

# Alpha-gal and Red Meat Allergy



## WHAT IS ALPHA-GAL?

An allergy to “alpha-gal” refers to having a severe and potentially life-threatening allergy to a carbohydrate molecule called galactose-alpha-1,3-galactose that is found in most mammalian or “red meat”. Unlike other food allergies which typically occur within minutes of ingestion, symptoms from eating red meat such as pork, lamb or beef may be delayed, occurring 3-8 hours after eating. Most food allergies are directed against a protein molecule, but alpha-gal is unusual because it is a carbohydrate, and a delay in its absorption may explain the delay in symptoms.

## WHAT ARE THE SYMPTOMS OF AN ALPHA-GAL ALLERGY?

As with other food allergies, signs or symptoms of an allergy to alpha-gal may include:

- » Hives and itching
- » Swelling of your lips, face or eyelids
- » Shortness of breath, cough or wheezing
- » Abdominal pain, nausea, diarrhea or vomiting

The most severe reaction, anaphylaxis, can present as a combination of several of these symptoms, may include low blood pressure, and is potentially fatal.

Because these symptoms are delayed, you may only wake up with them in the middle of the night after an evening meal.

## HOW IS AN ALPHA-GAL ALLERGY DIAGNOSED?

Diagnosis of this allergy starts with your allergist taking an appropriate history and physical examination. Because the onset is usually quite delayed, it can be hard to associate the symptoms with eating red meat many hours previously. Triggers include any red meat—including beef, pork, lamb or even horse products. It may even occur after eating hot dogs and hamburgers. In very rare cases, the reaction may extend to milk or dairy proteins and gelatin.

Your allergist may recommend testing that includes skin tests to the relevant animal proteins and blood tests which measure the levels of a specific immunoglobulin E (IgE) antibody, to mammalian meats. An investigational blood test, IgE against alpha-gal itself, may also aid in the diagnosis.

## HOW IS AN ALPHA-GAL ALLERGY TREATED?

Immediate symptoms such as hives or shortness of breath are treated the same as any other food allergy - in an urgent care setting with anti-histamines, epinephrine and other medications. Prevention long-term involves avoidance of all red meat in sensitized individuals. You may be advised to carry an epinephrine auto-injector, to be used in case of subsequent accidental exposures and reaction. These measures do not necessarily mean switching to a full vegetarian diet, since poultry and fish can be consumed and do not cause similar reactions.

As with other food allergies, there is the possibility that over time the sensitivity diminishes—although these changes may take many years to become apparent.

## HOW DO YOU BECOME ALLERGIC TO ALPHA-GAL?

Alpha-gal is a molecule carried in the saliva of the Lone Star tick and other potential arthropods typically after feeding on mammalian blood. People that are bitten by the tick, especially those that are bitten repeatedly, are at risk of becoming sensitized and producing the IgE necessary to then cause allergic reactions.

As might be expected, the incidence of tick bites is much higher in the southern and eastern U.S., the traditional habitat for the tick. However, cases are now increasingly reported in the northern and western states. And it is a phenomenon that has been observed worldwide, with different ticks responsible for similar cases of red meat allergy in many other countries such as Sweden, South Africa and Australia.

## OTHER REACTIONS AND DISCOVERIES

Interestingly, allergic reactions may occur to red meat, to subsequent tick bites, and even to medications that contain alpha-gal. Cetuximab is a cancer medication that contains alpha-gal, and people who have had allergic reactions to this medication (these are typically immediate reactions, because it is infused intravenously) have a higher risk for red meat allergy and are likely to have been bitten by ticks in the past.

The discovery of this peculiar allergy has allowed researchers to correlate tick bites with many cases of anaphylaxis that would previously have been classified as 'idiopathic', or of unknown cause. Also, while it was originally thought that the Lone Star tick had to feast on mammalian blood in order to carry the alpha-gal molecule, more recent research has shown that it may carry this molecule and be capable of sensitizing humans independently.

## HOW DO YOU PREVENT AN ALPHA-GAL ALLERGY?

Because this allergy is predominantly tick born, you are more likely at risk if you often go outdoors in wooded areas for activities such as hiking, fishing or hunting. The key strategy is to prevent tick bites. This may include wearing long sleeved shirts or pants, using appropriate insect repellents, and surveying for ticks after spending time outdoors.

Any observed ticks should be removed carefully by cleaning the site with rubbing alcohol, then using tweezers to pull the tick's head up carefully from the skin using steady pressure. Clean your hands and the site one more time and make sure not to crush the tick between your fingers.