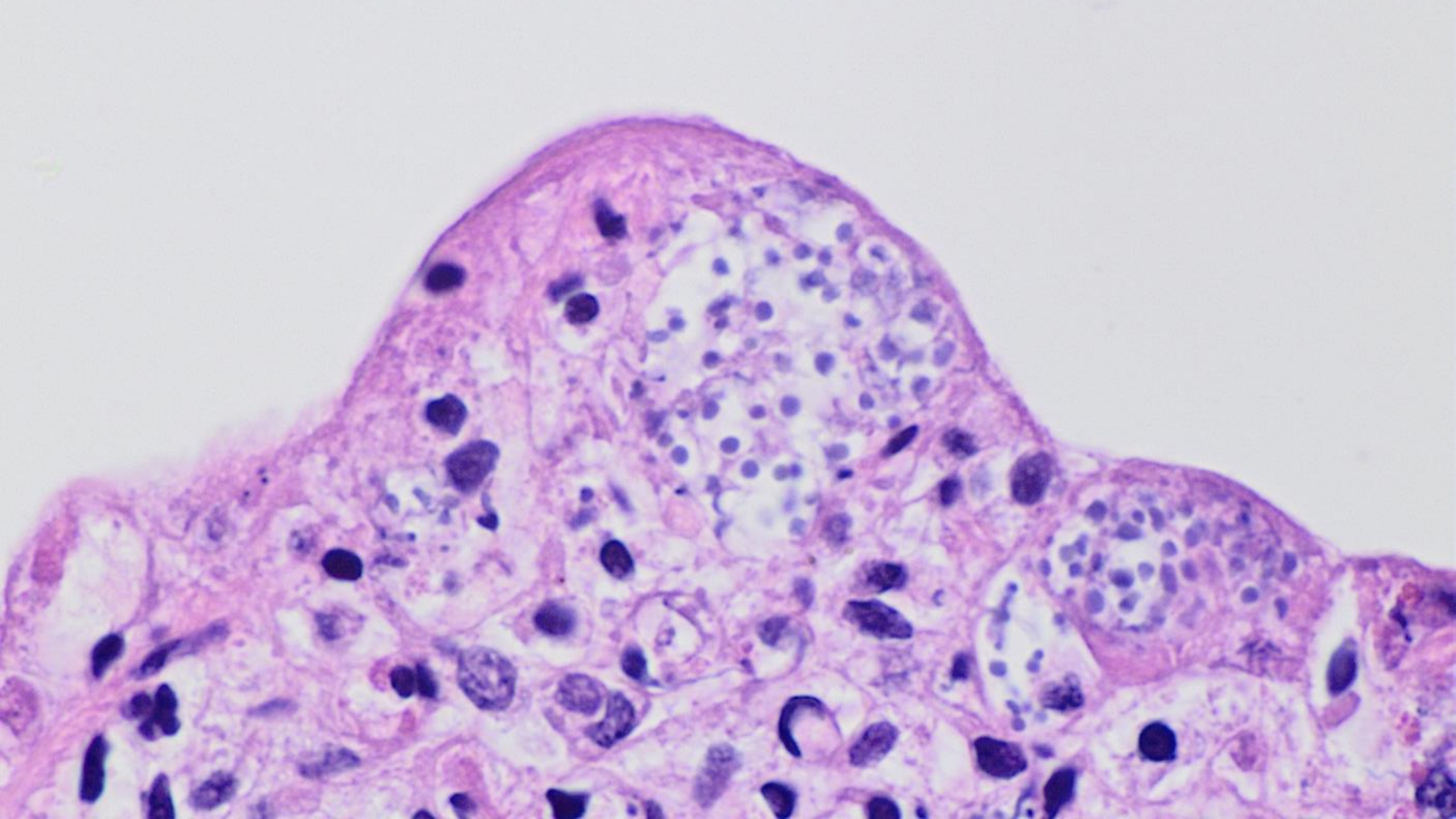
CASE HISTORY:

A 1-month-old baby boy living in Montana had been “not acting right” for about one day, with grunting-type respirations and vomiting. The baby was in mild respiratory distress when parents brought him to the emergency department. Shortly after labs were obtained, the infant stopped breathing, and resuscitation was unsuccessful. Those initial labs were negative for respiratory viruses including influenza, RSV, and COVID. He had been born at 36 weeks gestation to a mother with diabetes, but had normal development and well-child exams.

Autopsy was essentially unremarkable for gross pathology, and toxicology was negative. Histology revealed the pictured findings in the lungs:







QUESTION: What is the most likely source of exposure ultimately resulting in the death?

A. Gardening
B. Arthropod (insect/spider) bite
C. Wild animal
D. Domesticated animal

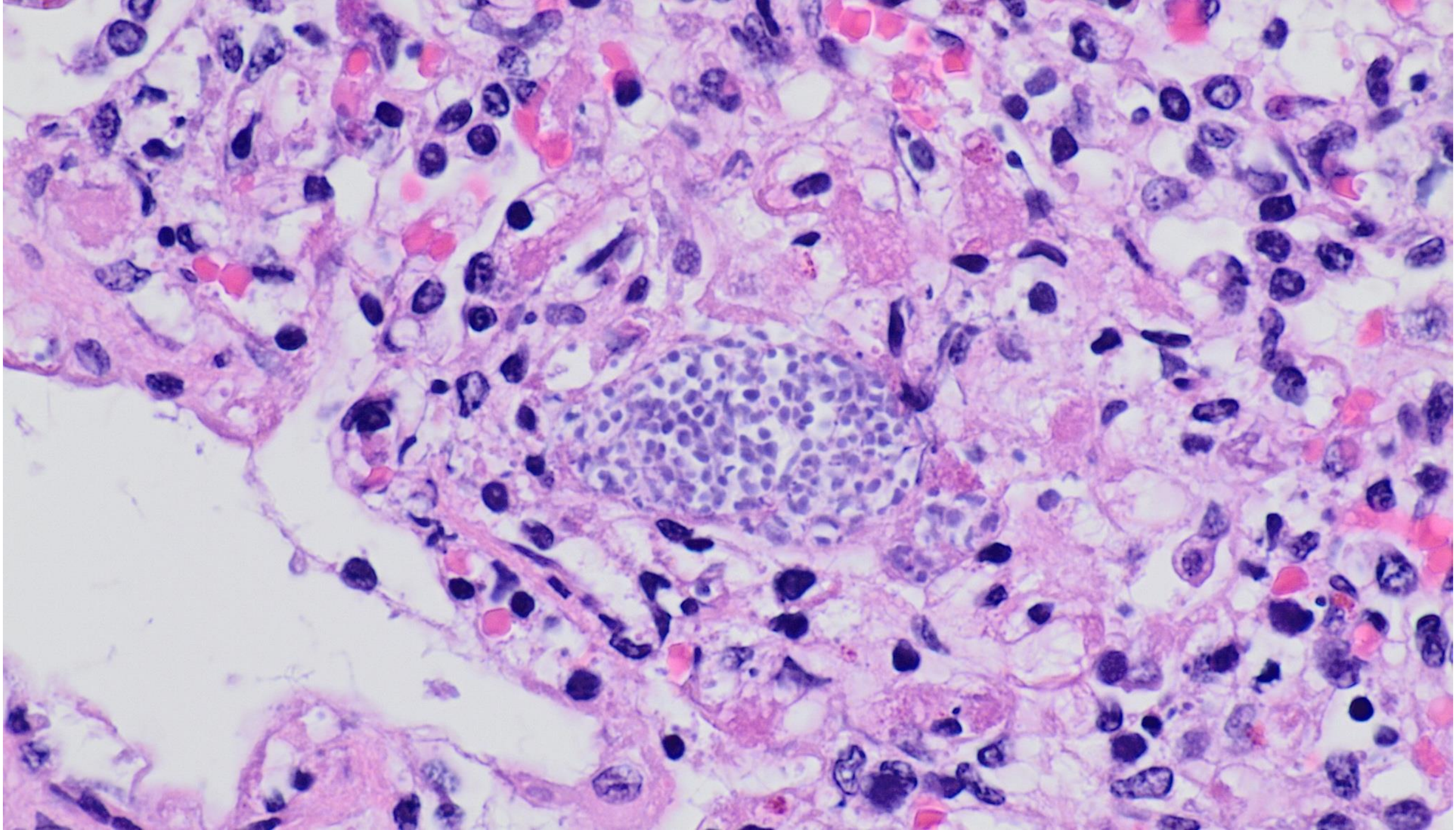
Answer…

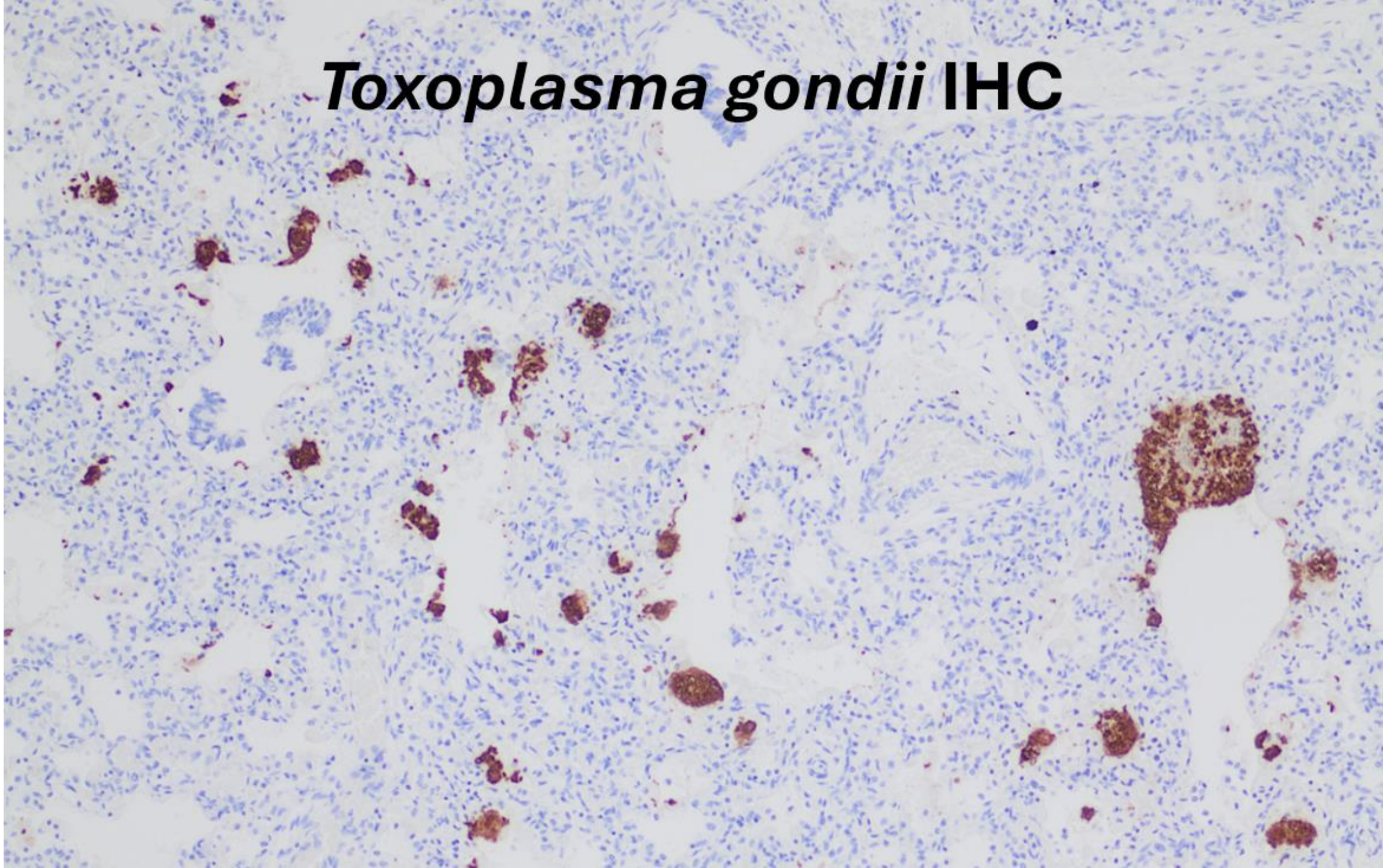
D. Domesticated animal

Microcystic lesions containing ovoid to crescent-shaped forms, smaller than adjacent cell nuclei but larger than typical bacteria, suggested a parasitic or less likely fungal infection. Immunohistochemistry confirmed ***Toxoplasma gondii*** **infection** (see additional images). The marked number of organisms in lung sections was associated with mononuclear cell infiltrate and fibrin deposition on airway surfaces. Cause of death was certified as *Toxoplasma gondii* pneumonia, which also explained the clinical presentation.

Toxoplasma gondii is a ubiquitous, zoonotic protozoan, with cats being the definite hosts that shed oocysts through feces into the environment. When assessing toxoplasmosis cases, inquiries about **exposure to cat feces** are essential. It is advised that pregnant women avoid changing cat litter for this reason, as vertical transmission via the placenta can lead to congenital toxoplasmosis. In this case, the family did indeed have a cat in the home. Exposure may also have occurred from interaction with livestock, ranching activities, drinking unpasteurized goat milk, etc., which are also related to domestic animals.

Toxoplasma gondii primary infections are usually asymptomatic, with latent infection persisting for life. Acute infection in immunocompromised persons or infants can result in rapid multiplication of the microorganisms, with *T gondii* tachyzoites penetrating any nucleated cell, forming a vacuole, and disseminating. Routine H&E staining can demonstrate these tissue cysts, measuring 15 to 100 µm, containing the parasites.




Toxoplasma gondii IHC

Other responses...

A. Gardening

Gardening and/or soil disruption can be an exposure related to certain fungi such as inhaling *Blastomyces* spores with resultant lung infection, or "rose gardener's disease" caused by *Sporothrix schenckii*.

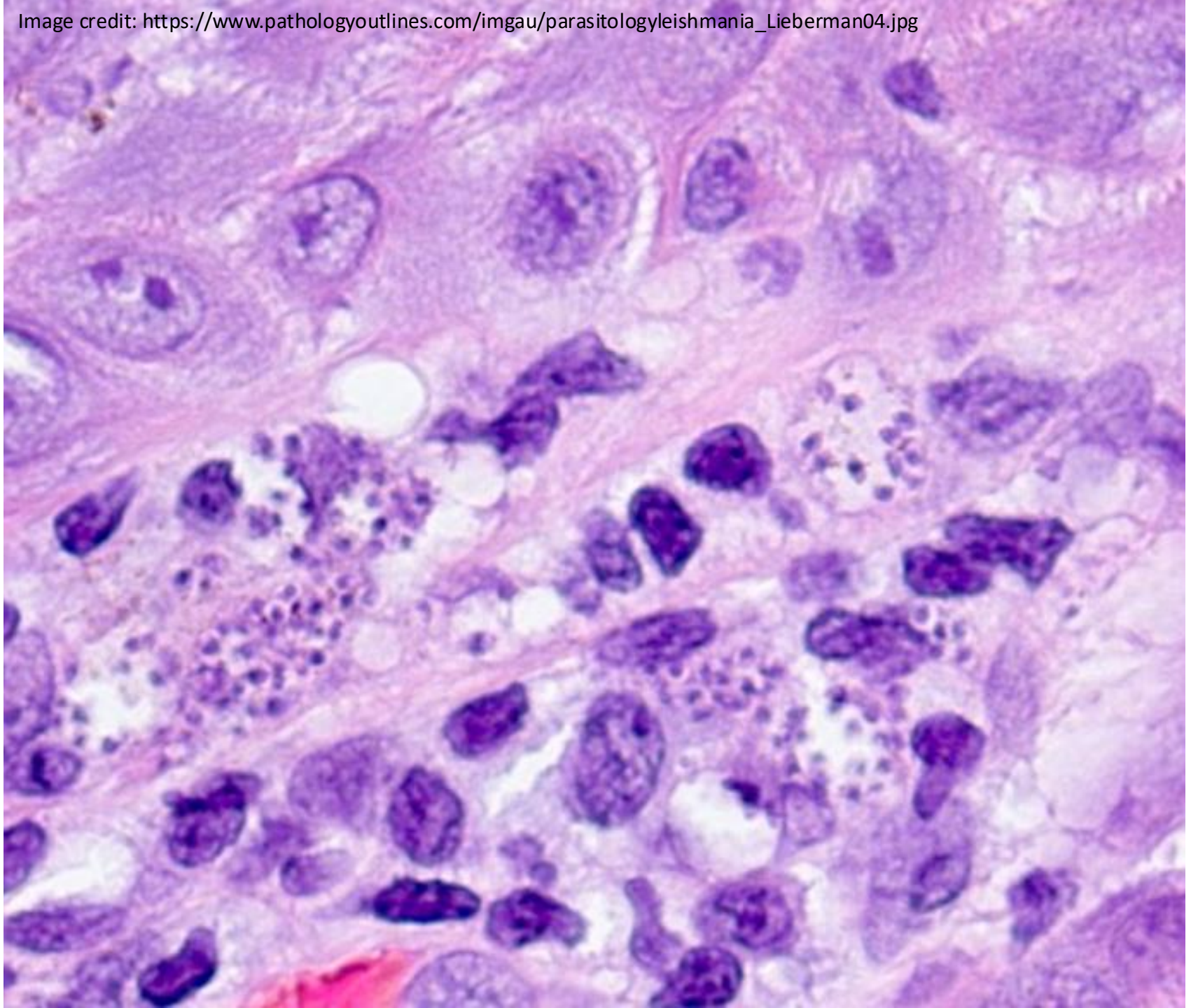
B. Arthropod (insect/spider) bite

Insects and arachnids can be vectors for a number of infectious microorganisms including bacterial (e.g., Lyme disease via ticks) and parasitic (Chagas disease with trypanosomes via triatomine “kissing” bugs, malaria via mosquitoes, leishmaniasis via sandflies).

Of note, **the microscopic appearance of Leishmaniasis is very similar to Toxoplasmosis** (see additional internet image). In this case, toxoplasmosis is more likely given the circumstantial and contextual information.

Histopathology of leishmaniasis

Image credit: https://www.pathologyoutlines.com/imgau/parasitologyleishmania_Lieberman04.jpg



C. Wild animal

Wild animal urine can be a source of bacterial leptospirosis infection, and roundworm infections with *Trichinella* are mainly spread when undercooked wild game is eaten, especially bear meat in North America.

REFERENCES

1. Cagle, P. T., Timothy Craig Allen, & Al, E. (2005). Color atlas and text of pulmonary pathology. Lippincott Williams & Wilkins, Cop.

2. Madireddy S, Mangat R. Toxoplasmosis. [Updated 2024 Oct 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. https://www.ncbi.nlm.nih.gov/books/NBK563286/

3. Dubey JP, Lindsay DS, Speer CA. Structures of *Toxoplasma gondii* tachyzoites, bradyzoites, and sporozoites and biology and development of tissue cysts. Clin Microbiol Rev. 1998;11(2):267-299.