Endocrine disruptors: history and difficulties in predicting effects.

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Editorial

Over the past thirty years, there has been a considerable increase in the incidence of hormone-dependent cancers such as breast, prostate, but also other pathologies such as the appearance of malformations in the genital organs (hypospadias for example). Metabolic disorders such as obesity and eating behavioural disorders such as anorexia, bulimia and anxiety have also increased enough for it to become a real public health issue. But how can we imagine an increase in all these pathologies despite all the scientific advances that Man has made?

One of the first answers to this question was made more than fifty years ago by Roy Hertz, who in 1958 considered "that it should be taken into consideration that the use of hormones in food Animals could expose some individuals to these hormones when they should never have been in contact with their life with such molecules that we were creating a steroids cycle in our environment and that we must seriously consider the implications for our development, growth and perhaps our reproductive functions.

Four years later, Rachel Carson wrote her book "Silent Spring", which raises public awareness of the problems associated with the toxic risks of toxic chemical pollutants in the environment.

Hence the hypothesis that xenobiotics released into the environment, found in the diet, and able to mimic or interfere with the action of endogenous hormones, would be responsible for these disorders of development, reproduction and behaviour in industrialized or developing countries and polluted areas. Hypothesis brought by Theo COLBORN which will give the name of "endocrine disruptor" to these molecules in 1991.

However, until the year 2003, the first European working group called the Credo (Cluster of Research into Endocrine Disruption in Europe) was set up to see 60 European laboratories gather together in order to federate research on system disrupter's endocrine. In 2005, this group organised a seminar in Prague, bringing together more than 200 scientists in endocrine disruption [1].

These experts (Ana Soto, Bruce Blumberg, Bernard Jégou, Jean-Pierre Bourguignon, Pierre Jouannet...) write a document designed to inform citizens, policy makers and constructive suggestions that could lead to better protection of human and Wildlife in Europe and around the world.

In the same period, endocrine disruptors have been found to affect not only the reproductive system and the nervous system (reprotoxic and neurotoxic effects), but may also affect the control of energy homeostasis. In 2002, Paula Baillie-Hamilton published a retrospective study in which she showed a correlation between exposure to low doses of chemical molecules and weight gain. In the same sense Bruce Blumberg in 2006, uses for the first time the word "Obesogen" to designate chemical molecules that have the ability to predispose mice to become obese.

It is now evident that endocrine disruptors have effects: -repro, -neuro, -metabo (toxic), to which are added other notions such as: mixtures (cocktail effects due to exposures to several chemicals), (Doses equivalent to levels of human exposure), window and duration of exposure (in utero, postnatal or lifetime), mode of exposure (dermal, oral, inhalation, etc.), Trans-generational effects (adverse effects that extend for several generations after a single gestational exposure) and epigenetic mechanisms (changes in the expression of genes that are transmissible but are reversible and do not result from changes in the sequence of the genes, DNA) [2-5].

All these points makes this research area "endocrine disruptors effects" even more complex and involves no longer considering the biological effects independently, but according to an integrative approach to the effect of exposure to cocktails mimicking environmental conditions. Then, it's necessary to determine whether their effects can be predicted or no on the basis of their experimental effects [6-8].

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