

NRP Endocrine Disruptors

Final Summary

Original project title Human exposure to endocrine disruptors and effective tissue levels of UV filters in experimental animals
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Cosmetics and UV filters among endocrine active chemicals in human milk

In a chemical-analytical study on human milk conducted in collaboration with the University Hospital Basel, UV filters were detected in 76.5% of milk samples together with a broad range of additional contaminants including other cosmetic constituents. UV filter exposure patterns varied in relation to individual use of cosmetics.

Research questions

Having identified several UV filters as endocrine active chemicals (EDCs) and found that 4-methylbenzylidene camphor (4-MBC) and 3-benzylidene camphor exhibited developmental toxicity, this project was designed to answer the following questions:

1. Are UV filters present in human milk, which provides information on exposure of infant and fetus?
2. How do levels of UV filters in human milk relate to levels in rat milk at dosages causing adverse effects?
3. How do they relate to other EDCs present in human milk? Is it possible to diminish exposure to EDCs originating from cosmetic products?

Results

4. As there existed no data on internal exposure of human populations to UV filters, we started a human breast milk study at the University Hospital Basel with 13 mother/infant pairs in 2004, 21 in 2005 and 20 in 2006. In the questionnaire, mothers were asked to give detailed information on their use of personal care products in addition to general epidemiological information. UV filters were detected in 76.5% of human milk samples which corresponded to reported use of products containing UV filters by 78.8% of the women. Exposure patterns varied between individuals and correlated with use patterns. The filters were pre-

sent at relevant levels as part of a broad range of additional contaminants including other cosmetic constituents.

5. Milk collected directly from lactating rats is not yet analyzed, but preliminary data from two collaborating laboratories on rat milk in stomach of neonate suckling rats indicate that at the lowest observed adverse effect level (LOAEL) dose of 4-MBC (7mg/kg), the 4-MBC level in rat milk is 255.3ng/g fat. The highest level so far analyzed in human milk was 19ng/g fat. The ratio of levels in rat milk at LOAEL and in human milk was only 13.4 times, i.e., below a minimal safety factor of 100.

Perspectives

1. Exposure of humans to UV filters and other cosmetic constituents deserves attention with regard to their reprotoxic potential and the increase of general load of EDCs.
2. The study illustrates the need for analyses of new groups of chemicals in addition to classical contaminants. Human monitoring studies should be repeated at regular intervals in order to assess the actual contaminant situation.
3. According to our data, proper information of the consumer should allow to reduce exposure to UV filters during critical life periods.