

Defining Endocrine Disruptors: Are Women Workers In The Automotive Plastics Industry Particularly At Risk?



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There are many people working in the automotive industry who are manufacturing plastic parts for cars. Many of them are women who spend their entire working lives doing this job. They are exposed to many chemicals used in the manufacturing process. Their exposures are mainly by breathing the fumes and dusts, but also by absorption through the skin. Many of these chemicals interfere with hormone systems and are therefore called endocrine disruptors.

The endocrine system is a sensitively balanced system of glands and hormones. Hormones, such as insulin, thyroxin, estrogen, and testosterone, interact with – or target - specific cells by a number of means. One easy way to illustrate this is the image of a lock and key. For example, target cells such as those in the uterus contain receptors (locks) into which specific estrogenic hormones (keys) can attach and thereby trigger specific biological events such as regulating ovulation or miscarriages. Similarly, hormones regulate such vital functions as body growth, response to stress, sexual development, production and use of insulin, and the rate of metabolism, among others.

Over the past 60 years, through technological advances, a growing number of synthetic chemicals have been used in the production of almost everything we purchase. They have become a routine part of our everyday life, found in cosmetics, cleaning compounds, baby and children's toys, food storage containers, furniture and carpets, computers, phones, and appliances. We encounter them as plastics and resins in our cars, trucks, planes, trains, sporting goods, outdoor equipment, medical equipment, dental sealants, and pharmaceuticals. Without certain additives like fire retardants, for example, we would not likely be using our computers or lighting our homes. Instead of steel and wood, plastics and resins are now being used to build homes, offices, factories, schools, and other buildings. What this constant everyday low-dose exposure means in terms of public health is just beginning to be explored.

Synthetic chemicals can disrupt a variety of endocrine functions in the body. First, they can mimic hormones and act as though they were the “keys” to the receptor “locks” and trick the cells into thinking that they are hormones. Second, they can interfere by binding to proteins that transport hormones or other proteins that have signaling roles in the cell and between cells. Thirdly, they can inhibit or induce enzymes, interfering with uptake and export from cells, and modify the ways that genes are read. Exposures to chemicals that are endocrine disruptors can result in effects on a variety of tissues and organs, particularly in developing infants and children.

There is no agreement between toxicologists and endocrinologists about how to test chemicals for endocrine disruption. There are no agreed methods that have been developed and internationally validated for testing chemicals for endocrine disrupting effects. Therefore, to date, no chemical in use has been thoroughly tested for its endocrine disrupting effects using agreed methods.

Traditional methods for testing toxicity used high concentrations of chemicals to obtain results quickly and within the much shorter natural lifetime of the test animals compared to humans. It was assumed that the higher the dose, the greater the effect. And it was assumed that there would be a dose at which there was no significant effect and that it would be safe to expose people up to these levels.

What we now know from the research of endocrinologists is that there are significant effects, sometimes at concentrations thousands of times lower than the “safe” level established by traditional toxicology. Instead, endocrinologists are saying that new tests need to be developed and undertaken on chemicals that are suspected endocrine disruptors, to see if there are irreversible effects at the low exposure levels commonly encountered.

What does this mean for the plastics workers, and particularly women, who are exposed to a variety of plastic monomers and polymers on a daily basis? It has been assumed that through traditional toxicology testing, the health of workers could be protected by keeping exposure levels in the industrial plants below the “safe” levels calculated by the toxicologists using high dose testing. One concern is the effect of a lifetime of exposures to a variety of plastics that are endocrine disruptors on the development of cancer, and particularly breast cancer in women. Another concern is for the health of pregnant women and their developing infants.

*Compiled with reference to the following TEDX website:
<http://www.endocrinedisruption.com/endocrine.introduction.overview.php>