Bartonella

Harmful emerging bacteria that induce damaging, hard-to-detect infections

Recent research has shown that *Bartonella* infection can present beyond the realm of Cat Scratch Disease (CSD) and has re-defined the role of *Bartonella* infection in both chronic and acute disorders

Symptoms and Conditions

Two types of presentations:

1 Acute

Cat Scratch Disease, an illness characterized by fever and lymph node swelling following a cat bite or scratch

2 Chronic

Moderate-to-severe and including debilitating conditions and symptoms, including neurologic, cardiac, vasoproliferative or rheumatologic

Bartonella can produce systemic disease and an assortment of symptoms in a variety of organ systems

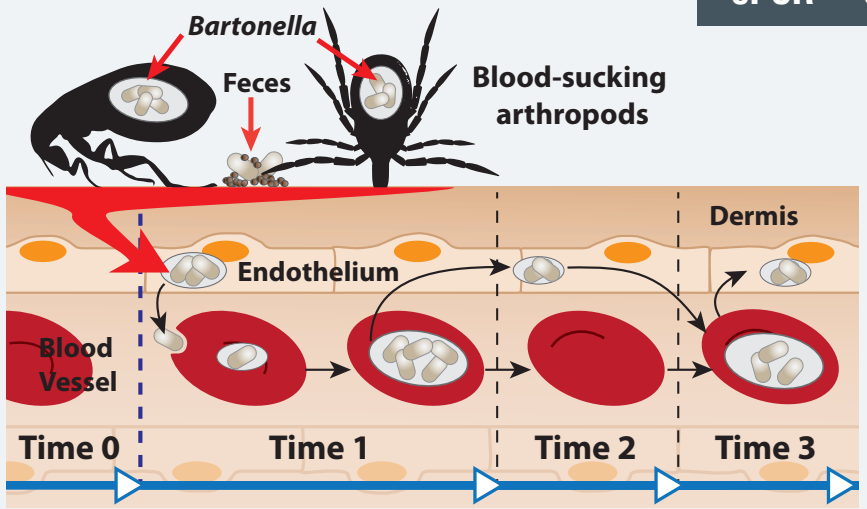
Non-specific/ General	Fever of unknown origin, granulomatous inflammation, fatigue, weight loss, irritability, headaches, migraines, rash
Cardiovascular/ Hematologic	Endocarditis, myocarditis, pericarditis, hemolytic anemia, hypertension, pulmonary thromboembolism, cardiac arrhythmias
Neurological	Hallucinations, vision loss, peripheral neuropathy, polyneuropathy, transverse myelitis, encephalopathy, areflexia, numbness, seizures
Ocular	Uveitis, retinal vasculitis vitritis, neuroretinitis, intraocular inflammation
Rheumatologic	Arthritis, arthralgia, chronic fatigue, myositis, myalgia, systemic vasculitis, osteomyelitis, bone pain
Vasoproliferative	Bacillary angiomatosis, peliosis hepatis, Carrion's disease

Risk Factors

- Outdoor or indoor exposure to fleas, biting flies, ticks and other arthropods
- Working or living with pets or other animals
- Naturally weakened or compromised immune systems due to age (younger children, adolescents, aging adults), cancer treatment, immune disorders and immune suppressive therapy

Up to 28% of symptomatic veterinarians and over 40% of chronically ill patients have tested positive for *Bartonella* using ePCR, compared to 0% of healthy controls (Lantos, 2014; Maggi 2012)

How does serial testing account for the cyclical presence of *Bartonella* in the blood?



Adapted from Harms, 2012

Our True Triple Draw™ method further addresses cyclical bacteremia by obtaining and testing three blood specimens during a 5–8 day period (e.g., M-W-F).

Why Are Conventional Diagnostics Inadequate?

IFA serology

- *Bartonella* avoid the immune response, resulting in an IFA false negative rate of up to 83% in chronically infected patients
- Cannot identify active infection
- Cross-reactivity with other bacteria is common
- Useful for monitoring treatment response

Standard PCR

- Infection is at low levels, resulting in a PCR false negative rate up to 90%

Culture

- *Bartonella* are difficult to grow without complex nutritional and growth conditions

Microscopy

- Cannot differentiate between a low-level *Bartonella* infection, other related organisms or processing artifacts

Cyclical Bacteremia

- *Bartonella* cycle in and out of the blood stream from tissues. Testing at a single point in time can result in false negatives simply because the bacteria are not in the blood at the time of patient sampling

ePCR™ overcomes these limitations

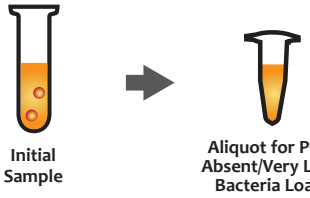
Animals exposed to fleas and ticks are likely to be infected with *Bartonella*. Up to 80% of stray cats, 50% of pet cats, and 4–28% of domestic dogs are exposed to *Bartonella* in their lifetime.

Why is *Bartonella* ePCR™ necessary for detection?

***Bartonella* ePCR** uses a specialized patented BAPGM™ enrichment medium and processes that exponentially grow *Bartonella* to levels that are detectable using PCR.

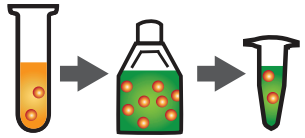
The *Bartonella* ePCR platform detects active, low-level infections.

Without Enrichment Culture



Risk of FALSE NEGATIVES

With BAPGM™ Enrichment Culture



Greater sensitivity and more TRUE POSITIVES verified by DNA sequencing

The ePCR Advantage

Trusted expertise in *Bartonella* research and diagnostics

- BAPGM processes **increase sensitivity for low-level and cyclical infections**
- Multiple genus-level PCRs **designed to detect all pathogenic *Bartonella* species**
- DNA sequence verification **confirms positives and identifies infecting species**
- True Triple Draw method **further accounts for cyclical bacteremia**

Healthy Pets, Healthy Families™

Bartonella infection can result in severe, life-threatening symptoms in both humans and companion animals, including dogs, cats, and horses.

The good news is that infection is both treatable and preventable, especially when detected early.

Find it. Treat it. Prevent it.

- Learn about important diseases, like *Bartonella*, that pets can acquire from arthropods and accidentally spread to families
- Practice flea and tick prevention to protect everyone from *Bartonella* infection
- Use the right test when you suspect *Bartonella* infection to ensure appropriate and timely treatment
- Consider testing healthy animals with a history of flea and tick exposure for *Bartonella*

***Bartonella* ePCR** was developed by infectious disease researchers at North Carolina State University. The ePCR platform is based on over 20 years of research experience and more than 100 scientific publications on human and animal *Bartonella*.

Up-to-date information on emerging zoonotic and vector-borne infectious disease is available at **www.galaxydx.com**

Galaxy Diagnostics, Inc.
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***Bartonella* ePCR** is compliant with the federal Clinical Laboratory Improvement Amendments (CLIA), which requires that all laboratories testing human specimens be certified by the federal government. Results from testing are to be used in conjunction with clinical findings to establish diagnosis.

Coming Face-to-Face with *Bartonella*

Are you suffering from a **chronic illness**? **Are your symptoms not improving?**

Do you have exposure to fleas, lice, ticks or companion animals?

You may have ***Bartonella***, a stealth infection that is extremely difficult to accurately diagnose.

GALAXY diagnostics

Best in Bartonella Testing