

Food Allergens

Alpha-Gal

Heather Norman-Burgdolf and Anna Cason, Dietetics and Human Nutrition



What is alpha-gal syndrome?

Alpha-gal syndrome (AGS), also known as red meat allergy, is a condition that results in an allergic reaction to some animal products after a tick bite. Lone star ticks are the species most associated with AGS in the United States. A bite from one of these ticks may cause a person to develop an allergic reaction to *galactose-alpha-1,3-galactose*, a sugar molecule found in the meat of some mammals. Those mammals include cows, pigs, and lambs, or what we commonly think of as red meat. The name alpha-gal comes from the name of the sugar that causes the allergic reaction. Alpha-gal syndrome is becoming increasingly more common. As it does, we continue to see that it causes different symptoms and severities in people.

Symptoms and Diagnosis

People who have AGS can have reactions like people with other food allergies. The most common symptoms include skin rashes, hives, digestive tract issues, and breathing problems. Some people have different symptoms each time they have a reaction and may even include joint pain and weakness.

The severity of the condition is different for everyone. A person with AGS may have a delayed allergic reaction, which could occur anywhere between 3 and 6 hours after ingesting mammalian meat or its byproducts. The symptoms of alpha-gal might decrease over time, particularly if the person does not get anymore bites from ticks carrying alpha-gal. In some cases, this has taken three to five years. New bites from ticks carrying alpha-gal can restart the allergy. These factors may make AGS difficult to recognize and diagnose.

Symptoms of AGS may not appear until several months after the tick bite, making it harder to diagnose, especially if people don't recall being bitten. In some cases, it might take more than one tick bite to trigger AGS. If you have any of these symptoms, it is important to work with a health-care provider to get a proper diagnosis. This may include an office visit to review patient history, do a physical exam, and get a specific blood test. If you suspect it may be AGS and are experiencing reactions after eating mammalian products, share this with your provider. The provider may recommend working with an allergist for more testing or a registered dietitian to help manage the condition.

Managing an Alpha-gal Allergy

AGS is different from other food allergies because the onset is sudden. It is also a reaction to foods that may have been a part of an overall diet for someone's entire life. There is no known treatment for AGS. Instead, dietary changes that remove the alpha-gal sugar from the diet will help manage and reduce the symptoms. Minor symptoms may improve with the use of an antihistamine. Severe reactions, such as anaphylaxis, need medical attention. Your health-care provider might prescribe medication for emergency treatment of your allergy. It is essential to understand how and when to use the medication. Reach out to your health-care provider with any questions.

Experts say people with AGS should take beef, pork, and lamb out of their diets to avoid allergic reactions. Although not all people with AGS react to all foods that contain alpha-gal, it is best to remove these potential allergens. Specific cuts and types of meat have higher amounts of alpha-gal and cause worse reactions. For example, organ meats such as liver, heart, and tripe have higher amounts of alpha-gal. For those who hunt, wild game is also a source of alpha-gal. This includes everything from deer to squirrels and rabbits.

Depending on the severity of the condition, some people may be able to have dairy products, including milk, butter, yogurt, and cheese. This includes products from any mammals, mostly cows and goats. Those with a more serious form of AGS may not be able to tolerate dairy foods at all. Other foods made with ingredients from mammals that may cause reactions include broths, bouillon, stocks, gravy, and other items made with gelatin, lard, or beef tallow. Carrageenan comes from seaweed and is a common ingredient in processed foods. Even though it does not come from mammals, it has the alpha-gal sugar. This is another product that needs to be eliminated from the diet.

Medications and Personal Care Products

Some supplements, medications—both prescribed and over the counter—and medical treatments may cause a reaction in people with AGS. These may include heparin, antivenoms, certain chemotherapy drugs, pancreatic enzymes, gel caps, and even heart valves derived from pigs or cows. Always make health-care providers aware of your condition. Ask if the prescribed medicine or suggested treatment causes a reaction for those living with alpha-gal.

Personal care products, including lotion, toothpaste, and even toilet paper, may contain alpha-gal-sensitive ingredients. If you notice symptoms still occur after changing your diet, consider reading the lists of ingredients of products commonly used for personal care.

Safe Foods When Living with Alpha-gal

Animal products are generally at the top of the list of protein sources. An alpha-gal safe diet does not mean low protein. There are high-protein foods that do not contain alpha-gal. These foods include:

- Poultry (chicken, turkey, duck, emu, ostrich, or quail)
- Seafood (fish, shellfish)
- Eggs
- Beans, peas, lentils
- Nuts and seeds
- Whole grains

You can substitute these high-protein foods in many favorite recipes to make them tolerable for people with alpha-gal syndrome. Foods like grains, vegetables, and fruits are part of a safe and balanced diet for people with alpha-gal syndrome. Consider searching for plant-based, dairy-free, or vegan recipes that are likely to eliminate ingredients that cause reactions. These recipes or resources may provide ideas or suggestions about ingredients to make recipes tolerable for people removing animal foods or dairy from their diets.

In addition to finding new recipes that are alpha-gal free, try to modify your favorite meals and recipes with some of these swaps for safe foods (Table 1).

People with alpha-gal syndrome tend to have different tolerance levels to animal products, dairy, and other byproducts. In the future, meat products on grocery shelves may be genetically modified to remove alpha-gal sugar and would be safe for those with AGS. Fumes from grills, cooking on stovetops, or even slow cookers may cause symptoms for someone with a more severe form of the condition.

Table 1. Recipe substitutes.

If a recipe calls for...	Try using...
Ground beef	ground chicken or ground turkey
Pork sausage	chicken or turkey sausage <i>*Be cautious of sausage casings as they may be made from pork. Check ingredients lists.*</i>
Cow's milk	plant-based milk alternatives like soy, almond, and oat milk
Cheese	nutritional yeast, a plant-based product that gives a dish the savory flavor that cheese provides
Butter	plant-based butters and some margarines
Lard	vegetable shortening or duck fat
Beef stock	chicken stock or vegetable stock

Dietary Supplements

Individuals with AGS that have to modify their diet significantly may need dietary supplements. Talking about this with a health-care provider or registered dietitian is important. Experts usually want those with a limited or restricted diet to supplement nutrients they are not taking in with food. As people adjust to living with AGS and making different food choices, they may feel like they are not eating a variety of nutritious foods. Those strictly vegetarian or vegan because of their AGS may need more vitamin B12, iron, vitamin D, calcium, and zinc. These nutrients are typically found in larger amounts in animal-based foods and products. When selecting a supplement, check labels to ensure it is an alpha-gal-safe product.



Label Reading and Ingredients Lists

Foods, supplements, and personal care products feature labels and ingredients lists to identify what is in the product. When selecting a product, always read labels and keep these things in mind:

- “Natural flavors” may be mammalian sourced.
- “Non-dairy” may still contain dairy ingredients. Look for “dairy-free” labels.
- Although a label may say vegan/cruelty-free, it does not mean that mammals were not used as an ingredient in the item.
- Vegan is not a regulated term. Look for a certified vegan label on the package to verify that a third party checked the product.
- Cruelty-free means it was not tested on animals. But ingredients could have been derived from animals.
- Even though you may consider a certain prepackaged food alpha-gal safe, keep reading ingredients lists because food makers could change products without notice.
- Foods that are closest to their natural form are considered less processed. These foods are less likely to contain hidden ingredients or byproducts and may be a safer choice than processed foods. When choosing any packaged food, always read ingredients lists to identify potential triggers.



Other Thoughts When Living with Alpha-gal

As someone adjusts to living with AGS, consider the following when making lifestyle management decisions:

- Cooking foods with heat does not destroy the alpha-gal sugar molecule.
- Cross-contamination concerns in the kitchen, with utensils, cookware, and cutting boards, have not been well documented, but may be a source of exposure for some.
- Rinse fresh fruits and vegetables under cool, running water to remove any extra coatings added to preserve freshness. Some food coatings may be derived from mammalian byproducts.
- Choose whole-grain foods when possible. These foods provide additional protein, vitamins, and minerals that may be missing in the diet.
- It has been reported that nonsteroidal anti-inflammatory drugs (NSAIDs), exercise, and alcohol may increase the severity and risk of reaction after consuming the alpha-gal molecule.
- It is often helpful to keep a journal to log foods and reactions. This will help to identify triggers, and you can share it with a health-care provider.

Living with AGS can be isolating. It can take a toll on your mental health. People may feel lonely, confused, or grieve as they face life-changing challenges associated with AGS each day. For example, AGS can impact someone’s social life. People may be less likely to eat at restaurants or participate in parties and celebrations because of concerns about exposure. Look for ways to stay connected to loved ones where food isn’t always involved. Examples include going for a walk, watching a sporting event, or doing a favorite hobby or pastime together. Consider joining support groups and social groups in your community and online for recipe ideas, product suggestions, and peer support.

It may be overwhelming with the number and types of foods that are considered “unsafe” for someone with AGS. However, there is a wide range of foods that are nutritious and safe for someone to eat. This is also true for supplements, medications, and personal care items. A person with AGS should always read the ingredients list or label for an item that they eat or put on their body to ensure there are no hidden sources of alpha-gal sugar in the product. Allergy sufferers should work with health-care providers, including a registered dietitian, to find a diet that works for them and matches their personal nutritional needs.

This publication provides information about AGS. Readers are encouraged to use it for education, and not as a substitute for professional medical advice. As research continues, we will learn more about prevention, management, and treatment of this condition.

Foods, Products, and Ingredients that *might* cause a reaction in AGS

Many of these items tend to have one or more ingredients that come from mammalian sources. Some products can be prepared in an alpha-gal safe way, or safe versions of the product may exist. Always review the ingredient list on packaged products. Even if a product is safe one time, it is important to read the label before purchasing again, as manufacturers may change ingredients without notice.

Food

Baked beans	Cheese (mostly soft cheese)	Jelly/gel candy	Refried beans
Beef broth	Corn muffin mix	Jerky (beef)	Sausage casings (beef- and pork-derived)
Beef (all cuts, including ground beef, chuck roast, flank steak)	Cow's milk	Lamb	Sauces (using animal fat)
Beef stock	Canned soups	Lard	Seaweed
Bison	Desserts/sweets	Marshmallows	Sheep
Biscuits	Fried foods	Organ meats (liver, heart, kidney, tripe)	Tallow
Bouillon	Goat	Pudding	Tortillas
Brisket	Gravy	Pork (bacon, ham, pork sausage, cuts of pork)	Tortilla chips
Buffalo	Heavy cream	Pie crust	Venison
Butter	High-fat foods	Rabbit	Yogurt
	Jelly/jams		

Medications and Personal Care Products

Cetuximab	Hand sanitizer	Perfume or fragrance	Snake antivenoms derived from horses or sheep
Chapstick/lipstick	Heparin	Prosthetic heart valves from cows or pigs	Sunscreen
Clothing and accessories (leather, wool)	Lotion	Shaving cream or aftershave	Thyroid hormone supplements derived from cows or pigs
Deodorant/antiperspirant	Makeup	Skincare products (serums, moisturizers, creams, toners, masks)	Toothpaste
Gel caps of medications or supplements	Mouthwash	Soap (hand soap, shower gel, face wash)	Vaccines that contain gelatin (measles, mumps, rubella, yellow fever)
Hair products (shampoo, conditioner, hairspray, styling gel or lotion)	Nail care (polish, remover, treatments)		Vitamin D3 supplements
	Pancreatic enzymes derived from pigs		

Ingredients

"Alpha-gal" will not be labeled in the ingredients list of products. However, the ingredients below have been linked to reactions in individuals with AGS. They can be found in both food and personal care items. If experiencing reactions to products with these ingredients, consider removing them from your routine to check for improvement.

Arachidonic acid	Caseinate	Glycerin*	Myristic acid *
Arachidyl propionate	Castoreum	Lanolin	Oleic acid *
Bovine extract	Collagen	Lard	Sodium caseinate
Carrageenan	Gelatin	Magnesium Stearate/ Stearic acid	Tallow
Casein			Whey

*This ingredient can be sourced from animals or plants. Plant-based alpha-gal safe versions are available. The product may be labeled as "vegan" to indicate plant sourced ingredients. Always check ingredients lists.

Alpha-gal-safe Grocery Shopping List

Many of these items are one ingredient, processed in a way close to their natural food form, or are alternatives to common ingredients used in cooking in baking. There are other foods not on this list that are safe. Always review the ingredient list on packaged products. Even if a product is safe one time, it is important to read the label before purchasing again, as manufacturers may change ingredients without notice.

Produce

All fresh fruit

Apples

Bananas

Berries
(blackberries, blueberries,
strawberries, raspberries)

Citrus fruits
(oranges, grapefruits, lemons, limes)

Cherries

Grapes

Melons
(watermelon, cantaloupe)

Peaches

Pears

Pineapples

All fresh vegetables

Asparagus

Avocados

Broccoli

Brussels sprouts

Carrots

Cabbage

Cucumbers

Celery

Garlic

Green beans

Lettuce

Mushrooms

Onions

Peppers

Potatoes
(russet, sweet, fingerling)

Spinach

Squash

Tomatoes

Zucchini

Bread/Bakery

Bread (white, wheat, rye)

Buns

Rolls

Bagels

Biscuits**

Muffins**

Baguettes

Brioche

Challah

Ciabattas

English muffins

Focaccia

Naan

Pita

Pumpnickel

Sourdough breads

Tortillas**

Tortilla chips**

Grains

Pasta

Rice (brown, wild, white)

Quinoa

Barley

Buckwheat

Bulgur

Farro

Millet

Oats

Rye

Wheat

Herbs

Basil

Chives

Cilantro

Dill

Mint

Oregano

Parsley

Rosemary

Thyme

Cooking Oils

Canola oil

Chicken fat

Coconut oil

Duck fat

Peanut oil

Vegetable oil

Drinks

Coffee

Fruit juice

Tea

Water

***Alpha-gal-safe versions of these foods are available. Always check ingredients lists.*

Alpha-gal-safe Grocery Shopping List (continued)

Many of these items are one ingredient, processed in a way close to their natural food form, or are alternatives to common ingredients used in cooking in baking. There are other foods not on this list that are safe. Always review the ingredient list on packaged products. Even if a product is safe one time, it is important to read the label before purchasing again, as manufacturers may change ingredients without notice.

Canned/Jarred/Dry Goods

Black beans
Black-eyed peas
Butter beans
Cannellini beans
Chickpeas or garbanzo beans
Fava beans
Great northern beans
Kidney beans
Lentils
(red, green)
Navy beans
Peas
Pinto beans
Split peas
Vegetarian baked beans**
Vegetarian refried beans**

Meat and Seafood

Chicken
(canned, ground, whole, sausage**, deli meat**)
Duck
Emu
Ostrich
Turkey
(ground, whole, sausage**, deli meat**)
Seafood and shellfish
Salmon
Tuna
Canned tuna
Canned salmon
Caviar and fish roe (eggs) [not flounder eggs]

Dairy (Dairy Alternatives) and Eggs

Eggs
(chicken, duck, quail)
Almond milk
Cashew milk
Coconut milk
Oat milk
Soy milk
Plant-based yogurts
Plant-based butter
Plant-based cheese
Plant-based cream cheese
Plant-based cream
Plant-based sour cream
Plant-based chocolate chips
Margarine**

Frozen Foods

Frozen fruits
(berries, cherries, mangoes)
Frozen vegetables without sauces
(corn, broccoli, carrots)
Edamame
Lima beans
Peas
Potatoes and potato products
(French fries, tater tots, hashbrowns) **

***Alpha-gal-safe versions of these foods are available. Always check ingredients lists.*

References

- Alpha-gal Information*. (n.d.). Alpha-Gal Information. <https://alphagalinformation.org>
- American Society for Microbiology. (2023, December 15). Alpha-gal Syndrome: When a tick bite turns to a meat allergy. <https://asm.org/articles/2023/december/alpha-gal-syndrome-when-a-tick-bite-turns-to-a-meat-allergy>
- CDC. (2024, January 24). *About Alpha-gal Syndrome*. Alpha-Gal Syndrome. <https://www.cdc.gov/alpha-gal-syndrome/about/index.html>
- CDC. (2024, May 17). *Products that may contain Alpha-gal*. <https://www.cdc.gov/alpha-gal-syndrome/products-that-contain-alpha-gal/index.html>
- Commins, S. P. (2020). Diagnosis & management of alpha-gal syndrome: Lessons from 2,500 patients. *Expert Review of Clinical Immunology*, 16(7), 667–677. <https://doi.org/10.1080/1744666X.2020.1782745>
- FDA. (2022, February). “Cruelty Free”/“Not Tested on Animals” Labeling on Cosmetics. FDA.gov. <https://www.fda.gov/cosmetics/cosmetics-labeling-claims/cruelty-free-not-tested-on-animals>
- Platts-Mills, T. A. E., Li, R. C., Keshavarz, B., Smith, A. R., & Wilson, J. M. (2020). Diagnosis and Management of Patients with the α -Gal Syndrome. *The Journal of Allergy and Clinical Immunology In practice*, 8(1), 15–23.e1. <https://doi.org/10.1016/j.jaip.2019.09.017>
- Roofe, N., & Whitson, Q. (2024). *Alpha-gal Syndrome*. University of Arkansas System Division of Agriculture Cooperative Extension. <https://www.uaex.uada.edu/publications/pdf/FSFCS210.pdf>
- WEBINAR: *Why Tick Season Isn't the Only Time to Focus on Alpha-gal Syndrome*. (2025). FoodAllergy.org; Food Allergy Research & Education. <https://www.foodallergy.org/resources/webinar-why-tick-season-isnt-only-time-focus-alpha-gal-syndrome>

Cooperative Extension Service

Agriculture and Natural Resources
Family and Consumer Sciences
4-H Youth Development
Community and Economic Development

MARTIN-GATTON COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

Educational programs of Kentucky Cooperative Extension serve all people regardless of economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, physical or mental disability or reprisal or retaliation for prior civil rights activity. Reasonable accommodation of disability may be available with prior notice. Program information may be made available in languages other than English. University of Kentucky, Kentucky State University, U.S. Department of Agriculture, and Kentucky Counties, Cooperating.

Lexington, KY 40506 Issued 04-2025



Disabilities
accommodated
with prior notification.