



Multiple toxic heavy metals and neonatal neurobehavior in China require considering co-exposure to Thimerosal-ethylmercury and adjuvant-aluminum

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The excellent study by Yu et al. (2011) is among the few that have examined the effects of mixed metal exposures in human infants. Two of Yu et al.'s objectives were "to determine the concentrations of key toxic heavy metals in umbilical cord blood and the corresponding effects on neurobehavioral development," and "to identify risk factors for prenatal toxic metal exposure." It is therefore crucial that we discuss all neurotoxic metals that infants are exposed to in utero as well as neonatally.

Yu et al. (2011) used a questionnaire to determine the fetus' potential exposure to toxic metals, including housing environment, parent's diet, smoking habits, and alcohol consumption. They paid particular attention to the amount and type of fish consumed by the mother. Nevertheless, there was no investigation into a prevalent source of organic mercury exposure in China – ethylmercury (EtHg) from Thimerosal-containing vaccines (TCV). To guarantee that the neurologic outcome data are validly associated with the neurologic insults, all neurotoxicants – including TCVs – must be considered.

In China, almost all neonates are given a dose of hepatitis-B vaccine within 24 h after birth. These TCVs may contain 7.5 to 17 µg ethylmercury (Gao et al., 2008); these vaccines are also adjuvanted with Al salts, which pose an additional load of another neurotoxic metal (Dórea and Marques, 2010). Pichichero et al. (2008) reported that 12 h after administration of such vaccines in newborn infants, there is a rise in blood Hg concentrations above the safe values of 5 ng/mL. Additionally, it is not uncommon for the vaccinated infant to develop fever and/or anorectic responses as a reaction to the immunologic stimuli of vaccination. For example, immediately after hepatitis B vaccination, Eales (2003) described behavioral changes in infants as "irritable and disinclined to feed." Additionally,

there is enough experimental evidence (Dórea, 2011) and observational studies (Dórea, 2010) to base a reasonable concern that Thimerosal and Al (Tomljenovic and Shaw, 2011) in vaccines can affect young (susceptible) children.

So far, studies examining the possible untoward effects of ethylmercury or aluminum (from TCVs) have only modeled a single exposure (Dórea, 2010, 2011). The effects of both Hg and Al in vaccines need to be sufficiently studied to demonstrate that the combination of the two metals cause no harm. Improving our understanding of maternal/infant exposure to a combination of environmental and iatrogenic chemicals and its association with neurodevelopment is even more essential. As shown by Yu et al. (2011), it is axiomatic that early life exposure to toxic metals will lead to important neuronal insults. The regulation of TCVs in young children must then be based on evidence, and studies like Yu et al. (2011) carry the potential to address such issues.

Conflict of interest statement

Nothing declared.

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