



Glycotoxins: Processed Foods Increase Risk of Chronic Disease

Researchers from Mount Sinai School of Medicine, New York report that cutting back on the consumption of processed and fried foods, which are high in toxins called Advanced Glycation End products (AGEs), can reduce inflammation and actually help restore the body's natural defenses regardless of age or health status. These benefits are present even without changing caloric or nutrient intake.

The findings, published in the October/November issue of the *Journal of Clinical Endocrinology and Metabolism*, provide a simple dietary intervention that could result in weight loss and have significant impact on several epidemic diseases, including diabetes, heart disease, and kidney disease.

The findings are the result of a clinical study involving over 350 people which was conducted in collaboration with, and with support from, the National Institute on Aging (NIA). The study builds on earlier research conducted in animal models that demonstrated the effective prevention of these diseases and even the extension of lifespan by consuming a reduced AGE diet.

“What is noteworthy about our findings is that reduced AGE consumption proved to be effective in all study participants, including healthy persons and persons who have a chronic condition such as kidney disease,” said the study's lead author Helen Vlassara, MD, Professor and Director of the Division of Experimental Diabetes and Aging at Mount Sinai School of Medicine.



“This suggests that oxidants may play a more active role than genetics in overwhelming our body's defenses, which we need to fight off disease. It has been said that nature holds the power, but the environment pulls the trigger. The good news is that unlike genetics, we can control oxidant levels, which may not be an accompaniment to disease and aging, but instead due to the cumulative toxic influence of AGEs,” said Dr. Vlassara.

AGEs are harmful substances that are abundant in Western diets, and proliferate when foods are heated, pasteurized, dried, smoked, fried or grilled. Once absorbed in the body, AGEs adhere to tissues and oxidize them, causing inflammation which in turn can lead to disease. Numerous animal studies conducted by Dr. Vlassara and her team have shown that oxidative stress from high oxidant



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levels and inflammation related to long-term exposure to AGEs may increase the risk of diabetes, heart disease, kidney disease and other chronic conditions.

For the study, a subset of 40 healthy participants who were either between the ages of 18 and 45 or older than 60, and another nine patients with kidney disease, were randomly assigned to one of two diets. One group followed their own regular Western diet that was rich in AGEs. The second group followed a diet of similar caloric and nutrient content, but with only one-half the amount of AGEs, known as the “AGE-less diet.” Participants in the AGE-less intervention were advised to avoid grilling, frying or baking their food and instead were instructed to poach, stew, or steam their meals. There was no change in calories or nutrient intake during this period.

After four months on the AGE-less diet, blood AGE levels, lipid peroxides, inflammatory markers, and biomarkers of vascular function declined by as much as 60 percent in healthy participants. A reduction of similar magnitude was found in kidney patients after only one month on the AGE-less diet.

Researchers also found a positive effect on a cellular receptor for AGEs called AGER1, which is critical for the clearance of toxic AGEs from the body. The number of copies of the AGER1 gene was measured in circulating blood cells. Since this number was severely suppressed in participants with kidney disease, all of whom had very high levels

of AGEs, the researchers speculate that important defense mechanisms can become “exhausted” as a result of chronically elevated AGEs. However, after a short period on the AGE-reduced diet, the number of AGER1 gene copies was restored to normal levels among patients with kidney disease.

The investigators believe that daily AGE consumption in the standard Western diet is at least three times higher than the safety limit for these oxidants. This could, in part, explain the changes seen in disease demographics.

Dr. Vlassara cautioned, “Even though the AGEs pose a more immediate health threat to older adults, they are a similar danger for younger people, including pregnant women and children, and this needs to be addressed. AGEs are ubiquitous and addictive, since they provide flavor to foods. But they can be controlled through simple methods of cooking, such as keeping the heat down and the water content up in food and by avoiding pre-packaged and fast foods when possible. Doing so reduces AGE levels in the blood and helps the body restore its own defenses.”