

# Alpha-Gal Syndrome Basics

## What is Alpha-Gal syndrome?

Alpha-gal syndrome (AGS), also known as "red meat allergy" or "mammalian allergy," is an allergic reaction to a carbohydrate called galactose-alpha-1,3-galactose or alpha-gal for short. Alpha-gal is found in the meat, organs, and other parts of animals classified as mammals. All mammals contain the alpha-gal sugar molecule, with the exception of humans, Old World monkeys, and apes.

## Cause

In the United States, the lone star tick (*Amblyomma americanum*) (Figure 1) is the main tick linked to AGS. It is mostly found in the Midwest, Eastern, and Southeastern parts of the United States. AGS has also been found in other parts of the world including Japan, the Middle East, South America, Europe, Africa, East and South Asia, Australia, and New Zealand, where different kinds of ticks are responsible.

When the tick bites, it introduces alpha-gal into the body. This can trigger an immune response to produce IgE antibodies, which leads to an allergic reaction later when the person consumes mammalian products. Not every tick bite causes AGS, and not everyone who is



**Figure 1:** Lone Star Tick (*Amblyomma americanum*). Photo: Yoonseong Park, Kansas State University Entomologist

bitten will get the condition. The reasons why are still being studied.

## Manifestation/Symptoms

In a typical allergic reaction, to a bee sting or peanuts, for example, the symptoms appear within minutes of exposure to the allergen. With AGS, allergic reactions can happen 2 to 8 hours after consuming red meat or mammalian meat. This delay happens because the food must be digested and absorbed into the bloodstream before it can trigger an allergic response. This process can take several hours (Figure 2). Symptoms include:

- Hives
- Skin rashes
- Swelling of the lips, tongue, throat, and eyelids
- Wheezing
- Heartburn
- Dizziness or faintness
- Gastrointestinal discomfort (e.g. abdominal pain, nausea, vomiting, and diarrhea)
- Anaphylaxis, characterized by symptoms like low blood pressure, swollen tongue or throat, trouble breathing, weak pulse, nausea, vomiting or diarrhea, dizziness or fainting (in severe cases this could be life-threatening).
- Atypical symptoms include arthritis, chronic urticaria, and swelling of the lips and tongue.

Not everyone has the same symptoms. If you experience very severe symptoms like difficulty breathing, dizziness, trouble swallowing, or full-body redness, don't delay and go to emergency services.

## Foods and products to avoid if you have AGS

- Mammalian meat such as pork, lamb, beef, and organ meats such as liver, kidney, etc.
- Meat broth, stock, gravy, bacon in salads, lard.

- Dairy products (milk, yogurt, cheese, butter, milk-based ice cream, milk-based kefir, whey protein).
- Gelatin-based foods such as candies, desserts, jellybeans, puddings, gummy bears, and marshmallows.
- Gelatin-based medications and vaccines. To check medications, see the resource list on page 3.
- Bovine extract (used to manufacture bioprosthetic valves)
- Carrageenan (food additive derived from seaweed but contains alpha-gal epitopes). Carrageenan is sometimes found in personal care products, such as toothpaste and shampoos, or used as a food additive to serve as a moisturizer, thickener, and emulsifier.
- Medications derived from mammalian-based ingredients
- Lanolin, a yellow fat from sheep, is used in topical products and vitamin D supplements.
- Glycerin, mammal-derived, can be used in topical products, medications, and foods to preserve moisture and texture.
- Magnesium stearate, used as a food emulsifier, binder, thickener, and lubricant.

## Diagnosis

AGS is often undiagnosed and misdiagnosed due to its relatively recent discovery and the atypical and often delayed onset of clinical symptoms. Diagnosis is based on clinical history and blood tests. Clinical history includes a detailed patient history that may include a delayed allergic reaction after consuming or being exposed to mammalian products and a history of tick bites. A blood test can help confirm AGS in people who have signs of the condition. According to the Centers for Disease Control and Prevention, “The blood test looks for specific IgE

antibodies that the immune system produces in response to alpha-gal. However, a positive alpha-gal sIgE test does not mean a person has AGS. Providers should consider the tests along with symptoms, whether allergic reactions are delayed, and history of recent tick bites or outdoor exposure.”

## Risk Factors

People who live in the South, East, and Midwest parts of the United States are more likely to be around lone star ticks.

People who have pets, live in rural areas, or spend a lot of time outdoors — such as farmers, foresters, ranchers, hunters, hikers, and campers — have a higher chance of being bitten by ticks and may be more likely to get AGS.

## AGS Management

There is currently no cure for AGS. The primary recommendation for individuals with AGS is to avoid consuming mammalian products and their byproducts. Cooking does not reduce the amount of alpha-gal in foods. They should also be careful with personal care products that may contain ingredients derived from mammals.

Certain factors can increase the likelihood of AGS reactions. These include some medications (for example, nonsteroidal anti-inflammatory drugs (NSAIDs, for pain relief), exercise, and alcohol. These factors may increase the likelihood of a reaction occurring, even with a small amount of alpha-gal.

Managing AGS can be difficult. Be cautious not to follow a diet that is too restrictive and be mindful of potential allergen exposure from cross-contamination. A very restrictive diet can increase the risk of nutrient deficiencies and lead to other health issues in the long run. Consulting a registered dietitian can help you understand your nutrient needs and determine which



**Figure 2:** A diagram showing the symptomatic process of Alpha-Gal syndrome from the initial tick bite to reaction.

foods to include to prevent deficiencies. A dietitian can also help check for iron and vitamin B12 blood levels and help you decide if you need supplements.

Pay close attention to which foods and products you need to avoid. Learn how to read food and personal care product labels. Also, keep track of which foods cause your symptoms.

## Prevention

- The best way to prevent AGS is to avoid tick bites. Ticks often live in bushy, grassy, and wooded areas.
- When outdoors, use insect repellants approved by the Environmental Protection Agency (EPA).
- Wear clothing that covers up exposed skin.
- Apply permethrin (insecticide) to your clothes and gear or buy pre-treated clothing.
- Check skin and clothing for ticks after spending time outdoors. Check your pets, too.
- Remove any ticks with tweezers.
- Shower immediately after outdoor exposure.

## Living with AGS

**Avoid tick bites:** Getting more tick bites can increase antibodies for alpha-gal and make symptoms worse.

**Avoid mammalian meats** and their byproducts.

**Read ingredient labels carefully:** Always read ingredient labels to make sure there are no hidden sources of alpha-gal in your food or non-food items.

**Talk with an allergist or dietitian:** They can support your management plan.

**Tell all healthcare providers:** Let all your healthcare providers know that you have AGS.

**Avoid certain medications:** Some medicines, vaccines and medical products can contain mammalian-derived components (e.g., gelatin, bovine-based ingredients). Ask your healthcare provider for alternatives.

**Carry an EpiPen:** If your healthcare provider has prescribed one, keep it with you in case of emergency.

**Wear a medical alert ID:** It is a good idea to have an ID that says you have AGS. This helps in emergency situations.

## Emotional and Social Support

**Join a support group:** There are local and online groups for people with AGS where you can connect and share experiences.

**Plan ahead when traveling:** If you're going out to eat or traveling, contact restaurants and airlines before you go to make sure they can accommodate your needs.

## AGS Resources for Alpha gal free products:

**Pillclarity:** List of alpha-gal free products, including medicinal items. <https://www.pillclarity.org/>

**SAGE alpha Gal:** Recipes for alpha-gal-free dishes. <https://sagealphagal.com/>

**FIG:** A comprehensive list of vegan products based on their ingredients. <https://foodisgood.com/>

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