

Exploring the Impact of Endocrine-disrupting Chemicals on Human Health

Zohilum Nekinon*

Department of Pharmacy, University of Queensland, Brisbane, Australia

Introduction

Endocrin-Disrupting Chemicals (EDCs) have emerged as a critical concern in the realm of public health. These substances, found in various products and environments, can interfere with the body's endocrine system, leading to a range of adverse health effects. This article delves into the intricate world of EDCs, aiming to shed light on their sources, mechanisms of action, and the significant consequences they pose to human health. With a focus on the latest research findings, this exploration aims to deepen our understanding of EDCs and the imperative need for regulatory measures and awareness campaigns. The most common types of FRs found in e-waste recycling sites are Brominated Flame Retardants (BFRs), of which Poly Brominated Diphenyl Ethers (PBDEs) are legacy BFRs that have been being phased out by industries since the mid-2000s voluntarily and due to regulations, except for decabromodiphenyl ether [1].

Description

EDCs can be found in everyday products such as plastics, pesticides, and personal care items. Bisphenol A (BPA), phthalates and Polychlorinated Biphenyls (PCBs) are some well-known EDCs. These chemicals often leach into food, water, and air, exposing humans through ingestion, inhalation, and dermal contact. Additionally, some EDCs, like dioxins and furans, are byproducts of industrial processes and can persist in the environment for long periods. EDCs exert their effects by mimicking, blocking, or altering the body's natural hormones. They can bind to hormone receptors, disrupt hormone production, or interfere with hormone transport. For example, BPA can mimic estrogen, leading to hormonal imbalance and potentially causing fertility issues and certain cancers. Understanding these mechanisms is crucial in recognizing how EDCs disrupt the endocrine system [2].

The health consequences of EDC exposure are vast and multifaceted. Research has linked EDCs to a range of conditions, including reproductive disorders, developmental abnormalities, obesity, diabetes, and hormonal cancers. For instance, exposure to phthalates during pregnancy can affect fetal development, leading to birth defects and developmental delays. EDCs' impact extends across the lifespan, with implications for both immediate health and long-term well-being. Thyroid hormones exert their influence in the body at extremely low doses and are maintained through complex feedback mechanisms such that interactions of even low doses of PBDEs can cause disruptions in homeostasis through multiple known pathways [3].

In response to the growing concern surrounding EDCs, regulatory agencies worldwide have taken steps to limit their use and exposure. For example, the European Union has banned or restricted several EDCs in various products. However, much work remains to be done to adequately address this issue. Public awareness campaigns play a crucial role in educating individuals about EDCs' risks and encouraging them to make informed choices regarding product usage.

*Address for Correspondence: Zohilum Nekinon, Department of Pharmacy, University of Queensland, Brisbane, Australia, E-mail: nekion@zohilum.au

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To comprehend the impact of EDCs, it's essential to first grasp the workings of the endocrine system. The endocrine system consists of glands that produce hormones, which regulate various bodily functions, including growth, metabolism, and reproduction. Hormones act as messengers, delivering instructions to target cells or organs. Any disruption in this finely tuned system can lead to health issues [4,5].

Conclusion

The impact of endocrine-disrupting chemicals on human health is a complex and pressing issue that demands attention at both the individual and societal levels. As our understanding of EDCs continues to evolve, it is evident that proactive measures are needed to reduce exposure and mitigate the health risks associated with these chemicals. Regulation, research, and education are essential components of a comprehensive strategy to address this challenge. By taking action to minimize EDC exposure and supporting ongoing research efforts, we can work toward a healthier future in which the harmful effects of these chemicals are minimized, if not eradicated.

Acknowledgement

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Conflict of Interest

None.

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