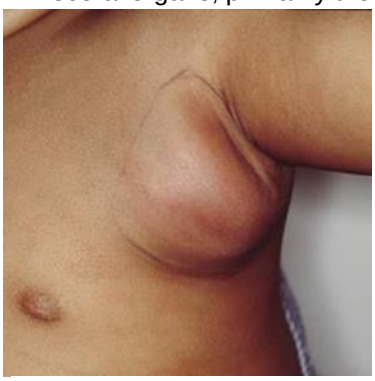
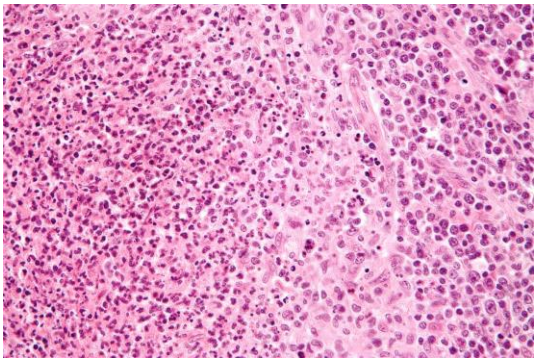
Bartonella

Bartonella henselae is a fastidious, slow-growing, gram-negative bacillus that is the most common causative organism of cat-scratch disease. The predominant clinical manifestation of cat-scratch disease (CSD) is regional lymphadenopathy/lymphadenitis. The highest incidence is found in children 5 to 9 years of age; infection occurs more often during the fall and winter. Children 14 years of age or younger account for 32.5% of all reported cases. Most patients with CSD are afebrile or have low grade fever with mild systemic symptoms such as malaise, fatigue, anorexia, and headache. A skin papule or pustule is often found at the presumed site of inoculation and will usually precede development of lymphadenopathy by 1-2 weeks. Less common manifestations of *B henselae* include culture negative endocarditis, ostemyelitis, prolonged fever with granulomata in the liver and spleen, and oculoglandular syndrome.. Among immunocompromised patients, primarily those with human immunodeficiency virus infection, *Bartonella henselae* is the causative agent of bacillary angiomatosis (vascular proliferative lesions of skin and subcutaneous tissue) and bacillary peliosis (reticuloendothelial lesions in visceral organs, primarily the liver). Additional species, such as *Bartonella clarridgeiae*, also have been found to cause cat-scratch disease. *B. henselae* is related closely to *Bartonella quintana*, the agent of louse-borne trench fever that caused significant illness and disease among troops during World War I, and also is a causative agent of bacillary angiomatosis.



Axillary lymphadenopathy in cat-scratch disease: image from Red

Cats are the natural reservoir for *B. henselae*, with a seroprevalence of 13% to 90% in domestic and stray cats in the United States. Other animals, including dogs, can be infected and occasionally are associated with human infection. Cat-to-cat transmission occurs via the cat fleas (*Ctenocephalides felis*), with feline infection resulting in bacteremia that usually is asymptomatic and lasts weeks to months. Fleas acquire the organism when feeding on a bacteremic cat and then shed infectious organisms in their feces. The bacteria are transmitted to humans by inoculation through a scratch, lick, or bite from a bacteremic cat or by hands contaminated by flea feces touching an open wound or the eye. Most patients have a history of recent contact with apparently healthy cats, typically kittens. Kittens (more often than cats) and animals from shelters or adopted stray cats are more likely to be bacteremic. There is no convincing evidence to date that ticks are a competent vector for transmission of *Bartonella* organisms to humans. No evidence of person-to-person transmission exists.



Gram stain of bartonella henselae. Image from: https://step1.medbullets.com/microbiology/104104/bartonella-henselae

The incubation period from the time of the scratch to appearance of the primary cutaneous lesion is 7 to 12 days; the period from the appearance of the primary lesion to the appearance of lymphadenopathy is 5 to 50 days (with a median of 12 days). *B. henselae* is a particularly fastidious organism and recovery by routine culture is rarely successful. Specialized laboratories experienced in isolating *Bartonella* organisms are recommended for processing of these cultures. If tissue (e.g. lymph node) specimens are available, bacilli may be visualized using a silver stain; however, this test is not specific for *B. henselae.* Early histologic changes in lymph node specimens consist of lymphocytic infiltration with epithelioid granuloma formation. Later changes consist of polymorphonuclear leukocyte infiltration with

granulomas that become necrotic and resemble granulomas from patients with tularemia, brucellosis, and mycobacterial infections. For testing of CSD, the indirect immunofluorescent antibody (IFA) can detect serum antibodies to antigens of *Bartonella* species. The IFA test is available at commercial labs and through the CDC, but because of cross-reactivity with other infections, clinical correlation is necessary for a diagnosis. Enzyme immunoassays for detection of antibodies to *B. henselae* have been developed, however, further investigation is needed to compare sensitivity and specificity to the IFA test. Additionally, PCR assays are available in some commercial and research labs for testing of tissue or body fluids.

Management of localized and uncomplicated cat-scratch disease from *B. henselae* primarily is aimed at relief of symptoms, because the disease usually resolves spontaneously. Antimicrobial therapy is recommended in acutely or severely ill immunocompetent patients with systemic symptoms, particularly those with retinitis, hepatic or splenic involvement, or painful adenitis. Reports suggest that several oral antibiotics may be effective, including azithromycin, clarithromycin, ciprofloxacin, doxycycline, trimethoprim-sulfamethoxazole, and rifampin. Also, IV gentamicin is typically effective as well. The optimal duration of therapy is not known but may be several months for systemic disease.

For immunocompromised patients, antimicrobial therapy is recommended because treatment of bacillary angiomatosis and bacillary peliosis has been shown to be beneficial. Oral agents such as azithromycin, clarithromycin, ciprofloxacin, doxycycline, trimethoprim-sulfamethoxazole, and rifampin are effective for treatment of these conditions and therapy should be administered for several months to prevent relapse in immunocompromised people. In these patients, doxycycline can be used for shorter durations (21 days or less) without regard to patient age. For longer treatment durations required for immunocompromised patients, doxycycline is not recommended in children younger than 8 years of age. For patients with unusual manifestations of *Bartonella* infection (culture-negative endocarditis, neuro-retinitis, disease in immunocompromised patients, endocarditis, osteomyelitis), consultation with a pediatric infectious disease expert is recommended.

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