

Endocrine Disrupting Chemicals and Their Impact on Human Fertility and Reproductive Health

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Introduction

Endocrine disrupting chemicals (EDCs) are exogenous substances capable of interfering with the body's hormonal signaling pathways, leading to adverse developmental, reproductive, neurological, and immune effects. These chemicals, commonly found in pesticides, plastics, industrial byproducts, and personal care products, mimic or block natural hormones such as estrogens, androgens, and thyroid hormones. Their pervasive presence in the environment and ability to bioaccumulate raise serious concerns about their long-term effects on human fertility and reproductive health, making them a growing public health priority [1].

Description

One of the primary mechanisms by which EDCs affect fertility is through hormonal imbalance. By binding to hormone receptors or altering hormone synthesis and metabolism, EDCs can disrupt ovulation in women, impair spermatogenesis in men, and reduce overall reproductive capacity. Chemicals such as bisphenol A (BPA), phthalates, and polychlorinated biphenyls (PCBs) have been strongly linked to decreased sperm quality, altered ovarian function, and irregular menstrual cycles, ultimately lowering the chances of conception [2].

Beyond direct effects on fertility, EDCs are associated with adverse pregnancy outcomes and developmental complications in offspring. Prenatal exposure to EDCs can result in miscarriages, preterm births, and low birth weight, while also increasing the risk of congenital anomalies. Furthermore, epigenetic modifications induced by these chemicals can persist across generations, leading to trans generational reproductive health concerns. This raises alarms about the long-term sustainability of human

Reproductive potential in populations with high EDC exposure. In addition to their effects on reproductive capacity, EDCs play a role in the rising prevalence of reproductive disorders [3].

Polycystic Ovary Syndrome (PCOS), endometriosis, cryptorchidism, and testicular dysgenesis have all been associated with environmental chemical exposure. The link between EDCs and hormone-dependent cancers such as breast, ovarian, and prostate cancer further underscores the breadth of their impact on reproductive health. Given that EDC exposure is often unavoidable due to widespread environmental contamination, awareness are vital to reducing their burden on public health [4,5].

Conclusion

Endocrine disrupting chemicals pose a significant threat to human fertility and reproductive health through mechanisms involving hormonal imbalance, developmental toxicity, and increased risk of reproductive disorders. Their widespread presence in the environment, persistence, and potential for generational effects highlight the urgent need for preventive strategies, regulatory action, and safer alternatives in consumer and industrial products. Addressing the challenges posed by EDCs is crucial for safeguarding reproductive well-being and ensuring healthier future generations.

Acknowledgement

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Conflict of Interest

None.

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