

Correspondence

Additional effects of dietary advanced glycation end products

To the Editor:

The excellent review by Smith et al¹ makes a convincing case for the contribution of dietary advanced glycation end products (AGEs) to the development of food allergy. There is also additional evidence that AGEs may be involved in asthma. Induced sputum levels of the AGE pentosidine are higher in patients with asthma than in those without asthma, and increase with age at a markedly faster rate in patients with asthma than in controls, such that they are higher in young patients with asthma than in old people without asthma.² In contrast to most tissues, where the receptor for advanced glycation endproducts (RAGE) is low or absent unless specifically upregulated, RAGE is present on eosinophils³ and in upper and lower airways,⁴ and at particularly high levels in the airways of patients with chronic obstructive pulmonary disease.⁵

In addition, there is at least 1 instance in which an allergy to a pharmaceutical results from the formation of immunogenic AGE epitopes on the drug.⁶

The negative effects of AGEs are not limited to allergy. There is strong evidence of a causal relationship between AGEs and aging, so much so that the beneficial effects of caloric restriction on decreasing oxidative stress and increasing longevity in mice are reversed when the restricted-calorie diet is modified to also be high in AGEs.⁷

AGEs do not appear on the list of ingredients printed on packaged foods. Anyone interested in eating a healthful diet that is not proinflammatory would do well to consider the high-

temperature cooking that creates these immunoreactive compounds.

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Disclosure of potential conflict of interest: J. D. Miller is President and CEO of Mission: Allergy, Inc.

REFERENCES

1. Smith P, Masilamani M, Li X-M, Sampson H. The false alarm hypothesis: food allergy is associated with high dietary advanced glycation end-products and pro-glycating dietary sugars that mimic alarmins. *J Allergy Clin Immunol* 2017;139:429-37.
2. Kanazawa H, Tochino Y, Kyoh S, Ichimaru Y, Asai K, Hirata K. Potential roles of pentosidine in age-related and disease-related impairment of pulmonary functions in patients with asthma. *J Allergy Clin Immunol* 2011;127:899-904.
3. Kvarnhammar AM, Cardell LO. Pattern-recognition receptors in human eosinophils. *Immunology* 2012;136:11-20.
4. Van Crombruggen K, Holtappels G, De Ruyck N, Derycke L, Tomassen P, Bachert C. RAGE processing in chronic airway conditions: involvement of *Staphylococcus aureus* and ECP. *J Allergy Clin Immunol* 2012;129:1515-21.e8.
5. Ferhani N, Letuve S, Kozhich A, Thibaudau O, Grandsaigne M, Maret M, et al. Expression of high-mobility group box 1 and of receptor for advanced glycation end products in chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 2010;181:917-27.
6. Bozhinov A, Handzhiyski Y, Genov K, Daskalovska V, Niwa T, Ivanov I, et al. Advanced glycation end products contribute to the immunogenicity of IFN- β pharmaceuticals. *J Allergy Clin Immunol* 2012;129:855-8.
7. Cai W, He JC, Zhu L, Chen X, Zheng F, Striker GE, et al. Oral glycotoxins determine the effects of calorie restriction on oxidant stress, age-related diseases, and lifespan. *Am J Pathol* 2008;173:327-36.

<http://dx.doi.org/10.1016/j.jaci.2017.03.039>