

A safe environment for children

Short report of an Expert Dialogue on new scientific insights in children's developmental disorders caused by low dose exposures to common chemicals

Debate about lessons for European policies on pesticides, toys, cosmetics, chemicals and fuel additives



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Short report of an Expert Dialogue on new scientific insights in children's developmental disorders caused by low dose exposures to common chemicals¹

Debate about lessons for European policies on pesticides, toys, cosmetics, chemicals and fuel additives

Two of Europe's foremost experts came together with MEPs, MEP assistants, European Commission representatives and NGOs, on October 7th, to discuss the latest science on the impacts that low dose exposures to hazardous chemicals can have on the health and development of the embryo, foetus and child. The meeting was hosted by **Dorette Corbey, Member of the European Parliament and Committee on Environment, Health and Food Safety**, in collaboration with **Women In Europe For A Common Future (WECF)**. Ms. Corbey said it was a timely event given the current debates in the European Parliament. She gave a particular welcome to her MEP colleagues, Frieda Brepoels (EPP-ED) and Hiltrud Breyer (Greens/EFA).

Sascha Gabizon, Executive Director, WECF said that her organisation is very concerned about the irreversible harm that very low doses of hazardous substances can do to children's health, when exposure occurs in vulnerable periods of child development. Many effects are life-long and some can even be transferred to the next generation. She showed that endocrine disrupting substances such as phthalates are widespread in many ordinary products such as cosmetics, toys, rain gear, shoes, wallpaper and furniture. Current EU legislation on pesticides, cosmetics, toys and chemicals does not sufficiently protect children against contaminants that can cause developmental disorders.

Professor Philippe Grandjean, University of Southern Denmark, Department of Environmental Medicine, Adjunct Professor of Environmental Health, Harvard School of Public Health: In Europe we talk about CMR chemicals, but we need to add E & N: Endocrine disrupting and Neurotoxic: CMREN. The development of our nervous system is very sensitive to external influences. The optimal function depends on the proper development and integrity of the complete organ. You don't have a second chance to develop the brain! In the third trimester of pregnancy, the fetus produces 200 brain cells per second. This process of brain development continues after birth until the total length of axons (nerve connections) can reach 4 times around the world. At various moments cells divide, differentiate, migrate, connect or disconnect. Neurotoxic effects depend on the type of chemical, the dose as well as the timing in regard to specific moments of vulnerability. See also www.pptox.dk for the conclusions of the first international scientific conference on this issue on the Faroe Islands.

The Minamata case in 1959 showed that pregnant women exposed to mercury did not suffer, but the child they carried was born with dramatic birth defects. Fetal Alcohol Syndrome shows characteristics in the child's features, but other neurotoxic contaminations don't show outward effects. However, 1 microgram mercury per gram of a person's hair – a US exposure limit - is already connected to a lower speed of the brain. The high levels of lead coming from petrol in the 1970s resulted in a loss of several IQ points, but even low exposures have effects: the safest level is zero. Manganese, another heavy metal of concern, is now being considered as a substitute for lead. This is not a safe alternative as it has similar neurotoxic properties to lead. The safe exposure limits of well documented neurotoxins such as mercury and lead have decreased with time, due to improving insights. First we thought there was something special about mercury, but now we know that many substances have similar effects.

¹ Report by Maria Buitenkamp for WECF. Video recordings and other materials related to this meeting are available at <http://www.wecf.eu/english/articles/2008/10/developmentalharm-children.php>

Many substances are more toxic than we think. We have 201 documented neurotoxicants identified in the 2006 Lancet article, around half of these being produced in high volumes and 90 of the 201 being pesticides. We have solid evidence on Lead, Methyl mercury, PCBs, Arsenic and Toluene. We are concerned about Manganese and pesticides. It is important to note that pesticides which are toxic to insect nervous systems, are also toxic to those of humans.

What we see is a world-wide silent pandemic. Perhaps as many as one out of six children's brain development have been adversely affected, in part by neurotoxins, as shown by our article in the Lancet in November 2006. Testing for neurotoxins is a necessity, in pesticides as well as in other consumer products.

The fact that we are moving into the era of the Information Society means that brains will be even more important. We need to focus more on the sensitivity of the human brain, more than on the particular chemical. We know the principles and the risks from the well documented chemicals which have caused harm - we should not do the same experiment for all the other substances. If I approached my Medical Ethics Committee, and requested to experiment with neurotoxic pesticides on pregnant women and children, they would of course refuse. They would not allow a researcher to risk the brain development of a child. However, politicians are accepting such an experiment on the entire population. Why? We should not risk the brains of our children. In vitro tests are available and ready to be used.

Professor Niels E. Skakkebaek, National Medical University, Department of Growth and Reproduction, Copenhagen, Denmark: not only the brain is important, testes are also important, and with 400% increases in testicular cancer, as we see in my country, politicians should be very worried, as the basis for testicular cancer is laid when the baby boy is in the mother's womb. This increase can only be explained by environmental causes. In Denmark, we see deteriorating reproductive health and lower fertility rates. The numbers in artificial conception are increasing. We see testosterone levels in men decreasing in all age groups. Testicular cancer is rising. Testicular cancer often has its origin in the uterus.

Testicular cancer is a whistle blower of problems with testicular development. Other male developmental disorders are testes that do not descend into the scrotum and hypospadias (a malformation of the penis).

In a Danish study, of 3000 young men from the general population, 20% have sperm levels below the WHO norms. We published an article with a comparison between the Danish and Finnish population. The research showed more abnormalities and fertility problems in Denmark, which for a large part can only be explained by higher environmental exposures to endocrine disruptors in Denmark.

Testicular development is probably programmed in the first trimester of pregnancy. Thus time of pregnancy - dependent on environmental factors - can pre-determine your likelihood to develop specific diseases. Oestrogen exposure, endocrine disruptors as well as genetic factors can play a role.

Cosmetics-phthalates do enter into the body - it's not like waxing a car, it doesn't stay on the surface. Measurements show that a morning application of body cream results in peak levels in the blood around noon. They remain in the blood until they apply a next layer the next day. In this way, pregnant women unintentionally continuously expose their unborn babies to a chemical, which in animal experiments damages testicular development. An increase in phthalate levels in the mother will decrease the testosterone levels in her son.

The last 10 years of research show an increase in testicular cancer in all countries of Europe, this is related to decreasing semen quality and increasing congenital genital malformation. Pre-natal and postnatal adult exposure to endocrine disruptors may contribute to these phenomena.

Discussion

Dorette Corbey: could contraception hormones explain the increase?

Prof. Skakkebaek: it does play a role, but it cannot explain the large increase.

Hiltrud Breyer, MEP: it is very difficult to include neurotoxins in the pesticides legislation. Bee toxicity is more easily accepted because of the economic interests. The industry claims that all insecticides will go from the market when we include neurotoxins.

Prof. Grandjean: Children should not be ingesting food containing neurotoxic pesticides. Many pesticides are made specifically to destroy insects' nervous systems. Unfortunately, humans have a biochemistry very similar to insects. This makes human brain development sensitive to the pesticides, and the consequences are serious in this age of technology, where we - and future generations - must rely on optimal brain functions. When something goes wrong in the child's brain development, it is damaged forever; you do not get a second chance to build a brain".

Bjorn Hansen of the European Commission said the current chemicals legislation does not request testing on neurotoxins, as the testing methods are not yet well developed. Which test should define the triggers for cutting of substances? The cost factor and animal welfare aspects are also important.

Professor Grandjean: the OECD has developed a test protocol for neurotoxicity during development, and there exist new cell-based laboratory tests, which no longer require live animals to be used and are less expensive.

Janna Koppe, emeritus neonatologist, explained that low vitamin K levels in unborn or newborn babies can cause life threatening bleeding of the liver and the brain. This dangerous vitamin K deficiency is induced by some medicines, but also by PCBs and brominated flame retardants such as HBCDD and the MCCP's.

Dorette Corbey said that the agricultural sector suggests that a great number of crops cannot be grown anymore without the pesticides now under debate.

Sascha Gabizon: this is difficult to believe, as alternatives exist and even the Food and Agriculture Organisation has stated that organic farming can feed the world just as well as conventional farming.

Prof Grandjean: There is a calculation on the economic losses related to brain damage, which shows that losing 1 IQ point costs 5000 euro. I wonder who would sell any IQ point for 5000 euro? You might lose 1 IQ point just from one chemical. The loss of IQ points from chemicals works against the trend of better care for pregnant women.

Sascha Gabizon showed a doll which according to the German testing organisation Ökotest contained a phthalate called Diisononylcyclohexan-1,2-dicarboxylat, whose chemical structure resembles other hormone disrupting chemicals. She said: if I understand the professors well, just by touching this doll, phthalates can enter my skin and go into the bloodstream, and can cause a deformation of the penis if I were pregnant of a boy?

Prof. Skakkebaek confirmed that by touching a toy with phthalates, some of these phthalates can enter into the mother's bloodstream through the skin. He explained: we can not prove the direct link from one specific chemical to testicular cancer, but we do have a lot of evidence that there is an association between higher levels of phthalates in the mother's breast milk and lower levels of testosterone in her baby boy. We also see an association between higher levels of brominated flame retardants in the breast milk, and undescended testes when the baby is born. We see the same association with pesticides.

Sascha Gabizon drew attention to the overview charts produced by WECF, which indicate the main chemicals of high concern, their effects, and the suggestions for EU policies². She added that it is unacceptable for parents to have to wait many years until the European Commission has agreed to require neurotoxicity testing, whereas all children born today are at risk of having retarded brain development or cancer later in life, from contaminants that their mothers are not even aware that they are being exposed to (and passing on to the child in their womb). We want European Parliamentarians to take their responsibility seriously and protect our children now, by making sure neurotoxins and endocrine disruptors are not allowed to be in children's food, toys and body-care products.

In regard to banning chemicals, **Professor Grandjean** recommended to add the E of Endocrine Disrupting, and the N of Neurotoxic to the CMR of Carcinogenic, Mutagenic and Reprotoxic, CMREN. They should all be substituted - especially in a product like cosmetics, there should be no need for any neurotoxins. Cosmetics are supposed to make you pretty, not stupid.

Prof. Skakkebaek: do not forget that there is always more than one exposure at a time – mixtures can have an impact even if the individual chemicals do not have an effect. This cocktail effect is difficult to test, but should be taken into account.

Dorette Corbey reiterated that the danger of chemicals in products we use on a daily basis is a difficult message to bring across. It involves habits of consumers. Politically, this is a very difficult message. How do you tell parents that the toys their children are playing with may potentially damage their health? Or women about the danger of their body lotion they put on every day? We don't want to scare people.

Prof. Skakkebaek: We don't want to scare normal people, but we want to scare you as politicians.

Sascha Gabizon referred to an amendment proposed by MEP Jacques Toubon, to allow high levels of mercury in toys, allowing exposure standards for mercury up to 2 mg per kilogram of bodyweight of a child per day.

Prof Grandjean: it is completely incomprehensible that any government would allow such high levels of mercury in toys, knowing the health effects of mercury. Currently many countries, in cooperation with the United Nations, are trying to get a total ban of mercury use worldwide. For mercury and lead the effects on brain damage and other health effects are proven, with almost 60 years of research behind us. We know that manganese has similar health effects as lead – a French study has shown a link between manganese in cord-blood of new born babies and delayed brain development. This is why it seems unbelievable that some new EU member states want to add manganese to petrol, a proposal currently debated in the European Parliament

Dorette Corbey concluded the meeting and thanked the participants, and the professors in particular, for providing helpful information and having called on the MEPs to take responsible decisions to better protect Europe's children, including "CMREN". She said the European Commission should include testing of neurotoxins into the chemicals legislation and asked for appropriate testing methods to be developed. As for pesticides, she argued that the voice of the agro-industry should be heard too, as it is linked to the security of our food. The use of pesticides should, however, be constrained to clear rules, which are currently being laid out in European legislation. Neurotoxicity should be part of this too.

² This information is included in the background paper "Safeguarding future generations: Developmental harm of children caused by exposure to hazardous chemicals in daily life"