

Alpha-Gal Syndrome (Red Meat Allergy)

Fact Sheet No. 18-092-1219

What is Alpha-Gal Syndrome and what causes it?

Alpha-Gal Syndrome, also known as mammalian meat allergy or red meat allergy, is a recently discovered allergic reaction to red meat (beef, lamb, pork, venison, rabbit, and so forth) and other products made from mammals (including some medications, cosmetics, vaccines, gelatin, and milk products). Alpha-gal is a sugar molecule not found in humans, fish, reptiles or birds but present in the cells of most mammals. Growing evidence suggests that this reaction may be associated with a tick bite. Alpha-gal has been found in lone star ticks (*Amblyomma americanum*) and blacklegged ticks (*Ixodes scapularis*) in the United States, but it can be found in other tick species in Europe, Australia, and Asia. At this time, more research is needed to better understand who is at risk for developing Alpha-Gal Syndrome and how tick exposure contributes.



Distribution of known cases of Alpha-Gal Syndrome, from Commins, et al. 2011

What are the symptoms of Alpha-Gal Syndrome?

Signs and symptoms of an alpha-gal allergic reaction include hives; swelling of the lips, face, tongue, or throat; shortness of breath; and anaphylaxis. Often, people will experience abdominal pain, diarrhea, and vomiting; these can occur along with other symptoms or by themselves. Anaphylaxis is a potentially life-threatening allergic reaction that restricts breathing and requires emergency medical treatment. It is important to note that these signs and symptoms may not appear for 3 to 6 hours after eating red meat or exposure to products containing the alpha-gal molecule. Drinking alcohol or exercising may reduce the time until a reaction occurs. Exposure to alpha-gal by injection (from a medication or vaccine) may also result in a more rapid allergic reaction.

What are some risk factors for Alpha-Gal Syndrome?

Studies are still being conducted to better understand who is at risk for developing Alpha-Gal Syndrome. Most cases of Alpha-Gal Syndrome have been reported in the Southeastern and Midwestern United States. Children and adults can develop Alpha-Gal Syndrome. However, most cases of Alpha-Gal Syndrome appear to be in people >50 years of age. Tick bites, especially lone star tick bites, may be associated with this allergy. People who spend a lot of time outdoors, especially in or near wooded areas with thick underbrush (the preferred habitat of lone star ticks) may be at increased risk. Lone star ticks can be found in many habitats and are often found in "edge" habitats between a mowed area and a wood line. Ticks are active from late spring through early fall and are especially numerous in the Southeastern and Mid-Atlantic United States.

How is Alpha-Gal Syndrome diagnosed?

Alpha-gal allergic reactions can be severe and life-threatening. Immediately see a healthcare provider if you are concerned about a severe allergic reaction. Otherwise, if Alpha-Gal Syndrome is suspected, make an appointment with a primary care provider or allergy specialist. Your healthcare provider will typically ask for a detailed history about exposure to ticks and allergy symptoms; the provider will perform a physical exam and bloodwork to look for specific antibodies (IgE) to alpha-gal. High levels of IgE antibodies along with symptoms suggest a diagnosis of Alpha-Gal Syndrome. If the alpha-gal IgE test is not available, doctors can perform a skin test in which they prick the skin and expose it to small amounts of substances extracted from products containing alpha-gal. If allergic, a raised bump (hive) will develop at the test site on the skin.

How is Alpha-Gal Syndrome treated?

Alpha-Gal Syndrome is treated similar to most other food allergies. You can manage symptoms by avoiding red meat and products that may contain alpha-gal; this includes mammalian food products such as red meat, meat-based gravies or sauces, gelatin from animal sources, foods cooked with lard, and high-fat dairy products such as whole cream and ice cream. Talk to your doctor before starting any new medication or before receiving vaccines as some products may contain alpha-gal.

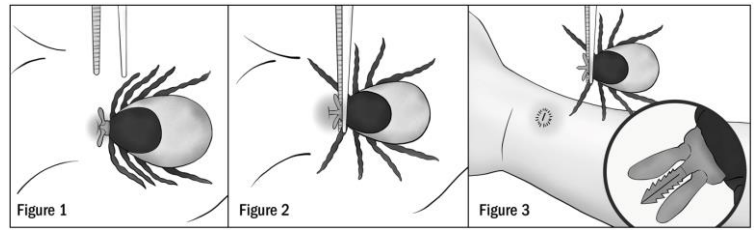
Antihistamines and other allergy-reducing medications may be used to control allergy symptoms. For a severe allergic reaction, an emergency injection of epinephrine and a visit to the emergency room may be necessary. Many people with allergies carry an epinephrine autoinjector such as an EpiPen®. It has been found that over time some people with Alpha-Gal Syndrome stop showing symptoms of an allergic reaction after exposure.

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COM 410-436-3613/DSN 312-584-3613/Web site: <http://phc.amedd.army.mil>
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How can Alpha-Gal Syndrome be prevented?

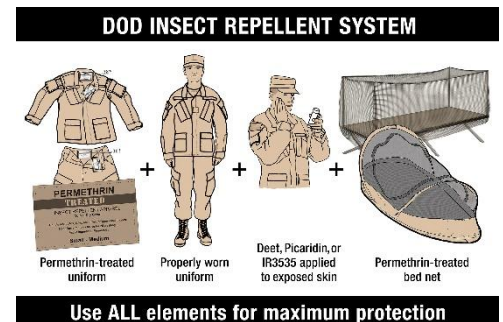
Take steps to avoid tick bites until additional research can clarify the association with alpha-gal allergy, tick bites, and other risk factors. It is recommended to use the DoD Insect Repellent System to protect against ticks and mosquitoes. The system includes using permethrin repellent on the uniform; applying DEET, picaridin, or IR3535 repellent to exposed skin;



wearing uniforms properly; and sleeping inside a permethrin-treated bed net in tick habitat. It is also important to check your skin and clothing for ticks routinely while in tick habitat; also, check your whole body carefully once indoors. A friend can help you check areas you cannot see. Attached ticks should be removed as soon as they are found by using sharp tweezers. Hold the tick as close to the skin as possible and apply steady upward pressure with the tweezers (Figures 1-3). To remove ticks from clothing, put clothes in a dryer on high heat for 10 minutes, and the ticks will die. Ticks removed from military personnel, their dependents, or DoD Civilians can be submitted for identification and disease testing through the APHC's DoD Human Tick Test Kit Program: <http://phc.amedd.army.mil/topics/envirohealth/epm/Pages/HumanTickTestKitProgram.aspx>

What can I use to treat my clothing with permethrin?

Factory-treated permethrin Operational Camouflage Pattern uniforms (OCP Permethrin) are now available to all Soldiers. The OCP Permethrin trouser and coat will have a sewn-in label indicating the uniform is factory-treated with permethrin. Untreated uniforms worn by other Services can be field-treated using either the IDA kit (NSN 6840-01-345-0237), which can last up to 50 washings, or the 0.5% aerosol spray can (NSN 6840-01-278-1336), which should be reapplied after 6 weeks and the sixth washing. When applying permethrin, always read and follow the label directions. Permanently mark the uniform label with the permethrin field-treatment date. **NEVER APPLY PERMETHRIN TO THE SKIN!** Aerosol products containing 0.5% permethrin and clothing factory-treated with permethrin are also commercially available for Civilian use.



What are the standard military insect repellent products available for use on exposed skin?

Approved military insect repellents for use on exposed skin come in a variety of formulations. Always refer to the label to determine frequency of repellent application based on activity. Do not apply repellent to eyes, lips, or to sensitive or damaged skin. Available military repellents (pictured in the photograph on the right) are:

- Cutter® pump spray (NSN 6840-01-584-8598) contains 25% DEET; repels mosquitoes for up to 10 hours; also repels ticks, chiggers, biting flies, no-see-ums, gnats, and fleas.
- Ultra 30™ Insect Repellent Lotion (NSN 6840-01-584-8393) contains 30% Lipo DEET; repels mosquitoes, ticks, chiggers, biting flies, sand flies, and fleas.
- Bullseye™ Bug Repellent pump spray (NSN 6840-01-656-7707), contains 20% IR3535®; repels mosquitoes and ticks for up to 8 hours.
- Natrapel® pump spray (NSN 6840-01-619-4795) contains 20% picaridin; repels mosquitoes and ticks for up to 12 hours, also repels chiggers, biting flies, stable flies, black flies, sand flies, and gnats for up to 8 hours.
- Ultrathon™ (NSN 6840-01-284-3982) contains 34% controlled-release DEET; repels mosquitoes for up to 12 hours, also repels ticks, chiggers, biting flies, deer flies, gnats, and fleas.



Where can I go to find additional resources?

More information about Alpha-Gal Syndrome can be found at: <https://www.cdc.gov/ticks/alpha-gal/index.html>

For a technical overview: Commins, Scott P., et al. 2011. The relevance of tick bites to the production of IgE antibodies to the mammalian oligosaccharide galactose- α -1, 3-galactose. *Journal of Allergy and Clinical Immunology*, 127.5: 1286-1293.