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Penn Study Finds No Relationship Between Elevated C8 Levels and Liver or Thyroid Abnormalities

Highest C8 Levels Found in the Very Young and Eldest

(August 15, 2005) – At a community meeting this evening in Vincent, Ohio, **Edward A. Emmett, MD,** Professor of Occupational & Environmental Medicine at the **University of Pennsylvania School of Medicine,** presented the health-related results of an independent, epidemiological study led by him to investigate C8 levels in the blood of residents of southeastern Ohio. Specifically, Emmett and his colleagues reported no relationship between elevated C8 levels and blood-test results that would indicate liver damage or a history of liver disease (including cirrhosis, hepatitis, and any other liver condition), or thyroid damage or a history of thyroid disease.

The researchers found the highest levels of C8 were in the most vulnerable populations – namely, children under 6 years of age and seniors over 60 – a situation, said Emmett, that is "the exact opposite of what we would want to see from a public-health perspective."

The scientists also reported that C8-levels in the blood were much lower in those who used bottled or spring water as their primary drinking source; and, for people using private well water, there was a direct correlation between C8 levels in the water they drank and C8 levels in their blood (in that higher levels of C8 in water yielded correspondingly higher levels of C8 in the blood).

The researchers detected no relationship between high C8 levels in blood serum and alcohol consumption, cigarette smoking, eating fish caught locally, and eating meat or game harvested locally. They did detect a link, however, between the consumption of large quantities of homegrown fruits and vegetables and higher levels of C8 in the blood. "The nature of this association will require further study," notes Emmett, "since it is not clear if this was due to C8 in the fruits and vegetables themselves, in the water used for cooking, cleaning, and canning the foods, or if the people eating more homegrown fruits and vegetables had a different diet and/or drinking habits than those who consumed smaller quantities of homegrown fruits and vegetables."

First Independent, Epidemiological Study of C8 Levels in Blood

The study – the nation's first government-sponsored epidemiological study of C8 levels in the blood of 326 volunteer subjects residing in four communities in southeastern Ohio – previously found C8 levels that were more than 60 to 80 times higher than those typically found in the

general population. They further concluded that water was the major source of contamination. Those earlier findings were released July 27, 2005.

All blood samples were run through a battery of carefully-chosen diagnostic tests designed to detect abnormalities in liver, kidney, and thyroid function, as well as cholesterol status. Based on those results, the researchers found no association between elevated C8 levels and changes in those tests.

"We did, however, find the highest elevations of C8 in the blood serum of young children and older adults, which is of concern since previous studies in animals have shown a possible link between high C8 levels and developmental and maturation deficiencies," said Emmett. "As a physician and public-health specialist, I urge parents within the study area to consider taking appropriate measures to reduce C8 levels in their children's blood-serum by using an alternative drinking-water source – such as bottled water -- if their primary residential water-source contains high levels of C8. I also advise consideration of the same precaution for pregnant women and women of child-bearing age who may wish to become pregnant."

Cancer Risk?

Although exposure to high concentrations of C8 over long durations has been shown to cause liver, pancreatic, testicular, and other cancerous tumors in rats, it is not certain that C8 would cause the same effects in humans. Indeed, an Environmental Protection Agency (EPA) Advisory Panel is currently debating whether C8 should be considered a likely carcinogen for regulatory purposes.

"Our study did not address the cancer-risk factor," explains Emmett. "However, it should be noted that we found no toxic effects in the livers of residents studied – and that information may be somewhat comforting because there is always substantial liver toxicity in rats whenever C8 has caused liver tumors in rats." Emmett also pointed out that current cancer statistics show no elevated cancer-risk in Washington County, Ohio – where the Penn study participants reside – and the rest of Ohio.

Recommendations

The researchers recommended the continuation on ongoing efforts to remove C8 from the area water as expeditiously as possible. They further recommended that residents consider an alternative drinking source if their primary residential water source contains high levels of C8. "Alternative water sources -- such as bottled or spring water – should be considered whenever water may be ingested orally – such as when drinking water, making tea or coffee, cooking, making infant formula, or brushing teeth," said Emmett. "Prior research has shown that C8 does not readily cross human skin, so it's unlikely that a risk is posed by simply showering, bathing, and washing in water containing C8," he added.

About the Study

The study – which is independent of any corporation, law firm, or class-action suit – is funded through a four-year Environmental Justice Partnership grant from the National Institute of Environmental Health Sciences; and is specifically designed as a collaborative initiative among environmental health scientists at Penn's School of Medicine, the Decatur Community Association in Cutler, Ohio, and a local physician affiliated with Grand Central Family Medicine in Parkersburg, West Virginia.

The objectives of the study were threefold: to measure the levels of C8 in the blood of a sample of the population exposed to C8; to determine whether the major route of exposure is from air, water, or a combination; and to determine if the levels of C8 are associated with adverse changes in biomarkers of health effects.

In addition to principal investigator Edward Emmett, MD, the study team included Frances Shofer, PhD, Les Shaw, PhD, Mary Hufford, PhD, Chintan Desai and Charlyn Okigbo, all from Penn; Hong Zhang, MD, with Grand Central Family Medicine in Parkersburg, WV; Nancy Rodway, MD, of Adena Occupational Health, in Chillicothe, OH; and David Freeman, with the Decatur Community Association, in Cutler, OH.

About C8

C8 is the commonly used name for perfluorooctanoic acid, or PFOA – a chemical used in the production of fluoropolymers. Fluoropolymers are used to make non-stick surfaces for cookware and other uses; aswell as to make clothing, carpeting, and other products resistant to grease, water, and stains. According to manufacturers, C8 is not present in the final products. C8 is very persistent in the environment and is not biodegraded. Once inside the human body, it is very slowly eliminated.