Connection between 'chalky teeth' in children and the uptake of Bisphenol A not likely

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Depending on symptomatic and phenotypic severity the condition of chalky teeth is categorised into three levels. The symptoms of chalky teeth were first described in 1978, with the term molar-incisor hypomineralisation (MIH) introduced in 2001. The condition is the consequence of a deline-ated defect in tooth enamel development which affects at least one of the permanent back teeth (molars) and, under certain circumstances, will also comprise the incisors. According to recent media coverage such tooth defects are claimed to be attributable to the uptake of Bisphenol A (BPA).

Amongst a wide range of various products BPA can also occur in food contact materials. Its use in the manufacture of baby bottles has been banned since 2011. Reports of a possible connection between MIH and BPA-exposure are based on a study by Jedeon et al. (2013) which examined the connection between BPA exposure and mineralisation defects of tooth enamel in rats. In subsequent publications the authors reported that the mineralisation dis-turbances occurred mainly in male (up to 71%) and less frequently in female rats (only up to 31%) (Jedeon et al., 2016a; Jedeon et al., 2014), and identified selected hormone-controlled signalling pathway as potential molecular targets (Houari et al., 2016).

The German Federal Institute for Risk Assessment (BfR) has evaluated the study (Jedeon et al., 2013) and concludes that there is currently no scientific reason to assume a connection between the uptake of BPA the occurrence of MIH in children. According to recent data from the

Netherlands, oral uptake of BPA in highly-exposed children amounts to 0.14 micrograms (µg) per kilogram (kg) body weight and day. This is is 35 times lower than the dose used by Jedeon et al. (2013). In conjunction with the different toxicokinetic behaviour of BPA in hu-mans a direct connection between BPA and MIH therefore appears unlikely in humans under conditions of expectable real-life exposure.

It should be noted that the study of Jedeon et al. is subject to several limitations, which limit its transferability. The examination in 2013 was conducted exclusively on male rats with only one dose of BPA being used. Later studies showed that the respective findings were considerably weaker or non-existent in females (Jedeon et al., 2014). It also appears that missing effects on day 100 of postnatal development were not put sufficiently into context. The findings of other groups from multigenerational studies on rats and mice, some of which used very high BPA doses with no reported tooth damage, were not taken into consideration.

The condition of MIH occurs in Europe with a frequency of 3-22 %, with a worldwide occurrence of 2-40 % (Elhennawy et al., 2017). Various reasons are assumed to contribute to this occurrence. Epidemiological studies point for example to maternal diseases during the last quarter of pregnancy, complications during birth or frequent illness in the first year of the born child (possibly also connected too high fever). Other reasons discussed are low blood levels of vitamin D as well as early intake of the antibiotic amoxicilli. Other studies report on a possible connection between MIH and increased exposure to dioxin, for under 5-year olds with high serum levels of tetrachlorodibenzo dioxin (TCDD) in Seveso later showed an in-creased prevalence of MIH.

Altogether it appears that MIH is caused by a variety of factors and thus has to be considered a multifactorial condition (Schneider and Silva, 2018).

More information: A-Z Index "Bisphenol A": www.bfr.bund.de/en/a-z_index/b … phenol_a-129760.html

BfR FAQs of 12 October 2017 on bisphenol A in consumer products: www.bfr.bund.de/en/faqs_on_bis … _products-60837.html

BfR Communication of 19 February 2015 "No health risk for consumers through Bisphenol A exposure - the BfR endorses the conclusion of the new EFSA assessment": www.bfr.bund.de/cm/349/no-heal … -efsa-assessment.pdf

Provided by BfR Federal Institute for Risk Assessment

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