Tick-Borne Condition Alpha-Gal: Info on It & for Those with Alpha-Gal

Alpha-gal is a sugar molecule found in most mammals (not people, apes, monkeys) and in products made from mammals including medications, vaccines, cosmetics, gelatin and milk products. It is not normally found in fish, reptiles or birds. Alpha gal is also found in some types of ticks. [Click here for CDC website on Alpha-gal](https://www.cdc.gov/alpha-gal/

What is known is that Alpha-gal allergy is an allergy to that alpha-gal molecule and it now appears to be associated with the bite of lone star ticks in the US. Other ticks may be involved, but the science is not yet settled in this newly emerging area. Alpha-gal is also found in other countries associated with the bite of different ticks.

**Symptoms can include:** Rash, Hives, Difficulty breathing, Drop in blood pressure, Dizziness or faintness, Nausea or vomiting, and Severe stomach pain, which commonly appear 3-6 hours after eating meat (e.g., beef, lamb, pork, venison, and rabbit) or exposure to products containing alpha-gal. They may not occur
after every exposure and can vary with individuals.

**CDC**: Alpha-gal allergies can be severe, and even life-threatening. See a healthcare provider immediately if you are concerned about a severe allergic reaction.

Diagnosis can be made by an allergist, or other healthcare provider, through detailed patient history, physical examination, and a blood test for specific antibodies, IgE, to alpha-gal.

**Patients with Alpha-gal Syndrome**: There is a non-profit devoted to the identification, diagnosis, treatment, and prevention of tick-borne diseases, including alpha-gal, and other lesser known diseases. They are conducting a research study survey of people with Alpha-gal. If you are interested in more information on it: See Alpha-gal on the TBC United website. By clicking the link, you will have left the LDA website. The link is provided for you as a service. The LDA does not have a position on the information provided or on the study.


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**Alpha-gal/Meat Allergy**
Meat allergy caused by the bite of the deer tick, *Amblyomma americanum*.

The tick’s saliva triggers immune response to a carbohydrate, alpha-gal, found in red meat. Although eating red meat is the most common allergic trigger to alpha-gal, ingredients found in everyday products such as dairy, gelatin, soap, cosmetics, lotions, household products, and medications can also cause an allergic reaction.*

Symptoms: Can develop 3-4 hours after exposure and include upset stomach, headaches, hives, rashes, swelling, shortness of breath, anaphylaxis.

* The Tick-Borne Conditions United, [www.tbcunited.org](http://www.tbcunited.org) website can provide additional information for you about alpha-gal. NOTE: If you click on the link, you will have left the [www.LymeDiseaseAssociation.org](http://www.LymeDiseaseAssociation.org) website. The information presented there is that of the Tick-Borne Conditions United.

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Tularemia
Tularemia is caused by a bacterium, *Francisella tularensis*, transmitted by ticks.

It can also be transmitted by contact with infected animal, contaminated water, contaminated aerosols or agricultural dust, bioterrorism.

Symptoms can include headache, chilliness, vomiting, aching pains, fever, swollen glands, sweating, weight loss, debility, infection site developing into an ulcer.

Treatment can include streptomycin or gentamicin.

Ticks that transmit tularemia include *Ixodes scapularis* (black legged/deer tick), *Amblyomma americanum* (lone star), *Dermacentor variabilis* (American dog) and *Dermacentor andersoni* (wood).
Tick paralysis

Caused by a neurotoxin secreted by *Dermacentor variabilis* (American dog), *Dermacentor andersoni* (Rocky Mt. wood), *Ixodes scapularis* (deer/blacklegged), and *Amblyomma americanum* (lone star ticks).

Symptoms begin 2-6 days after attachment and primarily involve a paralysis that begins in the feet and spreads upward. May be fatal if respiratory muscles involved.

Paralysis resolves when tick is completely removed, usually within 24 hours of removal.

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Q fever is caused by *Coxiella burnetti* (Cb). Disease can be tick-borne, but most cases result from inhaling Cb-containing dust. Cattle, sheep and goats are the primary reservoirs.

Symptoms include high fevers up to 105°F, severe headache, malaise, myalgia, chills and/or sweats, cough, nausea, vomiting, diarrhea, abdominal pain, chest pain, and may include endocarditis, encephalitis, pneumonia, hepatitis, splenomegaly.

Acute symptoms include hepatitis and pneumonia or chronic endocarditis.

IFA titers are used for diagnosis. Usually treated with doxycycline. Ticks that transmit Q fever include *Amblyomma americanum* (lone star tick) and *Dermacentor andersoni* (Rocky Mountain wood tick).
Rocky Mountain Spotted Fever

Rocky Mountain spotted fever (RMSF) is caused by the bacterium Rickettsia rickettsii.

Symptoms include fever, headaches, myalgia; characteristic spotted rash* begins on wrists, ankles, palms, and soles, and may be absent early in the disease. Treatment is usually doxycycline. *RMSF rash photo courtesy of Ed Masters, MD.

Humans and pets may contract RMSF. RMSF maybe life threatening. Need to get early appropriate treatment.

Ticks that transmit Rocky Mountain spotted fever include Dermacentor variabilis (American dog), Dermacentor andersoni (wood tick), Rhipicephalus sanguineus (brown dog), and possibly Amblyomma americanum (lone star).

See: A 5-Year-Old Gone Too Soon from Untreated Rocky Mountain Spotted Fever
(from Department of Defense – CDMRP)

Also see: American Dog Ticks, Bears, & RMSF

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Borrelia miyamotoi

Borrelia miyamotoi is a bacteria is in the relapsing fever group of Borrelia. Although it’s not closely related to the Lyme disease bacteria, it can cause a Lyme-like-illness. Symptoms include fever, headaches, muscle aches and chills, rash uncommon. Diagnosis is by PCR testing that is now available at several labs. Treatment is doxycycline. Borrelia miyamotoi was identified in 1995 in ticks from Japan. The bacteria is now transmitted by two ticks in the US, Ixodes scapularis (black-legged/deer tick) and Ixodes pacificus (western black-legged tick).

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Powassan (POW)

Powassan (POW) is caused by a flavivirus. There are two virus types. One virus type is transmitted by the deer tick/blacklegged tick (*Ixodes scapularis*): lineage 2 POW virus (“deer tick virus”). The other virus type is transmitted by other *Ixodes* ticks — *Ixodes marxi* (squirrel tick), and *Ixodes cookei* (woodchuck tick—found E. of Rockies into New England & Canada): lineage 1 POW virus. The Rocky Mountain Wood tick (*Dermacentor andersoni*) and *Ixodes spinipalpus* can also transmit the virus.

Humans are “dead end” hosts (ticks can’t pick up disease from them).

Transmission time can be within minutes of the bite. Incubation period is 1 week to 1 month after a bite.

Symptoms include headache, fever, nausea, vomiting, stiff neck, and sleepiness, breathing distress, confusion, tremors, seizures, paralysis, and possible coma. Encephalitis and meningitis can occur — 10% of encephalitis cases result in death.

Survivors of POW: 50% have permanent neurologic problems — Headaches, muscle wasting, memory problems

Supportive treatment is the only available treatment.

Tests for POW: Serum or CSF to detect virus-specific IgM & neutralizing antibodies

“Powassan could become epidemic like Lyme disease. Because it can be a serious disease causing fatalities and there is no treatment for it, Powassan has the potential to become a greater of a public health threat than Lyme disease.” —
Rickettsia 364D

Rickettsia species 364D (Rickettsia philipii), the etiologic agent of Pacific Coast tick fever (PCTF). Transmitted to people by the Pacific Coast tick, Dermacentor occidentalis. As of 2016, fourteen cases (14) cases reported (all in California); 1st case in 2008. Most cases in Northern CA. The Pacific Coast tick’s range includes most of California, southern Oregon, and northern Baja California, Mexico.

Symptoms: Fever, headache, eschar(s) [Eschar is dead tissue that falls off (sheds) from healthy skin.]

Click here for journal article on Pacific Coast Tick Fever

Left: Pacific Coast Tick – Female, Male and Nymph (Photo: Ervic Aquino, CA Dept.)
Ehrlichiosis/Anaplasmosis

Scientists used to separate ehrlichiosis into two entities caused by the bacterium *Ehrlichia*: Human Monocytic Ehrlichiosis (HME) and Human Granulocytic Ehrlichiosis (HGE). After further study, they determined that HGE is actually caused by a bacterium, *Anaplasma phagocytophilum*. HME is caused by a bacterium, *Ehrlichia chaffeensis*.

Symptoms of ehrlichiosis/anaplasmosis include: fever, malaise, headaches, chills, severe muscle aches, vomiting, anemia, lung infection, decreased white blood cells and platelets, elevated liver enzymes, seizures, encephalopathy, meningitis, confusion, ataxia and cranial nerve palsy. Co-infection with Lyme can cause more severe symptoms. Death can result.

Treatment is with doxycycline.

Ticks that transmit anaplasmosis include *Ixodes scapularis* (deer tick or black legged tick) and *Ixodes pacificus* (western black legged tick).

Ticks that transmit ehrlichiosis (HME) include *Amblyomma americanum* (lone star) and *Dermacentor variabilis* (American dog). *Ixodes scapularis* (deer tick or black legged tick) and *Ixodes pacificus* (western black legged tick) ticks have been
shown to carry the ehrlichiosis bacterium, but to date, transmission is still in question.