

CORRESPONDENCE

Considerations for cataract surgery: alpha-gal allergy



Red meat allergy is a relatively new consideration for the medical field. First described in 2009 by Commins et al., anaphylactic responses to red meat were found to be associated with immunoglobulin antibodies against galactose-alpha-1,3-galactose, also known as alpha-gal.¹ Reactions were noted in 24 patients who previously tolerated red meat. In 2011, further exploration revealed incidences of red meat allergy strongly overlapped with endemic areas of Rocky Mountain spotted fever, suggesting the lone star tick (*Amblyomma americanum*) was responsible for inducing the allergy.² Antibodies were produced against a tick salivary

antigen structurally similar to alpha-gal, leading to anaphylaxis with subsequent exposure to alpha-gal in red meat.²

Allergy to red meat specifically does not seem to be a problem meriting consideration for medication administration; however, a 2019 study outlines anaphylactic reactions to the monoclonal antibody drugs. Specifically, cetuximab was associated with elevated levels of immunoglobulin against alpha-gal prior to administration of the drug.³

It is common for pharmaceutical companies to use animal products in the manufacturing process. The presence of alpha-gal-containing products has been described in anesthesia and gelatin-based hemostatic agents, but, to date, no article has reviewed products commonly used in

Table 1. Products arranged by company.

Product Type	Specific Products	Use of Mammalian Products
Bausch & Lomb, Inc. IOL	Envista, Crystalens, Trulign, Akreos MICS, Akreos AO, Sofport, P359UV, EZE-60, S122UV, L122UV	"There are no animal products used in the manufacturing of any the IOLs listed."
Ophthalmic viscosurgical device	Amvisc, Amvisc PLUS	"The sodium hyaluronate bacterial fermentation process does use a component derived from bovine milk and porcine enzymes."
	OcuCoat	"Manufactured using hydroxypropylmethylcellulose, which is not derived from animals."
Glaukos Corp. iStent	GTS100R/L, G2-M-IS (iStent inject)	"Manufactured from implant grade titanium (Ti6Al4V ELI per ASTM F136) and are coated with stearylalkonium heparin powder. The stearylalkonium heparin coating uses sodium heparin that is derived from a porcine source."
Allergan, Inc. No products used in cataract surgery are listed as manufactured with animal-derived substances in the document "GLUTEN, STARCH, ALCOHOL, AND ANIMAL DERIVATIVES INFORMATION FOR PASSOVER"		
Alcon Laboratories, Inc. IOL	AcrySof (ReSTOR, Toric, and monofocal)	"AcrySof single-piece IOLs do not contain/contact tissues of animal origin. The IOL and the lens wafer do not contain or come in contact with animal tissues or derivatives. The raw material (polypropylene resin) used to manufacture the wagon wheel lens case contains or contacts tallow derivatives. Tallow derivatives are considered rendered safe by chemical and physical processes."
Ophthalmic viscosurgical device	DUOVISC, ProVisc	"One of the raw materials (sodium hyaluronate) contains or contacts animal tissue (bovine milk and porcine pancreatic enzymes)." "Neither DUOVISC nor ProVisc contains the 'alpha-gal' (galactose-alpha-1,3-galactose) molecule. Despite the lack of alpha-gal, Alcon is unable to state specifically that DUOVISC or ProVisc would not cause a reaction for a given patient."
Sterile Saline	BSS PLUS	"The raw materials in the formulation do not contain materials of animal origin."

IOL = intraocular lens

cataract surgery.^{4,5} During the postoperative period of cataract surgery, we routinely examine patients for inflammatory or infectious processes. The immune response generated within 24 hours of cataract surgery has been well described.⁶ This response is believed to be a result of the breakdown of the blood–aqueous barrier because of trauma, allowing interface with systemic immune processes. An exuberant inflammatory response during the early postoperative time can concern us for toxic anterior segment syndrome or endophthalmitis. Furthermore, 2 cases of intracameral injections of cefuroxime leading to anaphylaxis have been reported, increasing suspicion that the same could occur with alpha-gal exposure.^{7,8} Because the incidence of alpha-gal allergy is increasing, we must be aware of possible intraocular inflammatory responses to animal products, introduced into the eye during cataract surgery, in patients with alpha-gal allergy.

To address the issue, we have contacted various companies regarding the manufacturing process of their products and have assembled a table of their responses. It should be noted Johnson & Johnson Vision Care, Inc., was not included in the data summary after multiple attempts to contact them failed (Table 1).

Although the exact prevalence of alpha-gal allergy is not known, it is important for cataract surgeons to consider which products are used during surgery in all patients reporting red meat allergy. Varying degrees of inflammatory responses are common in patients with this allergy; some patients report a severe anaphylactic response, whereas others report mild hives. Similarly, varying degrees of intraocular inflammation could occur if the patient is exposed. Although there are no reports, to date, of intraocular inflammation because of exposure to alpha-gal

after cataract surgery, this is a condition that should be kept in mind in patients who have reported this allergy. Because this is a relatively new consideration for ophthalmology, further research should be undertaken to ensure patient safety during intraocular surgery.

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