



Mercury as a possible link between maternal obesity and autism spectrum disorder



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ABSTRACT

The incidence of both obesity and autism spectrum disorders (ASD) has dramatically increased during the last decades. Moreover, the most recent studies have revealed increased risk of ASD in offspring of overweight and obese women. However, the mechanisms of association between ASD and maternal obesity are unknown. Taking into account the existing data indicating the association between mercury (Hg) exposure and development of obesity and ASD, we hypothesize that Hg may serve as an additional link between maternal obesity and ASD. In particular, it is supposed that obesity is associated with excessive accumulation of Hg in the maternal organism. After conception, the fetus is developing in the conditions of Hg overload within the body of obese women thus predisposing to the development of ASD. The proposed hypothesis may be confirmed by the existing data. In particular, previous studies demonstrated that overweight and obese persons are characterized by a significantly higher level of Hg in hair, blood and urine than the lean ones. Therefore, an obese organism is characterized by elevated Hg burden that may be transferred to the fetus during pregnancy. Moreover, multiple studies have demonstrated a tight association between maternal and children Hg status being indicative of placental transfer of metal from maternal organism to offspring. Finally, a growing body of data indicates the influence of Hg exposure and Hg status on the risk of ASD in children. However, additional experimental and clinical studies are required to prove the hypothesis and provide novel data on the role of Hg in maternal obesity-associated ASD development. In particular, the contribution of Hg to ASD development in children from obese mothers should be determined. If a significant role of Hg in maternal obesity ASD risk will be confirmed, this will open additional perspectives of risk modification. Taking into account the universal mechanisms of Hg toxicity, transport, and accumulation, further preventive actions may be undertaken to reduce the risk of Hg toxicity and Hg-associated ASD development. In particular, it is supposed that the use of Hg chelators (like N,N'-bis-(2-mercaptoethyl)isophthalamide, NMBI), antioxidants, and anti-inflammatory compounds prior or during pregnancy may have a beneficial effect. However, the safety of such actions should repeatedly be tested to avoid adverse health effects in a developing fetus.

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Hypothesis

We hypothesize that Hg may serve as an additional link between maternal obesity and ASD. In particular, it is supposed that obesity is associated with excessive accumulation of Hg in

the maternal organism. After conception, the fetus is developing in the conditions of Hg overload within the body of obese women thus predisposing to the development of ASD.

Review of evidential support

Obesity epidemiology

Obesity is a metabolic disorder considered to be a worldwide epidemic [1]. It has reached epidemic proportions in developed

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