These Chemicals in Pet Food May Trigger Age-Related Disease

Biochemical compounds called advanced glycation end-products are present in heat-processed pet foods, and are linked to aging and disease. Now, a groundbreaking scientific study is in the works to evaluate the effect of these substances on the health of dogs.

STORY AT-A-GLANCE

- This week I'm helping to raise funds for an organization I co-founded called CANWI — the Companion Animal Nutrition and Wellness Institute
- This article, written by Dr. Joe Bartges of the College of Veterinary Medicine at the University of Georgia, provides proposed study design details for the first pet nutrition study CANWI will undertake
- The study will use specialized scientific techniques to measure the effects of advanced glycation end-products, which are disease-causing compounds found in processed pet food, on the health of dogs
- For this study, CANWI will receive no funding from big donors, the government or the pet food industry — all funding will come from pet parents

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Do you like hamburgers on the grill? How about caramelized onions to top them? And a toasted bun? Sounds pretty tasty … yes?

The heat involved in grilling and toasting releases lots of good flavors in food. Unfortunately, when heat is applied to meat, the proteins join with carbohydrates, creating what is known as the Maillard reaction.

The biochemical results are compounds called advanced glycation end-products (AGEs) that have been linked with aging, cancer, inflammatory diseases such as arthritis, diabetes mellitus and other diseases.

Scientific Studies Can Give Answers About Processed Pet Food

The questions we need to answer include:

- Do dietary AGEs play a role in disease and aging in dogs and cats as they do in people?
- Would feeding pets diets with lower AGE levels help to treat and maybe even prevent disease?

- Is it possible that AGEs indirectly influence health and disease by changing the way nutrients are used in the body, i.e. metabolic pathways?
- Do dietary AGEs affect the gut microbiome (the population of bacteria that live in the intestines and play such an important role in nutrition and health)?

In today's world we can use scientific techniques to investigate nutrient metabolism — a field called metabolomics — and measure changes in the gut microbiome to identify healthier diets and foods.

The researchers working with the Companion Animal Nutrition and Wellness Institute (CANWI) propose to use these special scientific techniques to start answering some of these critically important questions.

Proposed Study Design Details

Background: Dogs and cats are commonly fed processed commercial foods throughout their lives. Heat processing of pet food improves nutrient availability, shelf life and food safety.

It is also known that heat treatment of foods can cause a reaction between the amino acids in proteins and sugars called the Maillard reaction. The Maillard reaction occurs in animal and human tissues forming what is termed advanced glycation end-products or AGEs.

Studies have shown that elevated levels of AGEs in tissues are associated with age-related diseases in humans, rats and dogs including diabetes, cataracts, osteoarthritis, atherosclerosis, renal disease, cardiovascular diseases and cancers.

Maillard reaction products (MRPs) in diets can be absorbed and contribute to the AGE pool in the body. The absorption of MRPs from the diet and their accumulation into the AGE pool in the body may be one of the ways diets can impact age-related diseases in humans and animals.

As heat-processed commercial dry and canned pet foods are often the main or only source of food for dogs and cats, studies are needed to evaluate health impact of AGE consumption from dog foods.

Studies measuring AGE in dry and canned dog and cat diets have shown that the intake of AGEs is estimated 122 times higher in dogs and 38 times higher in cats than the average intake for an adult human on body weight basis.

A small, unpublished pilot study identified the effects of heat processing versus minimal processing in four pet diets with similar ingredients using liquid chromatography-mass spectrometry (LC-MS) to measure the AGEs.

It was determined that heat-processed canned compared to heat-processed dry foods were higher in AGEs as compared to a commercial fresh food type diet.

Our study is to determine if we can modify AGE intake by feeding diets that differ in AGE content. We will evaluate the influence of differing intakes of dietary AGEs in biological samples, fecal microbiome and metabolomic profiles.

Demonstrating a dietary effect will help determine what role heat processed pet diets with higher AGEs compared to more fresh food diets, may play in age-related diseases in dogs such as diabetes, kidney disease, osteoarthritis and cancer, among others.

CANWI's First Study Will Explain the Effects of AGEs on Dogs

These study results will help us begin to understand the role of AGEs and the influence of diet in canine health. The study will also serve as the foundation for more research to help us identify and improve pet nutrition. It's an exciting and novel approach to the role of nutrition in the health of dogs and cats.
