

Why your sofa may harm your health

- Household chemical linked to thyroid disease
- Scientists call for full investigation into safety

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The chemical, which has been linked to thyroid disease, is thought to enter the body via household dust and contaminated food. Photograph: Bryan Mullennix/Getty

A common household chemical found in everything from sofas and carpets to pots and pans has been linked to an increased risk of thyroid disease, in the first major study carried out on its effect upon health.

The substance, used to make nonstick cookware, stain-resistant furnishings and greaseproof wrappers, is believed to get into the body through contaminated food or household dust. Once in the body it accumulates in organs and other tissues.

People with high levels of the chemical in their blood were found to be twice as likely to have thyroid problems as those with the lowest levels, according to a survey of medical records of nearly 4,000 otherwise healthy US adults. The study is published in the journal, *Environmental Health Perspectives*.

Scientists said they cannot be certain the chemical is directly responsible for the rise in thyroid disease but called for a full investigation to assess its safety.

Studies in animals have found that the chemical, PFOA (perfluorooctanoic acid), and a sister substance called PFOS (perfluorooctane sulfonate), can cause thyroid problems and a variety of other medical conditions, including hormone imbalances, liver disease and cancer.

"It's been thought that because they're inert they don't cause any health problems, but we're starting to see some evidence that is suggesting that's not true," said Tamara Galloway, professor of ecotoxicology at Exeter University.

"Because these chemicals are inert they are persistent and they build up in the environment and also in human and animal tissues."

We all have trace levels of PFOA in our bodies that we pick up from the environment. The substance is so stable that it persists for years. It has been detected in people around the world and in wildlife as diverse as birds, fish and polar bears.

The thyroid gland produces hormones that control the body's metabolism and are vital for regulating heart rate and temperature. Thyroid disease can make the gland produce too much or too little hormone. An underactive thyroid can cause exhaustion, depression and weight gain. If the gland is overactive, it can cause weight loss and a rapid heartbeat. Women are 10 times more likely to have thyroid problems than men.

The Exeter researchers trawled medical records on the US National Health and Nutrition Examination Survey, a database representative of the country's adult population. They found 3,966 people aged 20 and older whose blood had been tested for PFOA and PFOS between 1999 and 2006.

The scientists put the patients into four groups depending on the concentration of PFOA in their blood. The records showed that 16% of women in the top group had thyroid problems, compared with 8% in the lowest group. A similar trend was seen in men, though the number who had thyroid disease was small.

Co-author David Melzer, professor of epidemiology and public health at the Peninsula Medical School in Exeter, said: "There have long been suspicions that PFOA concentrations might be linked to changes in thyroid hormone levels. Our analysis shows that in the ordinary adult population there is a solid statistical link between higher concentrations of PFOA in blood and thyroid disease."

The scientists concede that their study does not confirm PFOA is causing thyroid disease. One alternative explanation is that thyroid disease makes PFOA accumulate more quickly in the body.

An investigation into the health effects of PFOA is underway in West Virginia, where thousands of people have been exposed over decades after the chemical was released from an industrial plant owned by the US manufacturer, DuPont. Tony Fletcher, a scientist working on the investigation and an environmental epidemiologist at the London School of Hygiene and Tropical Medicine, said a full report is due next year.

The US Food and Drug Administration has a voluntary agreement with several companies to phase out PFOA production over the next few years. Ashley Grossman, professor of neuroendocrinology at Queen Mary, University of London, said: "We also don't know whether this chemical is directly affecting the thyroid. Thyroid disease is often caused by the body's own immune system attacking the thyroid gland, so perhaps this chemical is having some effect on the immune system, rather than directly on the thyroid.

"We'd need to do a lot more research to verify this link and to understand how the two are linked. In the meantime, it's important to remember that thyroid disease can be successfully treated."

A spokesman for the Health Protection Agency said: "A study like this cannot establish cause and effect. An independent scientific advisory committee has looked at the published evidence and found no reason to suspect the chemical causes thyroid problems."

Perfluorooctanoic acid (PFOA) is a manmade chemical known for its heat resistance and water, grease and stain repelling properties. Manufacturers use PFOA to make fluoropolymers, used in thousands of products. It is turned into non-stick coatings for cookware, flame retardants in furnishings, stain protection treatments for carpets, wire coatings and waterproof clothing such as Gore-Tex.