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# Publication on

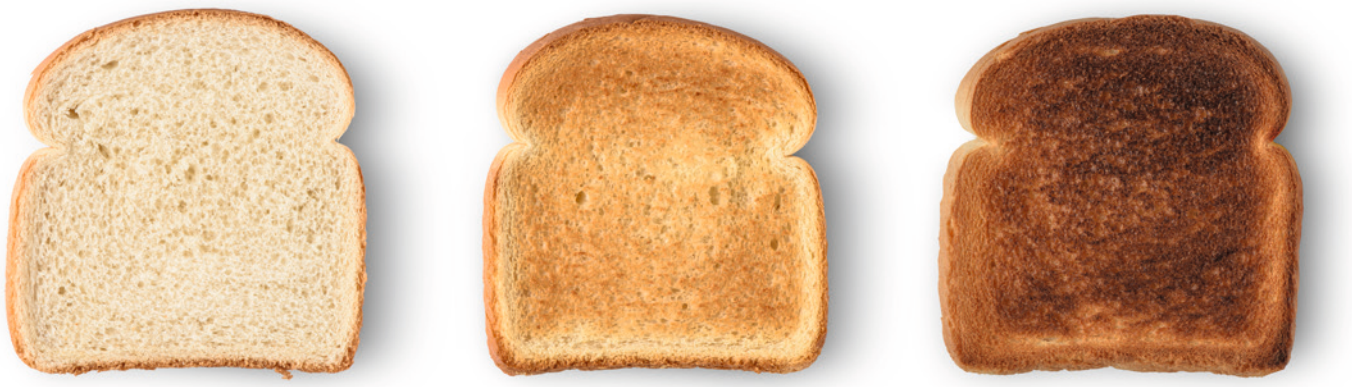
## minimal food processing may reduce risk of food allergy

Normal food processing and meal preparations such as cooking, frying and baking, stimulates a non-enzymatic reaction between sugars and proteins. This reaction is known as the Maillard reaction (MR) or glycation.

During food processing a cascade of chemical reactions, such as condensation and oxidation, leads to the production of Maillard reaction products (MRPs). MRPs can influence the taste, smell and color of many food products. In recent years, studies have found that MRPs are also linked to the development of several non-communicable diseases including food allergy[1-4].

The MR can change immunoreactivity towards food proteins, and MR-modified proteins may stimulate immune response through selective interaction with antigen presenting cells (APCs: monocytes, macrophages, and dendritic cells) carrying receptors for advanced glycation end products (AGE)[5]. Advanced glycation end products (AGE) are the end products of MR.

In people at risk for developing allergy, the enhanced presentation of MR-modified allergens to T-cells may promote the production of IL-4, IL-5 and IL-13 by Th2 cells[5]. IL-4 and IL-13 are responsible for initiating IgE antibody production by B cells. IgE antibodies bind to receptors on mast cells and basophils and causes immediate hypersensitivity reactions when they bind to (food) allergens.



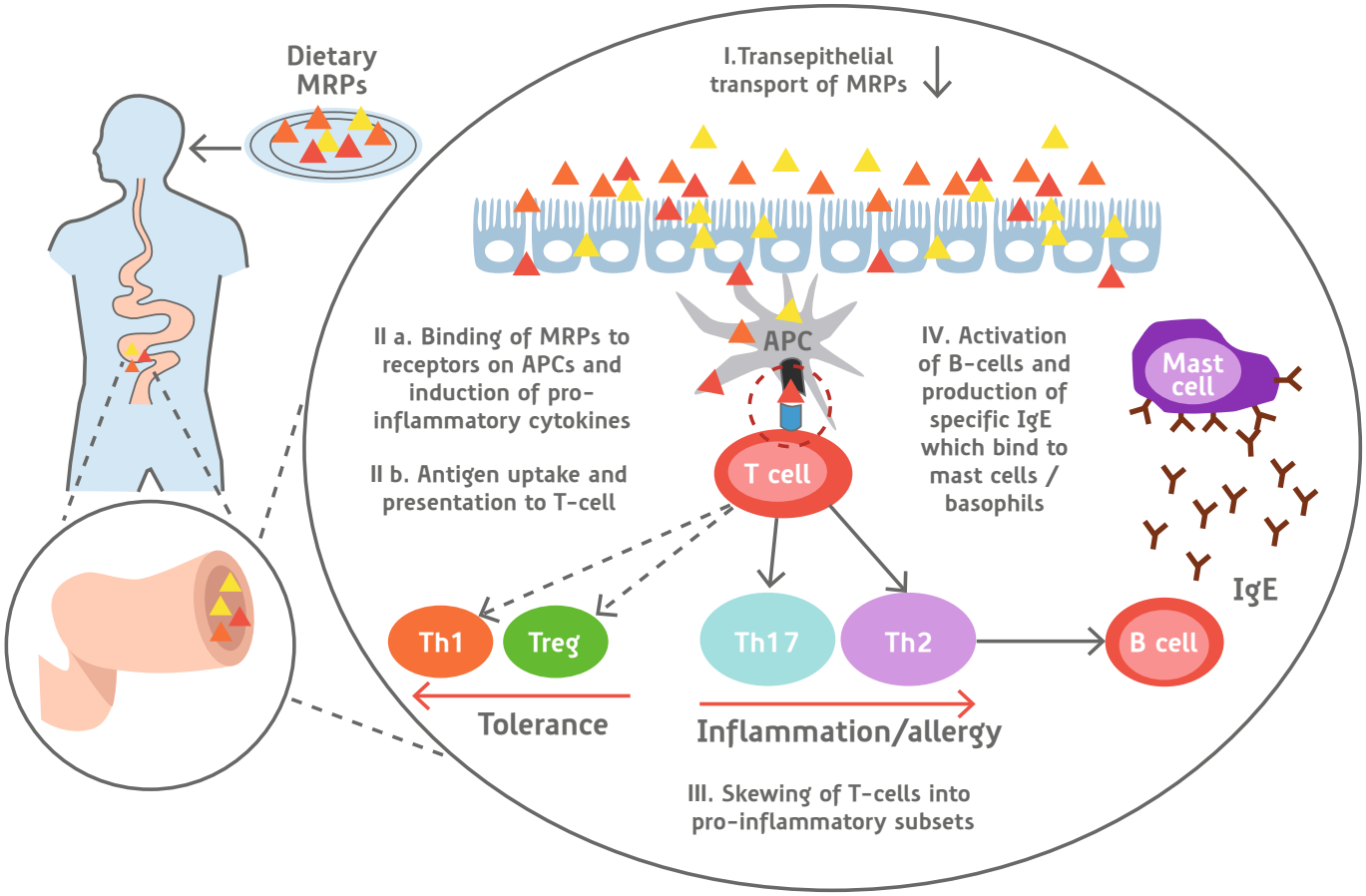



*Figure explains how dietary AGE products contribute to the allergic sensitization process. Dietary MRPs crosses the intestinal epithelial barrier (I), leading to antigen uptake by mucosal dendritic cells and presentation of peptides to specific T-cells (II). Activated antigen-specific T helper (Th) cells differentiate into pro-inflammatory and allergy-inducing Th17 and Th2 subsets (III). Allergen-specific B-cells are activated upon ligand binding and initiate the production of allergen-specific IgE antibodies (IV) that bind to mast cells and basophils and become detectable in the circulation. This figure was originally published in Nutrients[5].*

In some cases, there can be enhanced mediator release from basophils incubated with MR-modified proteins[5]. This could be a result of the immunogenic potential of MRPs enhancing the sensitization; and/or agglomeration leading to more efficient cross-linking and therefore mediator release.

The effect of MR on both the sensitization phase and the development of the symptoms of allergy needs to be further studied. Understanding the mechanisms involved in the immunoreactivity of AGEs would help to improve the diagnostics of food allergy[5]. For instance, the diagnosis of food allergy may be further improved by adding processed and MR-modified food allergens, in addition to the raw food antigens, into the diagnostic tests. Understanding the effect of MR may also contribute to the development of optimized conditions for food processing to control the rate of MR.

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Version April 2019