

Flame retardant 'Firemaster 550' is an endocrine disruptor, study finds

October 24 2012

(Medical Xpress)—The flame-retardant mixture known as "Firemaster 550" is an endocrine disruptor that causes extreme weight gain, early onset of puberty and cardiovascular health effects in lab animals, according to a new study spearheaded by researchers from North Carolina State University and Duke University.

Firemaster 550 is made up of four principal component chemicals and is used in [polyurethane foam](#) in a wide variety of products, ranging from mattresses to infant nursing pillows. The flame-retardant mixture was developed by Chemtura Corp., and was first identified by the research community in 2008. It was developed to replace a class of [fire retardants](#) being phased out of use because of concerns regarding their safety. This new study represents the first public data on whether Firemaster 550 has potential health effects.

In this pilot study, pregnant [lab rats](#) were assigned to three groups: a control group, which was not exposed to Firemaster 550; a "low-dose" group, which ingested 100 micrograms of Firemaster 550 once per day throughout pregnancy and nursing; and a "high-dose" group, which ingested 1,000 micrograms on the same schedule. These environmentally relevant doses are lower than the doses used in industry-funded studies. Researchers then evaluated the physiological outcomes of the exposure in both the mothers (called dams) and the offspring (called pups).

Importantly, the researchers detected TBB, one of Firemaster 550's component chemicals, in the fat of all the exposed dams and offspring,

but none of the unexposed animals. This means the flame retardant is capable of crossing the placenta during pregnancy, reaching infants via [breast milk](#), or both.

Because [flame retardants](#) that have been phased out are known to disrupt [thyroid function](#), and Firemaster 550 includes chemicals with structural similarities, the researchers looked at circulating [thyroid hormone](#) levels in dams at the end of the nursing period. The high-dose dams had much higher thyroid [hormone levels](#) than the control group, while low-dose dams had marginally higher thyroid hormone levels. This is significant because thyroid hormones influence brain development during pregnancy, as well as a host of other biological functions, such as metabolism.

Researchers also found extremely rapid weight gain in the offspring. By the time they were weaned from nursing, high-dose male pups were 60 percent heavier than the control group – and high-dose female pups were 31 percent heavier than the control group.

The increased weight in female pups contributed to the early onset of puberty. The control group hit puberty at 33 days old, while the high-dose group hit puberty at 29 days.

High-dose female pups also had difficulty regulating their glucose levels as adults. High-dose males had thickened walls in the left ventricle of the heart, suggestive of cardiovascular disease.

"This study indicates that Firemaster 550 is an [endocrine disruptor](#), and that raises a lot of important questions," says Dr. Heather Patisaul, an assistant professor of biology at NC State and lead author of a paper describing the work. "This was a small-scale study. We need to continue this work with a larger sample size and look at a broader range of potential effects related to obesity, thyroid hormone function and

metabolic syndrome. We also want to determine which of the component chemicals in Firemaster 550 are responsible for the various effects."

Provided by North Carolina State University

Citation: Flame retardant 'Firemaster 550' is an endocrine disruptor, study finds (2012, October 24) retrieved 27 April 2024 from <https://medicalxpress.com/news/2012-10-flame-retardant-firemaster-endocrine-disruptor.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.