

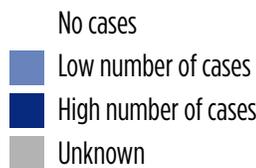
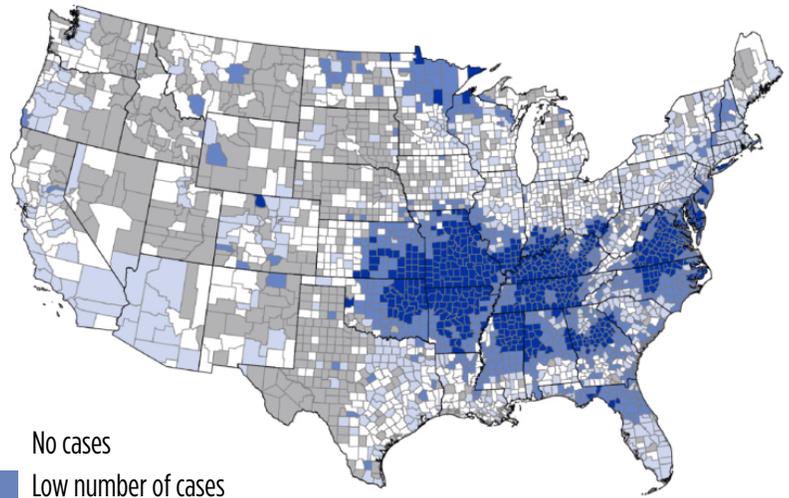
# Alpha-Gal Awareness

## Introduction

Alpha-gal syndrome (AGS) is a food allergy to mammal meat and other products made from mammals. It is caused by a tick bite and is sometimes called a tick bite meat allergy or a red meat allergy.

Symptoms are different for different people. They can range from mild to life-threatening. There is no known cure, so finding out early or preventing AGS is important.

Learning about AGS and ways to prevent tick bites can lower the risk of serious symptoms. This guide covers alpha-gal syndrome symptoms, testing, and prevention tips. For more help with meal planning, cooking, and shopping to avoid alpha-gal, check out MU Extension publications *Cooking with Alpha-Gal Syndrome* (N1351) and *Shopping for Alpha-Gal Syndrome* (N1352).



*Suspected alpha-gal syndrome cases in the United States, 2017-2022. (Nickelson, 2024)*

## Mammal Meat and Ticks

Red meat from mammals like beef, pork, rabbit, venison and sheep has a carbohydrate called alpha-gal. These molecules are also found in dairy foods and mammalian byproducts. Alpha-gal is also found in the saliva of the lone star tick. When this tick bites a person, it can transfer alpha-gal, potentially causing alpha-gal syndrome.

The lone star tick is common in the south and central U.S., including Missouri. Missouri has one of the higher rates of AGS.

## Symptoms

Two to six hours after eating meat, dairy or mammal byproducts, a person with AGS might have an allergic reaction. Common symptoms include hives and/or stomach problems, but breathing symptoms can also occur.

## Testing Tools

There are four steps to an AGS diagnosis. Your healthcare provider will typically:

1. Look at your medical history
2. Do a physical exam
3. Take a blood test that checks levels of IgE allergen response
4. Watch for reactions to mammal meat foods and products

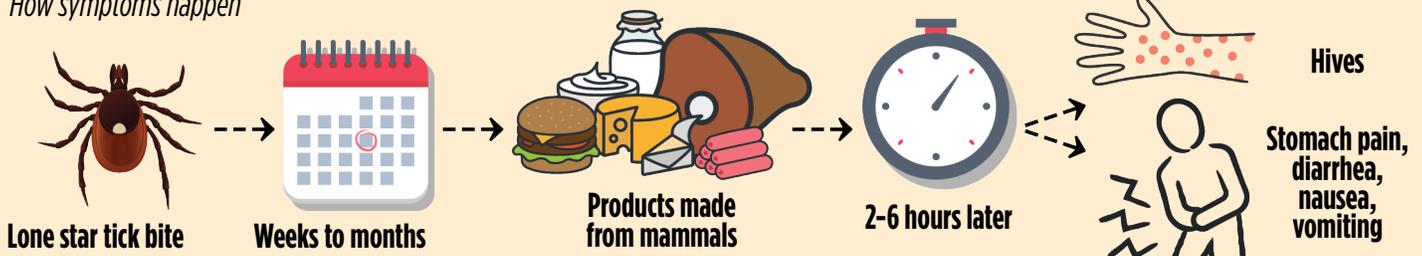


## Did You Know?

Many people with AGS report both waking up at night with stomach problems and a history of tick bites or outdoor hobbies.

The symptoms of AGS can change over time. People who avoid tick bites may see their reactions decrease. Yet, new tick bites can make the allergy worse and lead to stronger reactions.

*How symptoms happen*



## Common Symptoms of Alpha-gal Syndrome Reaction

- Hives or itchy rash
- Nausea or vomiting
- Heartburn or indigestion
- Diarrhea
- Drop in blood pressure
- Cough, shortness of breath, or difficulty breathing
- Swelling of the lips, throat, tongue, or eyelids
- Dizziness or faintness
- Severe stomach pain

## Prevention

Stopping tick bites is key to getting AGS under control. People with AGS should also avoid being bitten again. Repeated bites can make the allergy worse.

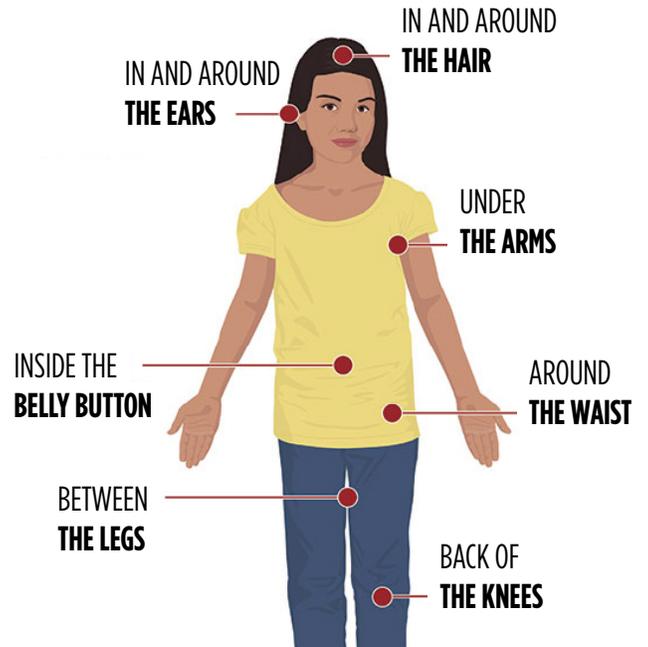
Ticks can bite at any time of year, but most bites happen from April to September. To avoid ticks:

- Stay away from grassy, brushy and wooded areas whenever possible.
- Walk in the center of trails while hiking.
- Wear light-colored clothing so you can spot ticks more easily.
- Tuck your pant legs into your socks or tape them.
- Use EPA-approved insect repellents on exposed skin, such as those with DEET or picaridin.
- Treat clothing and gear with products having 0.5% permethrin or buy pre-treated items.
- The CDC has more [information on their website](#).

### After being outside:

- Check your clothes, gear, and pets for ticks.
- Take a shower and change clothes as soon as you can.

### Look in these places for ticks

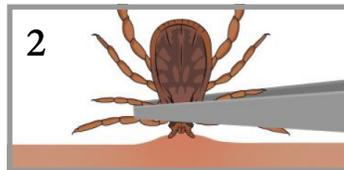


- Remove any attached ticks right away.
- If not washing immediately, dry your clothes on high heat for 10 minutes to kill any ticks that might still be on them.

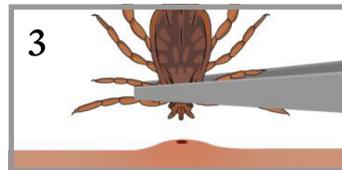
## Steps to Remove Ticks



1 Check for ticks



2 Grab tick close to skin



3 Pull out straight and dispose



4 Wash hands and bite

### More resources and agencies

Missouri Department of Conservation  
Missouri Department of Health and Senior Services  
Center for Disease Control and Prevention

### Sources

McGill S., Hashash, J. G., & Platts-Mills, T. A. (2023). AGA clinical practice update on alpha-gal syndrome for the GI clinician: Commentary. *Journal of Clinical Gastroenterology and Hepatology*, 2, 891-896. [View source online](#).

Missouri Department of Health and Senior Services (2023). Missouri tickborne disease story map. Retrieved from [View source online](#).

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# Cooking with Alpha-Gal Syndrome

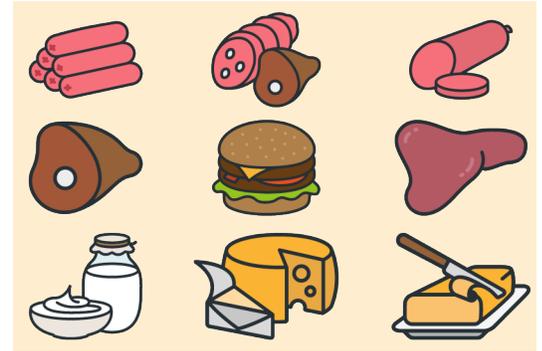
Alpha-gal syndrome (AGS) is a serious, potentially life-threatening allergic condition that can occur after a bite from the lone star tick. People with AGS have symptoms after eating meat and other products from mammals (cows, pigs, sheep, goats, rabbits). Because of this, AGS is sometimes called red meat allergy. Some people with AGS are also allergic to dairy and mammal byproducts. Symptoms may range from mild to life-threatening.

When cooking for a person with AGS, there are several important things to keep in mind.

## Trigger Foods

This is not a complete list. Other foods or ingredients may also trigger symptoms.

- Meat from mammals such as beef, pork, venison, lamb, bison, goat or rabbit
- Mammal organ meat such as liver, kidneys or sweetbreads
- Rocky mountain or prairie oysters
- Milk and dairy products (ice cream, yogurt, butter, cheese)
- Gelatin
- Meat broth, bouillon, stock, and gravy
- Butter, tallow, lard, or suet



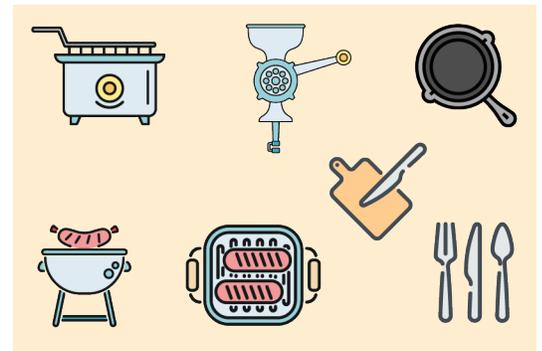
## Sensitivity

It's important to remember, not all people with AGS have reactions to every food with alpha-gal. Some are more sensitive than others.

Most people with AGS need to avoid red meat. Some also have sensitivity to dairy and dairy products. A small number must also avoid byproducts like gelatin.

Some may even need to avoid cross-contact (when the same cooking utensils or surfaces have touched both trigger foods and safe foods, contaminating a safe food). Areas of potential cross-contact include:

- Fry oil
- Meat grinders and slicers
- Cast iron pans
- Grills
- Cooking utensils, knives and surfaces



## Food Alternatives

The following foods do not contain alpha-gal but be aware of hidden ingredients. Refer to *Shopping for Alpha-Gal Syndrome (N1352)* guide sheet for more information about hidden ingredients. Alpha-gal sensitivity varies from person to person. Consult with your healthcare provider or registered dietitian to determine which specific foods need to be avoided and to develop a safe eating plan tailored to your needs.

- Poultry such as chicken, turkey, duck, emu, or quail
- Fish and seafood
- Eggs
- Fruits and vegetables
- Soy products
- Vegan dairy alternatives
- Legumes
- Nuts and seeds
- Grain foods



## Meeting Protein Needs

Some people may be concerned about getting enough protein if they must avoid red meat. Fortunately, most people can easily get enough protein. Adults should aim for 50-120 grams of protein a day. This should be split up evenly throughout the day. The table below lists foods that can help meet protein needs.

Food	Grams of protein per serving
Palm-sized portion of chicken	23
Palm-sized portion of fish	19
1 large egg	6
½ cup cooked beans or lentils	7-9
1 cup soy milk	7g
½ cup tofu	10-12
2 tablespoons peanut butter	7
¼ cup nuts	4-6
1 slice bread	3
⅓ cup rice or pasta	3

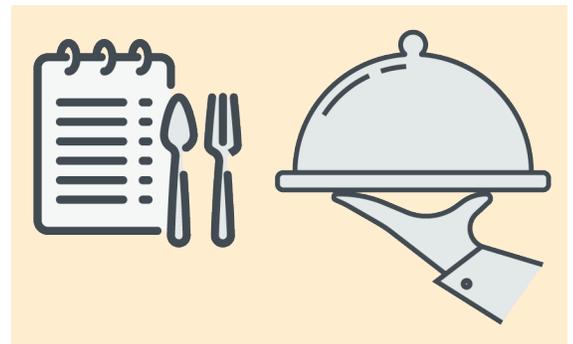


## Communicating About Allergies

When going out to eat, tell your server about foods and food ingredients that may trigger an AGS reaction. For more tips on dining out, check out the [resources available from Food Allergy Research & Education \(FARE\)](https://www.foodallergy.org/resources/dining-out) (<https://www.foodallergy.org/resources/dining-out>).

Make an easy-to-read list with allergen information to take to public places when eating.

Talk with your loved ones about AGS and make sure they understand your dietary restrictions and the risks.



## Cooking for Loved Ones

Talk with loved ones with AGS about foods that trigger reactions and brainstorm alternatives to prepare.

Communicate about their level of comfort with trying different foods or food ingredients that may contain alpha-gal to determine tolerance.

Learn about alpha-gal foods and ingredients, and read food labels every time.



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# Shopping Tips for Alpha-Gal Syndrome

Shopping for people with alpha-gal syndrome (AGS) can be challenging. There are several tips to make it easier.

1. Do not buy foods or byproducts of mammals, like beef, pork, etc.
2. Avoid food with alpha-gal that triggers an allergic reaction for you. These may include mammal meats and mammal byproducts. Remember AGS triggers can vary from person to person. Talk with your healthcare provider for individualized recommendations. Check out MU Extension publication *Alpha-Gal Awareness* (N1350) for more information about alpha-gal.
3. Read food labels and avoid ingredients that cause reactions.
4. If ingredients have vague labeling such as “natural flavors”, contact the manufacturer directly to ask if it contains alpha-gal ingredients.

## Hidden Ingredients

It is important to read the ingredient list every time. Foods that may seem safe may have hidden ingredients that can trigger an AGS reaction. Here are some examples. Alpha-gal sensitivity varies from person to person. Consult with your healthcare provider or registered dietitian to determine which specific foods and products need to be avoided and to develop a safe eating plan tailored to your needs

### Poultry

Food	Check for
Poultry sausages or brats	Beef or pork casings
Canned chicken	Beef or pork broth
Rotisserie chicken and lunch meat	Carrageenan
Pre-seasoned chicken	Beef or pork fat, stock, gravy, dairy or bouillon

### Snacks

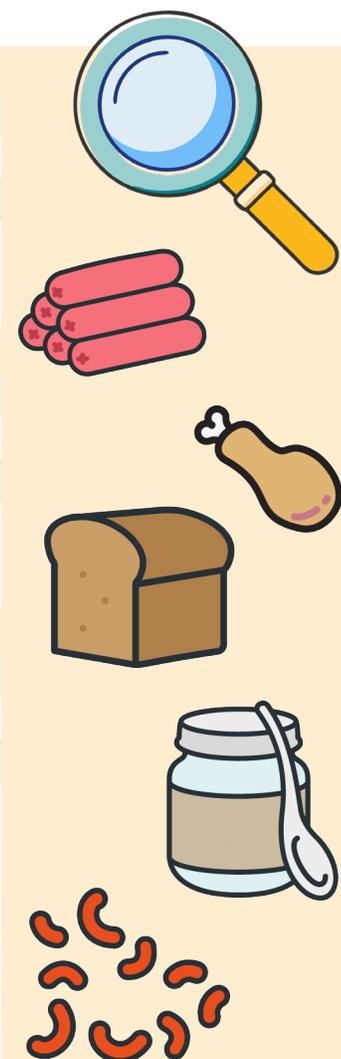
Food	Check for
Gummy products	Gelatin
Gelatin dessert with or without fruit	Gelatin
Pudding	Gelatin
Roasted nuts	Gelatin

### Grain Foods

Food	Check for
Breads	Butter, milk, lard
Toaster pastries	Gelatin
Cereals	Gelatin

### Food Pantry Staples

Food	Check for
Pasta or rice seasoning mixes	Dried beef or pork, broth or fat
Spice mixes	Beef or pork fat, broth, bouillon, stock, gravy, whey, powdered milk
Baked beans	Lard, bacon
Protein powder	Collagen, whey



## Common Ingredients to Watch Out For

- Gelatin
- Tallow (often beef fat)
- Glycerin\*\* (may be mammal-based or plant-based)
- Carrageenan (found in vegan and plant-based products)
- Lard
- Suet (mammal fat)
- Beef or pork fat
- Beef or pork stock
- Beef or pork broth
- Gravy
- Beef or pork bouillon
- Collagen\*\* (may be mammal-based or plant-based)

\*\* To verify if the ingredient is mammal- or plant-based, check with the manufacturer.



## Personal Items

Depending on the individual sensitivity, some people might have reactions to personal care items. If you are sensitive to non-food items, check for ingredients such as gelatine, glycerin, and collagen. Some of these are mammal-based, while others are plant-based. Check with the manufacturer to know for sure.



## Medication and Medical Treatments

Some medications and medical treatments could trigger an alpha-gal reaction. These may include over-the-counter and prescription dietary supplements, vaccines, ointments and creams, and pills with gel capsules among others. Be sure all your physicians (including dentist and eye doctor) and pharmacist are aware of your alpha-gal diagnosis.

### References:

CDC. (2024). Products That May Contain Alpha-Gal. Alpha-Gal Syndrome. [View source online.](#)

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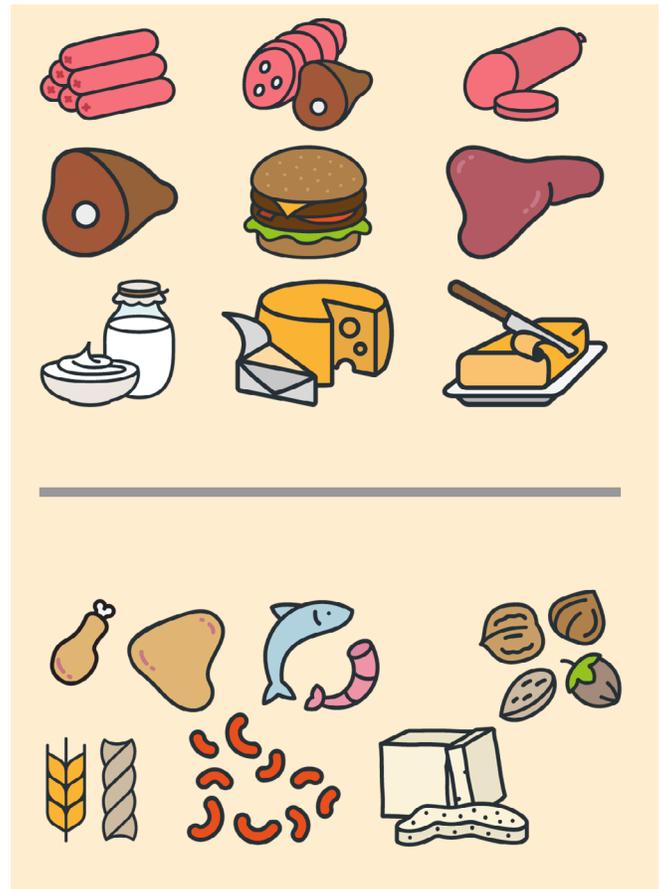
U.S. Department of Health and Human Services. (2020). Alpha-Gal Syndrome Subcommittee Report to the Tick-Borne Disease Working Group. [View source online.](#)

# Alpha-Gal Syndrome Food Substitutions

Alpha-Gal Syndrome (AGS) is an allergy to the alpha-gal molecule found in meat and other products from mammals such as beef, pork, goat and sheep. It can develop after a person is bitten by the lone star tick.

Many of the foods recommended below are naturally free of mammal products, but some may have hidden ingredients or come into contact with mammal ingredients during processing. AGS trigger foods can vary from person to person. Talk with your healthcare provider to determine which foods need to be avoided. Check out the MU Extension publication *Shopping Tips for Alpha-Gal Syndrome* (N1352) for more information on hidden ingredients. It is important to carefully read food labels every time. Alpha-gal sensitivity varies from person to person. Consult with your healthcare provider or registered dietitian to determine which specific foods need to be avoided and to develop a safe eating plan tailored to your needs.

If you want to try a food substitute in your favorite recipe, start by buying a small package to test it out. You can also split the item with a friend to save money. Before using it, look up how much you should use in place of the original ingredient. To find food substitutes, try shopping at different places like local grocery stores, natural food stores, or ethnic markets. You can also order many foods online. If you don't see what you need, talk to the store manager or owner to ask if they can order allergy-friendly foods for you.



Original Item	Substitutions
Mammalian meat (Beef, pork, deer, rabbit, lamb/mutton, bison/buffalo/beefalo, etc.)	<p><b>Poultry:</b> Chicken, turkey, duck, quail, pigeon, goose, pheasant, dove, emu, ostrich, etc.</p> <p><b>Freshwater fish:</b> catfish, carp, walleye, trout, bass, crappie, etc.</p> <p><b>Saltwater fish:</b> salmon, tuna, cod, mahi mahi, snapper, flounder fillet, sardines, anchovies, etc.</p> <p><b>Shellfish:</b> shrimp/prawns, crab, lobster, clams, oysters, scallops, crayfish/crawfish/crawdads, etc.</p> <p><b>Plant-based proteins &amp; grains:</b> tofu, plant-based meat alternative, beans, quinoa, lentils, farro, barley, rice, oats, etc.</p>
Mammalian fats (Butter, lard, suet, tallow, etc.)	<p><b>For baking:</b> Shortening, coconut oil, apple sauce, margarine (some kinds), vegan butter, mashed avocado</p> <p><b>For sautéing/pan frying:</b> Olive oil, vegetable oil, canola oil, coconut oil, corn oil, avocado oil, peanut oil, grapeseed oil, sesame oil</p>
Milk	Plant milk alternatives* such as soy milk**, almond and other nut milks, oat milk, rice milk, coconut milk, flaxseed milk, hemp milk, pea milk
Buttermilk	Plant-based milk & an acid (1 cup plant-based milk + 1 tablespoon vinegar or lemon juice = 1 cup buttermilk)
Cheese	Nutritional yeast***, vegan cheese^
Cream cheese	Vegan yogurt, avocado, vegan cream cheese^, hummus, silken tofu

Original Item	Substitutions
Beef or pork broth / stock	<ul style="list-style-type: none"> <li>• Water</li> <li>• Vegetable broth/stock, vegetable consommé</li> <li>• Vegetable bouillon/base, vegetable bouillon cubes or powder</li> <li>• Seafood broth/stock, seafood bouillon cubes or powder</li> <li>• Water with soy sauce (1 cup water + 1 tablespoon soy sauce = 1 cup broth)</li> <li>• Water with miso paste (1 cup water + 1 tablespoon miso paste = 1 cup broth)</li> <li>• Water with tomato paste (1 cup water + 1 tablespoon tomato paste = 1 cup broth)</li> <li>• Red or white wine, depending on the flavor of the dish (Check that the wine is 'vegan' or 'animal free' because some wines use animal byproducts during processing)</li> </ul>
Flavorings †	<ul style="list-style-type: none"> <li>• Worcestershire sauce</li> <li>• Liquid smoke</li> <li>• Soy sauce</li> <li>• Nutritional yeast</li> <li>• Miso powder / miso paste</li> <li>• Caesar seasoning ^^ †</li> <li>• Seasoned salts †</li> <li>• Mirin (sweet rice wine)</li> <li>• Sesame seeds</li> <li>• Green tea, black tea, other teas</li> <li>• Olives and capers</li> <li>• Dehydrated mushrooms &amp; chilies</li> <li>• Hot sauces †</li> <li>• Curry powder or curry paste †</li> <li>• Molasses</li> <li>• Pudding mixes, made with plant-based milk</li> <li>• Extracts: vanilla, lemon, almond, orange</li> <li>• Vinegars: white, apple cider, red wine, balsamic</li> <li>• Fermented foods: sauerkraut, kimchi, kombucha</li> </ul>

\* Plant milk alternatives do not naturally contain calcium and vitamin D, so look for options that have been fortified with both. Make sure the vitamin D comes from plant sources.

\*\* Soy milk is the closest substitute for cow's milk in terms of nutrition.

\*\*\* Nutritional yeast is a deactivated form of yeast that is rich in nutrients.



^ Vegan substitutions for cheese and cream cheese are similar in flavor and texture, but they may not melt the same way traditional cheese does.

^^ Caesar seasoning is a dry, powdered seasoning blend designed to imitate the traditional flavor of Caesar dressing and is often sold in vegan form

† Natural flavorings can be a common ingredient in some brands. Call food manufacturers to confirm the presence of mammal products in natural flavorings.

## References:

Alpha Gal Information. (2022). Try These Substitutions. *Food: First Steps*. Retrieved June 24, 2025, [View source online](#).

Norman-Burgdolf, H., & Cason, A. (2025, April). Alpha-Gal. *Food Allergens*. Retrieved May 22, 2025, [View source online](#).

# Alpha-Gal Syndrome Nutrients of Concern

Alpha-gal syndrome is a food allergy that some people get after being bitten by the lone star tick. After the bite, the person's body may react badly to eating red meat like beef, pork, or lamb, and sometimes dairy and byproducts like gelatin. Symptoms usually show up a few hours after eating. These can include stomach pain, hives, or more serious allergic reactions.



Because the reaction can be scary, some people become anxious and start avoiding more foods than they need to. This can make it harder to enjoy meals or eat out with friends. Doctors are still learning more about this condition, but avoiding red meat and other trigger foods is the best way to stay safe. AGS trigger foods can vary from person to person. Talk with your healthcare provider for individualized recommendations.

## What Happens When You Stop Eating Red Meat or Dairy?

When people stop eating certain foods, like beef, pork, milk, or cheese, they might not get enough important nutrients. Missing these foods can lead to low levels of iron, vitamin B12, calcium, and protein.

Foods	Key Nutrients
Red meat (beef, pork, lamb)	iron, zinc, B12, protein
Dairy (milk, cheese, yogurt)	calcium, vitamin D



## Why Are These Nutrients Important?

- **Iron** helps carry oxygen in your blood, gives you energy, and supports brain growth. It's especially important for pregnant women and kids. Low iron can cause tiredness and poor growth.
- **Zinc** helps your immune system and supports healthy growth and healing.
- **Vitamin B12** helps your body turn food into energy.
- **Protein** builds and repairs muscles and tissues in your body.
- **Calcium** builds strong bones and teeth.
- **Vitamin D** helps your bones stay strong and supports your muscles and immune system.

## What Can I Eat Instead?

If you can't eat red meat or dairy, there are other foods that can provide these nutrients. Here are some alpha-gal friendly foods:

Nutrient	Alternative Sources	Examples
Iron	Spinach, kale, lentils, chickpeas, seeds, white beans, kidney beans, fortified cereals, salmon, tuna, seafood	Add white beans and spinach to soups or try a tuna salad sandwich.
B12	Fortified cereals, nutritional yeast, salmon, tuna, eggs, turkey, chicken	Sprinkle nutritional yeast on popcorn or roasted vegetables for a cheesy flavor.
Zinc	Lentils, chickpeas, seeds (pumpkin, chia), cashews, oats, black beans, salmon, sardines, turkey, shrimp	Snack on a homemade trail mix with cashews and pumpkin seeds or top oatmeal with chia seeds.
Protein	Lentils, chickpeas, beans, tofu, nuts, nut butters, eggs, turkey, chicken, fish, seafood	Spread peanut butter on apple slices or bake trout fillets with garden vegetables.
Calcium	Fortified plant milks, fortified orange juice, collard greens, kale, white beans, broccoli	Blend kale into a fruit smoothie or make roasted broccoli as a side.
Vitamin D	Sunlight, fortified plant milks, rainbow trout, salmon, mushrooms, eggs	Scramble eggs with sauteed mushrooms and garden vegetables for breakfast.

## Should I Take Vitamins or Supplements?

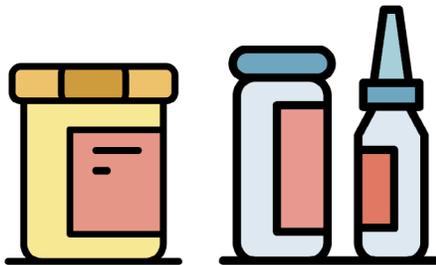
It's best to get your nutrients from food, but sometimes supplements can help.

## When Should I Consider Supplements?

- **Vitamin B12:** This vitamin is found in meat and dairy. If you don't eat those foods, you may need a supplement or eat foods like cereal or plant-based milk that have B12 added. Double check to make sure the vitamin B12 supplement is plant-based.
- **Iron:** If you don't eat meat or have low iron, you may need a supplement. Talk to a doctor first, because too much iron can be harmful.
- **Vitamin D:** If you don't get much sunlight, especially in the winter, a plant-based vitamin D supplement can help your bones and immune system stay strong.
- **Calcium:** If you don't drink milk or eat dairy, you may need calcium to help keep your bones healthy, especially as you get older.

## Thinking About Taking Supplements?

Before you start any supplements, talk to your healthcare provider or pharmacist. Some supplements, especially those made with gelatin or in gel-capsules may trigger an AGS reaction. Your pharmacist can help you select ones that are safe for you.



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