

Testimony in support of HB 27

Good afternoon and thank you for giving me the opportunity to speak to you today in support of House Bill 27. My name is Thomas Zoeller and I am a Professor in the Biology Department at the University of Massachusetts Amherst. My research over the past 25 years has been focused on understanding how thyroid hormone controls brain development and whether – and how - environmental chemicals like halogenated flame retardants can interfere with this action.

It is first important to recognize that thyroid hormone is essential for brain development – in the fetus, in newborns and in children. This fact is so well-recognized that every baby born in this country is tested for normal functioning of the thyroid gland at birth. In some regions of the country, as many as 1 in 1200 newborns have low thyroid hormone, and it is considered a medical emergency to ensure that they are identified and treated quickly to limit the cognitive deficits caused by low thyroid hormone during development.

It has also become clear that thyroid hormone levels in pregnant women are important for development of the fetus. This appears to be especially true in the first trimester when the fetal thyroid gland has not yet developed, but when thyroid hormone is still required for brain development.

My research on halogenated flame retardants such as PBDEs tetrabromo bisphenol A and some perfluorinated chemicals has demonstrated that these chemicals can interfere with thyroid hormone in the developing brain, but in ways that we do not fully understand.

Currently, the only tool we have to test whether these flame retardants affect the human thyroid system is to measure blood levels of thyroid hormone. But work in my laboratory and the laboratory of others has shown that some of these chemicals can interfere with thyroid hormone in brain in a manner that is not consistent with changes in blood levels of thyroid hormone.

We have expanded this work recently to humans by testing whether halogenated chemicals can interfere with thyroid hormone actions in the placenta. We have focused on placenta for the obvious reason that the tissue is available and is a known target of thyroid hormone action, but it is also likely that similar effects are occurring in the fetal brain. In collaboration with our Canadian colleague Dr. Larissa Takser in Quebec, our findings are fully consistent with the conclusion that environmental chemicals – most likely halogenated flame retardants – can interfere with thyroid hormone action in humans without affecting hormone levels in the mother or in cord blood.

This observation should be deeply concerning to everyone in this room because it means that common chemicals found in the home and workplace can affect the health of our children like a stealth bomber: flying below the radar of the ways we test chemicals for safety or to study the impacts of these chemicals on human health.

In closing, it is clear to me that these halogenated flame retardants can and do affect human development in part by interfering with thyroid hormone. This conclusion is based on years of high-resolution research that cannot be duplicated for every halogenated flame retardant. These chemicals are robbing our children and grandchildren of critical intellectual potentials. While these effects may not be visible on the faces of our children, they are no less important to them individually or to our society.

Thank you again for your attention.