VITALITY
DETOX DROPS

The Hidden Danger of Doggie Bags: PFAS Linked to Liver Damage

If we wanted to be dramatic, we might say that your doggie bag is trying to kill you. That would be a gross exaggeration, but it served to get your attention. In truth, one takeout container won't do much harm but according to a newly released study, the cumulative effect of many can do real damage. That's because many restaurants use takeout boxes containing PFAS (poly-fluoroalkyl substances), 'forever chemicals' linked to fatty liver disease, which is just as appetizing as it sounds.

Researchers at the University of Southern California, Los Angeles reviewed over 100 studies and found that increased enzyme levels that indicated liver disease are largely correlated with PFAS exposure. Their study was published in the journal *Environmental Health Perspectives*. It's worth noting that they were examining results from patients who drink little to no alcohol. Diet and lifestyle are factors in Non-Alcoholic Fatty Liver Disease (NAFLD) but they cannot fully account for its rising levels. Globally, one out of every four people has NAFLD and in the U.S. approximately one-third of all adults are predicted to have the disease by 2030, according to one study.

How PFAS Affect the Liver

PFAS are among a class of chemicals known as endocrine disruptors that interfere with hormone signaling systems in three ways. They can bind to a receptor within a cell, thus preventing the correct hormone from accessing that cell, block the way natural hormones and receptors are made or controlled or even mimic natural hormones in the body. When it comes to liver enzymes, the problem is that PFAS mimic body acid fats.

According to Liz Costello, one of the study's co-authors and a Ph.D. student in epidemiology at USC, "It's possible that PFAS activate some of the same receptors that fatty acids do, which could lead to fat accumulation or inflammation in the liver in a similar way that an unhealthy diet would."

Sources of PFAS

PFAs are not found only in takeout containers. They are used to make water, stain and grease-resistant products and they can be found in everything from nonstick cookware, rain jackets and cosmetics to fast-food wrappers. According to the study's authors, "The stable chemical properties that make PFAS ideal for industrial use also allow them to persist and accumulate in the environment, which is of concern because of the potential for long-term human

health effects." Those effects include increased cholesterol levels, high blood pressure, cancer, asthma and thyroid disease. Now, fatty liver disease has been added to that list.

What is Non-Alcoholic Fatty Liver Disease?

NAFLD is a common condition, especially in Western countries. The simple description is that it occurs when the liver cells have too much fat stored within them. It takes two forms, one relatively benign and the other more serious. Simple fatty liver, which is what most people have, doesn't involve inflammation of the liver or damage to liver cells. It may have no signs or symptoms and many who have the disease are unaware of it.

The second and more malignant form of NAFLD is known as Nonalcoholic steatohepatitis (NASH). NASH occurs on a continuum, starting with inflammation and liver cell damage and eventually leading to issues such as fibrosis, cirrhosis and liver cancer. Symptoms include:

- Bleeding easily
- Bruising easily
- Itchy skin
- Fluid accumulation in your abdomen
- Loss of appetite
- Nausea
- Jaundice
- Swelling in your legs
- Confusion
- Drowsiness
- Slurred speech
- Spider-like blood vessels on your skin

The Study

The USC research team reviewed 111 research studies of PFAS and the liver, including 25 in people and 86 in rodents. Given that more than 4,000 varieties of PFAS exist, they narrowed their search to just three commonly found in humans: perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS) and perfluorononanoic acid (PFNA).

The team also looked at liver enzyme levels, especially alanine aminotransferase (ALT). Elevated levels of ALT indicate liver damage in both humans and rodents. They discovered that all three of

the PFAS studied were linked to elevated levels of ALT as well as to the beginning stage of fatty liver disease in rodents.

“The major takeaway from this review is the comprehensive evidence across animal, population, and occupational studies that exposure to PFAS is linked to liver damage,” says Sarah Rock, another of the study’s lead authors. “These findings contribute to the growing evidence that PFAS may play a role in the development of multiple diseases.”

How To Limit Exposure to PFAS

PFAS are hard to avoid because they are embedded into so many common products. That doesn’t mean you can’t take steps to minimize your exposure. A few steps you can take:

- Wash fruit and vegetables before eating them, even if they’re labeled organic
- Use ceramic-coated cookware rather than non-stick pans
- Avoid using plastic containers in microwave ovens
- Bring your own metal or glass container to take home restaurant leftovers
- Limit your intake of foods that come in grease-resistant packaging. Studies have found that nearly half of all pastry and french fry wrappers contain PFAS
- Avoid stain-resistant coatings
- Avoid Gore-Tex and Scotch guard clothing

Making slight changes can alter the cumulative build-up of PFAS from a lifetime of takeout containers and microwaved lunches and becoming aware is the first step. In the meantime, it can’t hurt to keep an eye on that doggie bag. It might be plotting something.

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