

## Effects of Endocrine Disruptors on Pediatric Age: what we can do to Reduce the Risk?

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Endocrine disruptors (ED) was first describe in 1993 by Theo Colborn. Is an exogenous substance or mixture of substances that modifies endocrine system functions and consequently causes adverse effects on the health of an intact organism, its offspring or populations.

About 800 substances are capable to interfere with ED, but only a minority were studied until now.

The age of exposure may have different consequences when we are talking about a fetus or child, with varying periods of sensitivity and window periods.

Even low doses of ED can cause effects especially if exposure occurs in a critical period.

The ED act in nuclear receptors, non-nuclear steroid receptors and enzymatic pathways of synthesis and metabolism.

The ED chemicals are: perfluorinated alkyl acids (PFOS, PFOA), organochlorine pesticides (HCB,DDE,DDT), organophosphate pesticides (DAB, chlorpyrifos), nondioxine-like (PCBsPCB-153), dioxin-like compounds (2,3,7,8-TCDD, PCB-126) brominated flame retardants, (PBVD-47,PBVD-99, HBCD), phthalates (DBP) and organohalogens (4-OH-CB-146).

What are the main effects in human being? Can affect the reproduction, cause cancer, thyroid disease, neuroendocrine problems, obesity, diabetes and interfere with the neurodevelopment.

In boys, because of the effects of phthalates, PCBs, dioxins and pesticides, can reduce the motility and concentration of spermatozooids and cause "Testicular dysgenesis syndrome".

Triclorcarban and BPA, cause in girls early ovarian failure, polycystic ovarian syndrome, abnormalities of the reproductive tract, uterine leiomyomas and endometriosis, pubarche and thelarche.

In industrialized countries, in the last decades, the incidence of cancer have increase significantly, not fully explained by genetic causes. As a example, xenoestrogens in the fetal period are responsible for breast cancer.

On the thyroid, PCBs, phthalates, BPA, are associated with ↓ T4 or TSH. Hypothyroidism is caused by interference in the uptake of iodine (perchlorate).

Organotins (tributyltin, triphenyltin) and phytoestrogens cause lipid accumulation and differentiation of adipocytes with evolution to obesity.

The incidence of type 1 DM increase 3 - 5%/year because of DE. Phthalates, BPAs, PCB's, dioxins are responsible for this increasing.

Dioxins are associated with impaired glucose metabolism and BPA cause hyperinsulinism and insulin resistance, with secondary type 2 diabetes.

In the last decades, we found an increased incidence of autism spectrum disorder (ASD) and attention deficit/ hyperactivity disorder (ADHD).

Exposure to pesticides and phthalates in the fetal period, cause inhibition of the gabaminergic system and ASD. Biphenyl and PCB interfere with the testosterone level and are related with ADHD.

What we can do to avoid or reduce the influence of DE in our health?

Is impossible to avoid everything that contents DE, but we can be more selective, avoiding microwave heating in plastic containers, avoiding eating or drinking in plastics, choosing wooden toys, using cosmetics without phthalates, reducing the consumption of canned, using water filter and choosing organic farming.

If we are more conscious in our daily routine, using strict criteria in choosing a product or food, we can reduce the harmful effects on health caused by endocrine disruptors in our children.

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