Tick Allergy and Mammalian Meat Allergy Frequently Asked Questions (FAQ)

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For patient or carer support contact Allergy & Anaphylaxis Australia or Allergy New Zealand.

Information is also available on the Tick Induced Allergies Research & Awareness (TIARA) website.

Q 1: What are tick related allergies?

Allergic reactions that are related to tick bites include:

- Large local skin reactions.
- Generalised reactions.
- Allergic reactions to mammalian meat, mammalian products including gelatin and mammalian milks.

Clinical immunology/allergy specialists in Australia were the first to describe a link between tick bites and the development of mammalian meat allergy. This association has since been confirmed by researchers on all six continents where people are bitten by ticks, in more than 29 countries.

This document focuses on allergies to ticks and the link between tick bites and the development of allergic reactions to mammalian meats and related food products.

Q 2: How is a diagnosis of tick allergy confirmed?

At this time, there are no skin or blood tests for allergen specific Immunoglobulin E (IgE) antibodies to confirm a diagnosis of tick allergy. Australian researchers have identified the allergens that cause tick allergy are proteins in tick saliva.

Diagnosis is based on the history of the reaction since tick anaphylaxis commences as soon as the tick is disturbed or removed improperly. Tick anaphylaxis is rare in other countries, however, it has become much more common, along with mammalian meat allergy, in this century. Tick anaphylaxis only occurs with bites from adult ticks.

Q 3: How is a diagnosis of mammalian meat allergy confirmed after a tick bite?

Researchers have identified that the following allergy tests done on the patient's blood are positive in the majority of people with mammalian meat allergy after a tick bite.

The following blood tests for allergen specific IgE may assist in confirming a diagnosis:

- Alpha-gal (Gal-alpha-1,3-Gal thyroglobulin, bovine) U953 Immunocap. Alpha-gal is a sugar molecule present in all mammals except humans, great apes and Old-World monkeys. It is also found in the gut and saliva of ticks.
- Mammalian meats Immunocap (Beef, Lamb, Mutton, Pork and Rabbit are available).
- Blood tests for a mast cell Tryptase level may also be necessary to understand the level of risk for more severe reactions. Tryptase is an enzyme that is increased in people with a condition called Mastocytosis. It is associated with a higher risk of more severe allergic reactions to many allergic triggers, particularly insect stings and bites, including tick bites.

Q 4: How are tick bites related to mammalian meat allergy?

An allergic reaction to mammalian meat can be caused by eating meat from mammals, meat products and animal-derived gelatin which can be in many food products. Animal-derived gelatin is also used as a binding agent in some medications, and in intravenous blood substitutes known as gelatin colloid, such as Haemaccel and Gelofusine, these are no longer used in resuscitation. Some people may experience similar allergic symptoms from mammalian milks and milk products.

The target allergen associated with these allergic reactions, Alpha-Gal, is present in the saliva and gut of ticks, and mammalian meats, including beef, lamb, mutton, pork, goat, horse, kangaroo, venison and other exotic mammals including marine mammals such as whales, dolphins, seals and porpoises. People with mammalian meat allergy are advised to avoid all mammalian meat, mammalian meat products and mammalian gelatin.

Q 5: What are the symptoms of mammalian meat allergy?

Symptoms of allergy to mammalian meat typically occur four to six hours after eating mammalian meat and may range from gut symptoms, welts and swellings (urticaria and angioedema), through to life-threatening anaphylaxis. The allergic response to meat does not occur at the time of the tick bite (unlike tick allergy).

Anaphylaxis or allergy to Alpha-gal can present at any time after a tick bite, even months or years after the initial bite. The production of allergy antibody to mammalian meat (alpha gal allergen) occurs after bites from all life stages of the tick which blood feed; larvae, nymphs (grass ticks) and adults (both engorged with blood and not engorged).

Gastrointestinal symptoms that are similar to irritable bowel syndrome are commonly reported in people who have mammalian meat allergy. People living in areas with a large number of ticks, or with a history of living in one of these areas, and experiencing gut discomfort should be screened for Alpha-Gal allergy.

If the person is able to avoid further tick bites, significant improvement may occur in 18- 24months, and many people who have no further tick bites will tolerate some mammalian meat again within three to four years. Any further tick bites may more than double the levels of alpha gal allergy antibody. If the condition does stop, then a tick bite can reactivate mammalian meat allergy.

Large local reactions to the site of a tick bite are more common than generalised allergic reactions.

Q 6: What proteins can people with mammalian meat allergy eat?

The following protein foods and their derivatives, as long as they are free of mammalian meat related ingredients, are safe for someone with mammalian meat allergy to eat.

Chicken	Molluscs	Crustaceans
Turkey	Quail	Goose
Fish	Duck	Eggs
Legumes	Lentils	Soy products – Tofu, Tempeh

Alpha-Gal-free, safe food thickeners include food additives numbered 400 through to 406, 415 and 418, pectin from citrus peel and apple 440. Seaweed based products and food additives are safe to consume **except for Carrageenan**, numbers 407 and 407a.

The foods listed below **CONTAIN** mammalian meat or meat products and **should be avoided**:

Beef	Buffalo	Venison
Veal	Rabbit	Deli Meats – including but not limited to bacon, ham, salami, silverside, chorizo, prosciutto, black pudding, haggis, all offal
Pork	Guinea Pig	Fats from mammals such as tallow, suet, lard, dripping

Lamb and Mutton	Offal such as kidneys, brains, liver, tripe	Gelatin products and gelling agents
Mutton	Whale	Meat extracts – Bovril, Bonox
Kangaroo and Wallaby	Dolphin, Seal	Meat based stocks – beef stock
Goat	Possum	Meat based gravy

Mammals are any animal which suckles their young. If unsure check an authoritative internet source.

The foods and ingredients listed below **MAY CONTAIN** mammalian meat derived additives and labels should be carefully assessed before eating or drinking.

Lollies and confectionery such as jelly-based lollies, jelly babies, party mixes, jubes and marshmallows	Mousses and desserts
Jam	Energy drinks that contain taurine
Soups, stock cubes and liquid stocks	Gravies and Gravox
Hot chips coated in tallow	Flavour ingredients in chips and snacks
Rennet – check cheeses made outside Australia	Sausages and sausage skins (even chicken sausage skins)
Margarine	Cheese spread

Other products and medications listed below often contain meat derived products or by-products such as gelatin in capsules. Check the following products with your doctor, dietitian or pharmacist, if not obvious.

Vitamins and over the counter medications	Cetuximab	Some vaccines
Prescription medications	Artificial Blood	Pancreatic enzymes
Heparin	Herbal medicines	Cosmetics such as shampoos, lotions, moisturisers, soaps, wound dressings

People living with mammalian meat allergy may be sensitive to mammalian milks and related products.

If you have not had a suspicion that milk products were associated with your symptoms previously, and your symptoms are completely controlled by following the mammalian meat free diet, it is not necessary to remove milk and its products from your diet.

If you do suspect an associated allergy to mammalian milks and their products you may need to avoid mammalian milks and their products including yoghurt, cheese, butter, margarine, chocolate, animal rennet, ice-cream and cream.

Q 7: What nutrients are at risk when following a mammalian meat free diet?

The key nutrients found in mammalian meat include protein, readily absorbable iron and B group vitamins including Cyanocobalamin (B12), Thiamine (B1), Riboflavin (B2) and Pyridoxine (B6).

Dietary adjustments when excluding mammalian meats and products, may be necessary and might include:

- Inclusion of other protein sources including fish, poultry, legumes, nuts, and eggs which are also excellent sources of readily absorbable iron.
- Eating foods rich in B vitamins including whole grains, vegetables, poultry, fish, legumes and for people who can tolerate it, mammalian milks and their products.

- Vitamin B12 is an essential nutrient for the maintenance of a healthy nervous system and is at risk if a vegetarian diet is chosen. Choosing some fish and poultry, milks if tolerated and vitamin B fortified vegetarian products and milk alternatives can support B12 intake.
- Iron is readily absorbed from meat proteins and can be at risk when red meat is removed from the diet. Inclusion of fish, eggs and poultry can support optimal absorption of iron from plant foods. Eating foods rich in Vitamin C, and plant-based proteins can also support iron absorption.
- Menstruating females should have their iron levels checked when commencing the dietary change, and monitored to ensure an adequate iron intake.

It is recommended that you consult with an Accredited Practising Dietitian if you:

- Have confirmed anaemia.
- Live with dietary restriction for other reasons including other allergies, medical conditions or through personal preference.
- Also need to avoid mammalian milk and milk products.
- Have a small appetite.

Cross contamination of your food is a considerable risk:

- Take care when eating out and ask questions about food preparation such as; are grills shared, are utensils separate for meat and fish/chicken. This is relevant in restaurants, at home and when eating out with others in private homes or at public barbecues.
- Plan ahead – call the restaurant or café in advance and ask lots of questions.
- Carry your own food and snacks in case it is needed.
- When travelling, beware of exotic meats like whale, horse, dog or guinea pig.

Q 8: What measures can be taken to reduce the risk of tick bites?

The following measures may reduce the risk of tick bites:

- Wear long-sleeved shirts and long trousers when walking in areas where ticks live.
- Tuck shirt into trousers.
- Tuck trouser legs into long socks.
- Wear a wide-brimmed hat if gardening.
- Wear light-coloured clothes, which makes it easier to see ticks.
- Brush clothing before coming inside to remove ticks.
- Undress carefully and check for ticks daily, checking carefully in the neck and scalp.
- Use insect repellent that contains DEET (such as RID, Tropical RID, Tropical Aerogard, or Bushmans).
- Use permethrin-treated clothing when exposed to tick habitat, or gardening in tick endemic areas.
- Have a registered pest controller treat your backyard for ticks if contracting tick bites there.
- People with recurrent severe allergic reactions to tick bites may consider relocating to an area where ticks are not endemic.

Allergen immunotherapy to switch off tick bite allergy or mammalian meat allergy is currently not available.

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